REQUEST FOR PROPOSAL

(Division 1 and Technical Requirements)

Volume 2 of 2

Amendment 003: August 15, 2011

Building Addition – B273
Child Development Center (CDC)

Detroit Arsenal, Warren, Michigan

Prepared for:

US Army Corps of Engineers

Louisville District
Louisville, Kentucky

Contract Number: **W912HN-07-D-0024**
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See back of page for Security Statement and Conditions for Release

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1.0 PROJECT OBJECTIVES

1.0.1 The project objective is to design and construct facilities for the military that are consistent with the design and construction practices used for civilian sector projects that perform similar functions to the military projects. For example, a Company Operations Facility has the similar function as an office/warehouse in the civilian sector; therefore the design and construction practices for a company operations facility should be consistent with the design and construction of an office/warehouse building.

Comparison of Military Facilities to Civilian Facilities

Military Facility	Civilian Facility
Child Development Center	Daycare

1.0.2 It is the Army's objective that these buildings will have a 50 year useful life. The design and construction should provide an appropriate level of quality to ensure the continued use of the facility over that time period with the application of reasonable preventive maintenance and repairs that would be industry-acceptable to a major civilian sector project OWNER. The facility design should consider that the Army may repurpose the use of the facility over the 50 year life. The Army's intent is to install products and materials of good quality that meet industry standard average life that corresponds with the period of performance expected before a major renovation or repurpose. The design should be flexible and adaptable to possible future uses different than the current to the extent practical while still meeting the operational and functional requirements defined within. Flexibility is achieved through design of more flexible structural load-bearing wall and column system arrangements. The site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles. Develop the project site for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

1.0.3 Requirements stated in this contract are minimums. Innovative, creative, and life cycle cost effective solutions, which meet or exceed these requirements are encouraged. Further, the OFFEROR is encouraged to seek solutions that will expedite construction (panelization, pre-engineered, etc.) and shorten the schedule. **The intent of the Government is to emphasize the placement of funds into functional/operational requirements. Materials and methods should reflect this by choosing the most economical Type of Construction allowed by code for this occupancy/project allowing the funding to be reflected in the quality of interior/exterior finishes and systems selected.**

1.1. SECTION ORGANIZATION

This Section is organized under 6 major “paragraphs”.

(1) Paragraph 1 is intended to define the project objectives and to provide a comparison between the military facility(ies) and comparable “civilian” type buildings.

(2) Paragraph 2 describes the scope of the project.

(3) Paragraph 3 provides the functional, operational and facility specific design criteria for the specific facility type(s) included in this contract or task order.

(4) Paragraph 4 lists applicable industry and government design criteria, generally applicable to all facility types, unless otherwise indicated in the Section. It is not intended to be all-inclusive. Other industry and government standards may also be used, where necessary to produce professional designs, unless they conflict with those listed.

(5) Paragraph 5 contains Army Standard Design Criteria, generally applicable to all facility types, unless otherwise indicated in the Section.

(6) Paragraph 6 contains installation and project specific criteria supplementing the other 5 paragraphs.

2.0 SCOPE

2.1 PROJECT SUMMARY

This project shall provide an addition to the existing Child Development Center (CDC) at Detroit Arsenal and shall include all building and site features as identified herein for a complete operational facility. The CDC is intended for children ages 6 weeks through 5 years. Two existing building additions are included. The main facility addition will include new activity areas for infants, toddlers and kindergarten age children. The second addition will include a new dry storage area off the existing kitchen. This project will include new exterior playground areas and all necessary site improvements and utility connections. A bid option will include additional spaces including a new administrative area, a new staff lounge area, and ancillary spaces in addition to the new activity areas.

This “Design Build” construction project shall include design and construction services as a logical extension of the concept building addition drawings included within this section in Attachment F – Conceptual Floor Plans, concept site drawings included in Appendix J – Drawings, and the technical specifications included in Appendix AA – Concept Technical Specifications. These documents are considered partially complete. The Design Build Contractor shall complete the architectural and engineering design in compliance with these concept documents and the other requirements within this RFP.

The design development of indoor and outdoor activity spaces shall complement and support the programmatic objectives and provide a safe, secure and age appropriate environment. The selection of materials and equipment to be used in the new additions shall comply with the requirements defined herein but shall also be complimentary and compatible with the materials and equipment associated with the existing CDC. The facility is intended to allow staff visual control of their spaces to aid them in facilitating programming, supervising the children, and supervising activities. The facility shall be child-friendly, designed to manage risk to the children, be easily adaptable for staff, and require relatively low maintenance.

This project includes all related site-work and utilities (electrical, water, gas, sanitary sewer, and information systems distribution), lighting, parking, curb and gutter, sidewalks, fencing, storm drainage, landscaping, and other site improvements. Playground shall include age appropriate play equipment, safety fill material, fall zones, borders, trike paths and evacuation sidewalks. This project also includes connection to the energy monitoring and control systems, fire detection and reporting systems, sprinklers, surveillance, and electronic access control systems. Special construction includes sustainable construction features complying with Leadership in Energy and Environmental Design (LEED) Silver certification. Access for persons with disabilities will be provided. Comprehensive interior design and audio visual design services are included.

The maximum gross square footage (GSF) for the CDC Building Additions shall not exceed 8,365 square feet. The Base Bid concept scheme includes approximately 7,524 gross building square footage. An optional bid scheme shall be priced that includes approximately 8,341 gross building square footage.

2.2. SITE:

Provide all site improvements necessary to support the new building facilities. Refer to Paragraph 6.

Approximate area available 1.50 acres

2.3. GOVERNMENT-FURNISHED GOVERNMENT-INSTALLED EQUIPMENT (GFGI)

Coordinate with Government on GFGI item requirements and provide suitable structural support, brackets for projectors/VCRs/TVs, all utility connections and space with required clearances for all GFGI items. Fire extinguishers are GF/GI personal property, while fire extinguisher brackets and cabinets are Contractor furnished and installed CF/CI. All Computers and related hardware, copiers, faxes, printers, video projectors, VCRs and TVs are GFGI.

The following are also GFGI items: Security Cameras (CCTV)

2.4. FURNITURE REQUIREMENTS

Provide furniture design for all spaces listed in Chapter 3 and including any existing furniture and equipment to be re-used. Coordinate with the user to define requirements for furniture systems, movable furniture, storage systems, equipment, any existing items to be reused, etc. Early coordination of furniture design is required for a complete and usable facility.

The procurement and installation of furniture is NOT included in this contract. Furniture will be provided and installed under a separate furniture vendor/installer contract. The general contractor shall accommodate that effort with allowance for entry of the furniture vendor/installer onto this project site at the appropriate time to permit completion of the furniture installation for a complete and usable facility to coincide with the Beneficial Occupancy Date (BOD) of this project. The furniture vendor/installer contract will include all electrical pre-wiring and the whips for final connection to the building electrical systems however; the general contractor shall make the final connections to the building electrical systems under this contract. Furthermore, the general contractor shall provide all Information/Technology (IT) wiring (i.e. LAN, phone, etc.) up to and including the face plate of all freestanding and/or systems furniture desk tops as applicable, the services to install the cable and face plates in the furniture, the coordination with the furniture vendor/installer to accomplish the installation at the appropriate time, and all the final IT connections to the building systems under this contract.

The Government reserves the right to change the method for procurement of and installation of furniture to Contractor Furnished/Contractor Installed (CF/CI). CF/CI furniture will require competitive open market procurement by the Contractor using the Furniture, Fixtures and Equipment (FF&E) package.

2.5. NOT USED

3.0 CHILD DEVELOPMENT CENTER

3.1. GENERAL INFORMATION

The design must comply with the Army Standards for the facility type as applicable to the project scope (building addition in lieu of new construction). Army Standard for Child Development Centers (CDC) for children 6 weeks-5 years is provided in Attachment A.

The design must comply with the US Army Corps of Engineers “Standard Design Criteria Child Development Centers for Children Ages 6 Weeks to 5 Years” as applicable to the project scope (building addition in lieu of new construction). The standard is provided in Attachment B.

The design shall comply with the requirements of a “Small” standard design CDC, unless noted otherwise.

3.1.1. MANDATORY REQUIREMENTS

The conceptual floor plan for the project facility type and size has been approved by the Government and shall be considered prescriptive. The conceptual floor plan is provided in Attachment F and should be considered partially complete. The Design Build Contractor shall complete the architectural and engineering design as a logical extension of these concept documents and in compliance with the other requirements within this RFP. Antiterrorism/force protection measures shall be included in accordance with Unified Facilities Criteria (UFC) 4-010-01, DOD Minimum Anti-Terrorism Standards for Buildings dated 8 October 2003 and updates as applicable. Sustainable engineering principles shall be integrated into the design, development, and construction of the project in accordance with the EPAct2005, EISA 2007 and Executive Order 13423. This project will comply with U.S. Army Corps of Engineer's Technical Instructions 800-01; Detroit Arsenal Architectural Compatibility Plan; International Building Code; NFPA 101, Life Safety Code; Unified Facility Code 3-600-01, Design: Fire Protection for Facilities; and U.S. Army's Military Construction Transformation/MILCON Business Process principles.

3.1.2. OTHER REQUIREMENTS

(a) UFC 1-200-1, Design: General Building Requirements

(b) Louisville District Design Guide (LDDG) Available at: http://www.lrl.usace.army.mil/ed2/

3.1.3. BETTERMENTS

(a) Heat Generation: For additional comfort in the infant and pre-toddler activity rooms, utilize radiant floor heating as a primary or supplemental heating source.

3.1.4. NON-AUTHORIZED BUILDING FEATURES

The following features are not authorized or in this Child Development Center:

(a) Draperies

(b) Lead-based paint is forbidden throughout (lead-based paint is defined as any paint containing more than six one-hundredths of 1 per centum (0.06 percent) lead by weight (calculated as lead metal) in total nonvolatile content of the paint, or the equivalent measure of lead in the dried film of paint already applied).

(c) Materials containing asbestos are forbidden throughout.

(d) Special decorative materials, such as pictorial or high-relief tiles and carpets, are forbidden throughout.

3.1.5. COORDINATION

Coordination at all stages of design development of CDC new construction projects is required with the Installation DPW (facilities engineer), IMCOM Center of Expertise, Region Child & Youth Services Program Manager Development Services (CDS CYS) Coordinator, the installation Child & Youth Services coordinator; and Family and Morale, Welfare and Recreation Command (FMWRC).

3.1.5.1. GOVERNMENT OCCUPANCY DURING CONSTRUCTION

The Government will occupy site areas and existing building during the entire construction period. Cooperate with the Government during construction operations to minimize conflicts and facilitate ongoing Government usage. Perform the Work so as not to interfere with The Government's continued operations. Limit construction noise Monday-Friday between 12 noon and 2:00pm (scheduled nap time for the children).

Keep driveways and entrances serving premises clear and available to The Government, Government's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize use of driveways and entrances and avoid peak drop-off/pick-up times.

Existing building mechanical and electrical equipment including telecommunications, security and CCTV shall be fully operational during the construction periods. Maintain utilities to the existing child development center (CDC) during the construction period and schedule shutdowns with the User.

Where existing building exits are closed off for construction operations, make appropriate alterations to the existing building so that it can be operated in a safe and approved manner for life safety.

The Government has identified alternative means of egress for existing building exits that will be impacted by this project. Coordinate with the Government to maintain these alternative exits free and clear during construction.

3.1.5.2. USE OF EXISTING BUILDING

Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect existing building and its occupants during construction period.

Smoking is not permitted in or around the existing Child Development Center or new construction areas.

3.1.5.3. WORKING DAYS

Coordinate any potential impact with the Government due to Federal holidays, closings or special events.

The CDC is closed on the following days:

(a) All Federal Holidays

(b) November 25, 2011

The CDC has activities planned which may impact the normal operational schedule as follows.

(a) September 7, 2011 - “Back to School Night”

(b) October 27, 2011 - “Fall Fest”

(c) November 17, 2011 - “Lunch with Your Child”

(d) December 1, 2011 - “Holiday Extravaganza”

(e) January to March 2012 - Basketball, Saturdays 9:00 am - 1:00 pm

(f) February 17, 2012 - Training Day (No Children)

(g) May 4, 2012 - Provider Appreciation Day (No Children)

(h) June to August 2012 - School Summer Camp

3.1.5.4. WORKING HOURS

The existing CDC will be fully operational during the construction of the building addition. Construction activity shall not have a negative impact to adjacent building operations. Government operations will not shut down during normal Government employee working hours of 5:30 am to 6:00 pm Monday through Friday, except Holidays and for special events identified in other sections of this RFP. Work outside of normal working hours will be permitted for the Design-Build Contractor to maintain construction schedule and for circumstances when off-hour construction is desirable such as when interruption of government services/utilities would otherwise be required. The Design-Build Contractor must comply with City Ordinances for noise and appropriate notification of the Installation must be made. The Installation will have the authority to disallow certain after-hours work when it adversely effects Installation operation.

Pending Government coordination, work shall be limited to non-disruptive construction activities between the hours of 12:00 pm and 2:00 pm Monday-Friday. This time is set aside as “nap time” for the children and construction activities which may disturb the children will not be allowed.

Between 7:00 am - 9:00 am and 3:30 pm - 5:30 pm are peak parent drop-off/pick-up times where the parking lot and front entrance experience heavy usage. Coordinate activities to minimize disruption to these areas.

Periodic coordination meetings will be held between the Contractor, COR, CDC Staff, DPW and other parties to coordinate potential impacts of work on CDC operations.

3.1.5.5. EXISTING WARRANTIES

Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. If possible, it is suggested that the original Installer or fabricator be retained to cut and patch the work that is damaged during selective demolition. If it is impossible to engage original Installer or fabricator, it is suggested that another experienced and specialized firm be engaged.

3.1.5.6. TEMPORARY ENCLOSURES

Provide temporary enclosures for the protection of the existing building, its occupants, and new construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.

Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

Erect and maintain dustproof partitions, weatherproof and fire resistant temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

3.1.5.7. TEMPORARY FENCE

Provide plywood or OSB fence, 6 feet high, framed with four 2x4 rails, with preservative-treated wood posts spaced not more than 8 feet apart shall be constructed between the existing Child Development Center (CDC) and the proposed addition as shown in Appendix J Drawings. Fence shall be designed for weather resistance and durability.

3.1.5.8. CUTTING AND PATCHING

Schedule any cutting and patching operations with the User. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay. Cut existing construction to

provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition. Use methods least likely to damage elements retained or adjoining construction. Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Provide materials and comply with installation requirements specified in other Sections of this RFP. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3.1.5.9. CLEANING

Clean existing building areas of dust, dirt, and debris caused by selective demolition, cutting and patching operations. Return adjacent areas to condition existing before selective demolition operations began. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3.2. FUNCTIONAL AND OPERATIONAL REQUIREMENTS

The design must comply with the functional layouts and arrangements shown in the drawings. Room types, sizes and configurations, ceiling heights, and finishes are mandatory as denoted in the concept designs and as applicable in Attachment B Design Criteria For Child Development Centers (For Children 6 Weeks – 5 Years). Any construction details, wall sections, and building elevations are purely illustrative.

3.2.1. SITE PLANNING AND DESIGN

The conceptual site plan for the project has been approved by the Government and shall be considered prescriptive. The conceptual site documents are provided in Appendix J and should be considered partially complete. The Design Build Contractor shall complete the engineering design as a logical extension of these concept documents and in compliance with the other requirements within this RFP.

3.2.1.1. Facility Type Specific Site Planning and Design Criteria

ASTM F 1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use

ASTM F 1918 Standard Safety Performance Specification for Soft Contained Play Equipment

ASTM F 1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

ASTM F 2223 Standard Guide for ASTM Standards on Playground Surfacing

ASTM F 2373 Standard Consumer Safety Performance Specification for Public Use Playground Equipment for Children 6 Months through 23 Months

CPSC Pub No 325 (1997) Handbook for Public Playground Safety

NFPA 1 Uniform Fire Code

3.2.1.2. Circulation and Parking

Site circulation, parking areas and entrance drives have been laid out to meet the safety requirements for children. The following were important considerations in the site layout and shall be utilized in its further development: Provide separation of vehicular and pedestrian circulation. Minimize pedestrian crossing of traffic lanes. It is highly desirable that after parking, users do not have to cross a traffic lane to enter the building. If the crossing of a traffic lane cannot be avoided, a crosswalk must be provided. In addition, other devices to slow traffic, such as speed humps, should be provided for traffic approaching the crosswalk. The entrance drives and parking area shall comply with NFPA 1 and UFC 3-600-01 to allow fire truck access. Arrange all parking in accordance with UFC 4-010-01.

No stained or acid etched concrete is allowed.

3.2.1.3. Outdoor Play Area

Refer to Attachments B and F for additional requirements.

(a) Minimum requirements for Infant Playground

- Play Structure with minimum of (2) play panels
- Crawler
- Fun Center Structure
- Tot Tree or playhouse
- 2 seat full bucket arch swing, 7'H crossbar, minimum 3.5" dia beams and legs
- 5' trike path, resilient play surfacing in the center of trike paths for play structures
- (1) building or building façade
- (2) different type traffic signs
- Minimum 20' x 20' waterproof shade structure to cover fun center and tot tree
- Additional shade structure to cover crawler
- Light color resilient surfacing
- Minimum 50' depth of playground from face of building

(b) Minimum requirements for Preschool/Pre-K Playground

- Three slides
- Challenging climber
- Tunnel
- (3) Play panel minimum
- (4) platforms (minimum)
- Highest platform @ 48" max
- Must accommodate a minimum of 20 children at a time
- (4) seat (belts) arch swing, 7'H crossbar, minimum 3.5" dia beams and legs
- 5' trike path, resilient play surfacing in the center of trike paths for play structures
- (4) different buildings (facades) and 3 different type traffic signs
- Minimum 15' x 15' x 8' waterproof shade structure
- Additional shade structure to cover play structure
- Light colored resilient surfacing
- Minimum 50' depth of playground from face of building

(c) The playground design shall be reviewed by the garrison CYS staff and requires approval by the FMWRC Center of Expertise (CX).

(d) Playground installation shall be in accordance with the Consumer Products Safety Commission (CPSC) and all applicable ASTM standards. Provide written documentation that the playground meets these standards and has been inspected by an independent Certified Playground Safety Inspector prior to the facility being turned over to the Government. Send a copy of the documentation of the installation and inspection to the FMWRC CX and provide the original documents to the garrison CYS staff.

(e) Poisonous plants, plants with thorns and fruit bearing plants are not permitted in the outdoor play or activity areas. Evaluate shrubs, bushes, trees, flowers, etc. used around the outdoor activity and play areas for potential hazard or toxicity using Peterson's Field Guide to Venomous Animals and Poisonous Plants for guidance.

(f) The Government will relocate the existing playground equipment that will interfere with construction. The Contractor shall coordinate relocation with the Government and protect existing building construction, playground equipment and surfacing from damage.

3.2.2. UTILITIES

Above ground utilities and equipment shall be made inaccessible to children. To meet child safety requirements concerning entrapment and fall attenuation, it is recommended that storm drainage inlets, utility clean outs, valve covers, and manhole covers be located outside the children's outdoor play area. Under no circumstances are the utilities to be sited within the fall zones of play equipment. In the event utilities must be located within the outdoor play area, the surface openings should be less than 5/16 inch to prevent finger entrapment in accordance with USCPSC guidelines and ASTM F 1487 Standard Consumer Safety Performance Specifications for Playground Equipment for Public Use.

3.2.3. ARCHITECTURE AND INTERIOR DESIGN

3.2.3.1. Building Exterior

The exterior architectural image and selection of material shall comply with all requirements herein and be complementary and compatible with the existing CDC facility.

3.2.3.1.1. Exterior Doors

Provide exterior windows and doors as described in Attachment B Design Criteria For Child Development Centers (For Children 6 Weeks – 5 Years) and that are in compliance with UFC 4-010-01. All exit door hardware shall be located 44 inches above the finished floor.

3.2.3.1.2. Exterior Windows

Provide exterior windows and doors as described in Attachment B Design Criteria For Child Development Centers (For Children 6 Weeks – 5 Years) and that are in compliance with UFC 4-010-01. Furnish exterior windows with color coordinated horizontal blinds, which are operable by cord or hardware that can be adjusted in length to be out of the reach of children and shall be strangle-proof.

3.2.3.2. Building Interior

3.2.3.2.1. Space Configuration

The functional relationships of spaces as shown on the drawings in the Attachments to this section are mandatory and must be followed.

3.2.3.2.2. Toilet Facilities

Central children's toilet facilities are prohibited in the 6 week to 5 year old CDC facilities. In these, toileting facilities are provided in each activity room.

Provide adult toilet facilities, separate from the children's toilets, as shown on the plans in Attachment F. (Bid Option #1)

3.2.3.2.3. Interior Finishes

No stained or acid etched concrete is allowed. Interior finish materials shall be as indicated in Attachment B. Provide interior colors as indicated in the color scheme provided in Attachment I of this section. Coordinate colors with Attachment I with those of the existing CDC.

3.2.3.2.4. Special Protection

Provide surface-mounted, high impact integral color rigid vinyl corner guards at all outside corners of gypsum board walls, and stainless steel corner guards at all outside corners of ceramic tile walls, especially where subject to heavy traffic. Also, consider installing chair rails in areas prone to hi-impact use, such as corridors, etc.

3.2.3.3. Comprehensive Interior Design (CID)

For CDC projects, a CID package is NOT required. The Contractor is not responsible for selecting or purchasing furniture. However, a Structural Interior Design (SID) package limited to a room finish schedule and interior and exterior color boards is required reflecting the color schemes indicated in Attachment I.

3.2.4. FIRE PROTECTION

Requirements are based on NFPA 101 Life Safety Code for New Day Care occupancy.

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3.2.4.1. Fire Detection and Alarm and Mass Notification

Provide addressable fire alarm and mass notification systems in the new addition in accordance with NFPA 72 and NFPA 101. ~~There is an~~ Extend the existing Simplex 4100U fire alarm voice evacuation system to the new addition. The existing system communicates with the base fire department via Local Area Network (LAN). The existing system utilizes Class B circuits. Portions of the existing system are not in conduit. All new circuits must be installed in conduit. Locate any new control panels in an environmentally controlled location. Contact Simplex at 248-427-5148 prior to project start. Simplex to do building alarm bypass, re-design and software, final wiring termination, and provide BaseOps with hard copy drawings of changes or additions included in this project. Existing initiating devices or notification appliances affected by the construction are to be replaced with new.

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(a) Provide smoke detectors in all environmentally conditioned spaces, including storage over 20 square feet, except for the kitchen. Also provide smoke detectors at all exterior storage rooms. No heat detectors are required in this facility.

(b) Provide manual pull stations inside the facility at each exterior exit door.

(c) Install magnetic latches to hold fire doors open in area separation wall(s) that release when the fire evacuation signal sounds.

(d) Provide audible (voice) and visual notification devices throughout the facility.

(e) Provide a Mass Notification System in accordance with UFC 4-021-01 and as directed herein. Combine fire alarm and mass notification systems where possible.

3.2.4.2. Fire Suppression Systems

Provide complete automatic sprinkler systems according to NFPA 13 Installation of Sprinkler Systems and UFC 3-600-01 Fire Protection Engineering for Facilities for all CDCs. The existing fire sprinkler system is designed based on standard NFPA 13 requirements (not the more demanding UFC 3-600-01 requirements). The addition will have to support UFC 3-600-01 requirements. Provide a new fire line into the addition. Provide a new sprinkler riser. Determine if a fire pump is required to meet the design criteria of UFC 3-600-01 and include if required. Flow test data is provided in Appendix D for bidding purposes only. Conduct a new flow test prior to hydraulic design.

3.2.4.3. Fire Extinguishers

Provide accommodations for fire extinguishers as required by NFPA 10.

3.2.5. PLUMBING

3.2.5.1. Water Temperatures

Hot water temperatures for lavatories used by both adults and children shall be 80 to 95 deg F and must not exceed 110 deg F. Hot water temperature for laundries shall be 140 deg F.

3.2.5.2. Free of Lead

Extreme care is required to ensure that potable water systems "free of lead" have been installed. A thorough pre-sterilization flushing is important for removing sediment and solder/flux trash from the potable water lines. Liquid chlorine is highly corrosive and contributes to leaching lead from brass or other lead containing metals. High chlorine levels shall not be allowed to remain in the plumbing system after the required holding period. "Lead-free" may not really mean lead free. Virtually all brass plumbing parts still legally contain 5-7% lead. Care shall be taken to install lead free potable water systems as defined by the ICC IPC.

3.2.6. HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

3.2.6.1. Temperature Control

Install thermostats 54 inches above the floor with a protective covering. Provide temperature sensors mounted within 12 inches of the finished floor. These shall also have protective coverings.

3.2.6.2. Other Special HVAC Systems and Equipment

Consider noise level, service, and efficiency when locating equipment. Do not place HVAC equipment in playground areas. Whenever possible, provide HVAC separate from the other building systems. Apart from other advantages, this will facilitate better filtration of the dust and molds that many children are particularly sensitive to. In addition to heating and cooling equipment, consider a humidifier/dehumidifier to meet required levels. Also note the following:

(f) Install air diffusers that minimize drafts on children.

(g) HVAC Systems and equipment shall meet the requirements of UFC 4-010-01. This UFC includes specific requirements for air intakes to HVAC systems and emergency air distribution shutoff for example.

(h) Provide carbon monoxide detectors as required by National Association for the Education of Young Children (NAEYC) best practices.

3.2.7. ELECTRICAL SYSTEMS

Electrical power, lighting and telecommunications shall be provided to the facility as specified below, in accordance with APPLICABLE CRITERIA, GENERAL TECHNICAL REQUIREMENTS, all IEEE Standards (including Recommended Practice) where the scope is applicable to this design effort, all UL Standards where the UL scope is applicable to this design effort, and where itemized in the combined interdisciplinary areas cited.

(a) Perform a short circuit study as an integral part of selecting and sizing electrical distribution components (all equipment shall be fully rated; that is, do not use series-combination rated equipment).

(a) Perform a coordination study to ensure that protective device settings are appropriate for the expected range of conditions (depending on the design and construction schedule, it is acceptable to design adequate protective devices with adjustable features, followed by a coordination study required during construction to specify the correct settings.)

(b) Complete point-by-point lighting calculations shall be provided for each room as well as for exterior lighting.

(c) Circuit breakers, disconnect switches, and other devices that meet the OSHA definition of energy-isolating device must be lockable.

(d) Do not exceed 5 percent combined voltage drop on feeders and branch circuits if the transformer providing service is located within the facility. If the transformer is located exterior to the facility, limit the combined voltage drop for service conductors, feeders, and branch circuits to 5 percent. Individual voltage drop on branch circuits should not exceed 3 percent. Branch circuits supplying sensitive circuits should be limited to 1 percent voltage drop.

(e) In general, to minimize sound transmission, do not install “back-to-back” outlet boxes.

(f) Locate electrical transformers and other above-ground utilities so they are outside of the fenced playground and inaccessible to children. Locate manhole covers, handhold covers outside the children’s outdoor play area.

(g) Do not install surface mounted raceways, boxes or partially-recessed enclosures in areas or passageways used by children.

(h) Locate electrical distribution equipment installed within the facility, including dry-type transformers and electrical panels, within dedicated electrical rooms/closets.

(i) Provide a minimum of 20% space in all new panelboards.

(j) Mechanical equipment shall be fed by individual start/disconnect switches mounted next to equipment.

3.2.7.1. Interior Electrical Power

(a) The building is currently fed from a 1600A 208Y/120 VAC, 3 phase, 4 wire main distribution switchboard. This switchboard contains sufficient capacity to feed the new addition.

(b) Provide new branch circuit panelboards fed from the main distribution switchboard as required located in the electrical closet of the new addition to feed all new electrical loads.

(k) Provide a dedicated electrical circuit for dry storage.

3.2.7.1.1. Receptacle Placement

In accordance with applicable codes, standards, referenced UFCs, and the attachments to this section. In general, provide wall duplex outlets, not less than 8 feet on center. Provide not less than one duplex outlet per wall on walls less than 9 feet long. Locate outlets to eliminate the need for extension cords. Above counter receptacles shall be mounted in the vertical wall space above the counter-top. Data, CATV, and CCTV outlets shall each be provided with an associated duplex receptacle. Provide the child activity areas with wall duplex outlets that are at a horizontal wall spacing of no more than 6 feet from outlet to outlet. Provide duplex outlets in Child Activity Areas for items such as a small refrigerator, AV equipment, CCTV system, telephones, and computers for staff and children. Receptacles for refrigerators are to be child-safe and mounted 18 inches above the floor in a location that will be blocked by an installed refrigerator. Coordinate the location of electrical outlets with crib location and general room arrangement.

3.2.7.1.2. Mounting Height

In accordance with applicable codes, standards, referenced UFCs, and the attachments to this section. Unless indicated otherwise, mount general use receptacles 18 inches above finished floor.

3.2.7.1.3. Tamper Resistant

Install tamper resistant electrical outlets in areas accessible to children, including corridors. Use tamper resistant/GFCI where GFCI is required by code.

3.2.7.2. Interior Lighting

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3.2.7.2.1. General Lighting

General lighting shall be in accordance with applicable codes, standards, referenced UFCs, and the attachments to this section. Lighting design shall consider ease of facility maintenance and minimize the lamp types and wattages used throughout the facility. Provide emergency lighting in all areas required by NFPA 101 and in all child care activity rooms. Whenever possible, unless otherwise noted, incorporate the emergency lighting into the normally provided lighting fixtures. All lighting ~~including~~ excluding emergency lighting shall be connected to the existing Tridium Vykon system. Illuminated exit signs shall be provided throughout the facility and all exits. Exit lights shall be red LED. Furnish fixtures in child accessible areas with shatter-proof lenses. In areas with finished ceilings, provide fluorescent lensed troffers to match existing fixtures in order to create a seamless transition between the existing facility and the new addition. Provide fluorescent industrial light fixtures in mechanical and electrical rooms. Lighting levels shall be provided in accordance with the Standard Design Criteria for Child Development Centers, UFC 4-740-14, UFC 3-530-01 and the IESNA edition handbook.

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3.2.7.2.2. Dimming and Switching

In accordance with applicable codes, standards, referenced UFCs, and the attachments to this section. Where dimmer controls are used, provide lighting fixtures that do not oscillate visibly at low intensities. Provide child activity rooms, training room, Staff Offices/Rooms, and Corridors with dimming or a multilevel switching scheme (three lamp fixtures with inboard lamp switched separately from the two outboard lamps to provide three distinct, evenly distributed lighting levels.)

3.2.8. COMMUNICATIONS

Communications design must be performed and stamped by a Registered Communications Distribution Designer (RCDD) with 2 yrs related experience. The information systems designer must prepare the test plan, and witness and certify the testing of telecommunications cabling.

3.2.8.1. Telecommunications. Telecommunications must be designed in accordance with the Technical Guide for Installation Information Infrastructure Architecture (I3A). An acceptable building telecommunications cabling system encompasses, but is not limited to, copper and fiber optic (FO) entrance cable, termination equipment, copper and fiber backbone cable, copper and/or fiber horizontal distribution cable, workstation outlets, racks, cable management, patch panels, cable tray, cable ladder, grounding, and labeling.

(a) Infrastructure. Telecommunications infrastructure shall meet the I3A and ANSI/TIA/EIA requirements. Distribution shall be via cable trays and/or EMT throughout the building. Provide a minimum 1” EMT from the outlet box to the distribution system. Terminate copper distribution cable in the Telecommunications Room on Cat 6 cabinet or rack mounted patch panels with 110-type compliant connectors on the back and 8-pin modular connecters on the front.

(b) Outlets. Provide telecommunications outlets in accordance with the I3A based on functional purpose of the various spaces within the facility as modified by user special operational requirements. Voice/data outlets shall be two 8-pin modular (RJ45 type) outlet/connector in a double gang outlet faceplate, one connector labeled voice use and one labeled data use. Copper outlet/connector must be TIA/EIA Category 6 for all projects. Install one Cat 6 UTP cable to each connector provisioned at the faceplate, wired in accordance with T568A (default configuration). Provide each utility space, such as mechanical, electrical and telecommunications rooms with at least one wall mounted, single connector telecommunications outlet, with a wall mounting lug face plate near the entrance door.

3.2.8.2. CATV. Provide a completely operational CATV cabling system including, but not limited to, all necessary raceways, cabling, terminations, jacks and faceplates. CATV riser cable shall be RG-11 type. The horizontal cable for the CATV system shall be RG-6 with "F" type connectors on the terminal end. Terminate the CATV

cabling on splitters located on the CATV backboard in the telecommunications room, or in a location indicated by the DOIM. All CATV horizontal cabling shall be homerun between CATV jacks and the CATV backboard. Coordinate service requirements to the building with the local CATV service provider. At a minimum provide one 4' empty conduit stubbed out of the building to facilitate the CATV service entrance.

3.2.8.3. Intercommunications System. Provide a complete intercom system with master station at the reception desk and slave stations in childcare, administrative areas and the entry vestibule. Slave units shall only be able to communicate with the master station.

3.2.9. ATTACHMENTS A THROUGH J

The Attachments represent the Army Standards and existing building information at the time of award. The Standards may be updated through the course of the contract. Information provided with the project task orders will take precedence.

Attachment A - Army Standard for Child Development Centers (for children 6 weeks - 5 years)

Attachment B - Design Criteria For Child Development Centers (For Children 6 Weeks – 5 Years)

Attachment C - Not Used

Attachment D - Not Used

Attachment E - Not Used

Attachment F - Conceptual Floor Plans

Attachment G - Not Used

Attachment H - Not Used

Attachment I - Army Child Development Center Primary Color Scheme

Attachment J - Existing Building Code Analysis

Attachment A

Army Standard for Child Development Centers (for children 6 weeks - 5 years)

DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON DC 20310-0600

DAIM-ZA

MAR 12 2008

MEMORANDUM FOR

Commander, US Army Corps of Engineers (CEMP), 441 G St NW, Washington, DC 20314
Installation Management Command (IMCOM), 2511 Jefferson Davis Highway, Arlington, VA 22202

SUBJECT: Army Standard for Child Development Centers

1. The enclosed Army Standard for design and construction of Child Development Centers are hereby approved for implementation. The standard applies to all Army Child Development Centers for children ages 6 weeks to 5 years of age. Child Development Centers for children ages 6-10 are addressed by a separate standard approved by the Army Facilities Standardization Committee, 19 October 2004. Only the Assistant Chief of Staff for Installation Management has authority to approve exceptions to this standard. Waivers from the Army Standard must be approved in accordance with the AR 420-1.

2. The standard is mandatory for all Child Development Center Military Construction, Army (MCA) projects FY 08 and beyond.

3. The co-chairs for the Facilities Design Team (FDT) for Child and Youth Services are Ms. Linda Harwanko, IMWR-CY, Linda.Harwanko@fmwrc.army.mil, 702-681-5384, Ms. Margaret (Peggy) Hinson, IMWR-CY, Margaret.Hinson@fmwrc.army.mil, 703-681-5399; and Mr. James T. Clark, CEHNC-ED-CS-A, James.T.Clark@hnd01.usace.army.mil, 256-895-1673.

4. The USACE Center of Standardization for Child and Youth Services is Mr. Richard Grulich, CEHNC-ED-CS-A, Richard.D.Grulich@hnd01.usace.army.mil, 256-895-1670.

ROBERT WILSON
Lieutenant General, GS
Assistant Chief of Staff
for Installation Management

Enclosure
as

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THE ARMY STANDARD FOR CHILD DEVELOPMENT CENTERS (FOR CHILDREN 6 WEEKS – 5 YEARS)

Description:

Child Development Centers are required by the Army to support readiness of families by reducing the conflict between military mission workforce requirements and parental responsibilities. There are several Military unique factors which impact on the need for child development centers to include: younger families with children away from extended families; large infant and toddler populations; variety of short and long program options needed; services required 10-12 hours a day and evenings and weekends as needed. Availability of facilities, predictability of facility layout and design, and the consistency of facility standards across the Army and the Department of Defense have contributed to the Military child development programs being the model for the nation. The Army Standards define the mandatory components, functional capabilities and relationships, and features and characteristics of the facility. The Army Standards for Child Development Centers for children 6 weeks – 5 years of age are based on Army Baseline Standards, DoD requirements for certification and the National Association for the Education of Young Children requirements for accreditation.

CATEGORY CODE	DESCRIPTION
74017	Child Development Center – Under 6 Years of Age

Facilities covered in this standard are for the child development centers for children 6 weeks – 5 years of age with the following child capabilities:

- Small 126 child capacity
- Medium 232 child capacity
- Large 338 child capacity

Applicability

- The Army Standard applies to Army facilities worldwide.
- The Army Standard is mandatory for all construction projects effective in FY08 and beyond.
- All geographic districts shall incorporate the mandatory design criteria described herein in close coordination with the USACE designated Center of Standardization (COS) for Child and Youth Services.
- All Child Development Center projects must be reviewed by the COS and IMCOM Center of Expertise to ensure conformance with the Army Standard.

Waivers:

- Only the Assistant Chief of Staff for Installation Management has authority to approve exceptions to the Army Standards.
- Waivers from the Army Standard must be requested in accordance with AR 420-1 and the Army Facilities Standardization Program Charter, latest edition.
- All waiver requests to the Army Standards require COS conflict resolution prior to submission by the Garrison Commander.
- Garrison Army Standard waiver request submissions must be received in sufficient time to allow complete review by the Facility Design Team and development of recommendations or course of action for the AFSC to consider prior to implementation into project design.
- Late submissions and/or project delays are NOT sufficient stand-alone justification for accelerated review or other dispensation for not meeting the Army Standard contained herein.

THE ARMY STANDARD FOR CHILD DEVELOPMENT CENTERS (FOR CHILDREN 6 WEEKS – 5 YEARS OF AGE)

Item	Mandatory Criteria
~~**Central Counter/Reception Desk**~~	~~Must have central counter for clerk to view/observe the flow of children, parents and visitors. Reception counter to be two tiered with no sharp edges. The lower level to be 30" above the finished floor (AFF) and the upper level at 42" AFF. Provide communication and data connectivity to include access control and central intercom system. The configuration and functional relationship between the main entry and the reception counter/desk must be maintained for access control.~~
~~**Isolation Area**~~	~~Must have a small space designated behind the reception desk to serve as a rest area for sick children. Area to be sized to accommodate a cot or crib and lockable area for storage of first aid supplies. Space is immediately adjacent to the reception area. Receptionist must be in the direct line of site of this area. Immediate access to bathroom facility must be provided for ill child. Locate a single occupant child height ADA compliant toilet (15" to the toilet rim) and sink (20" AFF) immediately adjacent to the isolation area. Self priming floor drain required to prevent sewer gases from occupying space.~~
~~**Patron/Visitor Waiting Area (Lobby)**~~	~~Must have a waiting area for parents and visitors adjacent to the central counter/reception desk. The configuration and functional relationships between the main entry, reception counter and public toilet shall be maintained since visual control of these areas is required.~~
Car Seat/Stroller Storage Area	Must provide an area for patrons to leave car seats and strollers in an area directly accessible from the corridor and waiting area. Space to include shelving for car seats and open space to park strollers.
~~**Public Toilets**~~	~~Handicapped accessible public toilet(s) for parents and visitors shall be located within view of the reception area. For medium and large facilities, a minimum of two (2) separate public toilets are required. For small facilities, one (1) unisex toilet is required.~~
Administrative Offices/Workstations (Bid Option #1)	~~At a minimum, must provide a private office for the Director and Assistant Director(s).~~ All other administrative staff to be provided with workstations. ~~The Director's office to be adjacent to the reception counter/patron waiting area and accessible to parents and visitors.~~ Provide communication and data connectivity.

Item	Mandatory Criteria
Staff Lounge (Bid Option #1)	Must be provided in all child development centers. Allow adequate space for comfortable seating along with table/chairs for 25% of the staff. Provide a solid surface counter top with integral backsplash and single compartment sink/faucet. Provide GFCI electrical outlets above the counter for microwave and other appliances. Provide space for refrigerator and vending machine along with electrical outlets and water line to support ice making capability in freezer. Full height lockers for administrative ~~and kitchen~~ staff secured to the wall are to be provided. Provide communication and data connectivity.
~~**Training Room**~~	~~Must provide a training room to include a minimum of two workstation(s) for the Training and Curriculum Specialist (TACS). Provide electrical outlets, data ports and phone lines for these workstations. Include a work counter/surface to accommodate up to three (3) computers to facilitate training/distance learning by direct care staff. Provide communication and data connectivity.~~
Staff Toilets (Bid Option #1)	~~Must provide staff toilets separate from the public toilets. One water closet for every 15 employees scheduled to be in the facility at any one time.~~ Locate staff toilets near the children's activity rooms.
Central Storage and Interior Storage Closets (Bid Option #1)	Must provide a central storage room near the administrative office and interior storage closets for storage of program materials.
Infant/Pre-Toddler/Toddler Activity Room	Must provide infant/pre-toddler/toddler activity rooms to accommodate up to 14 children at 35 sq ft of useable space per child. Space dual functions for eating and sleeping. A sign-in desk to be located immediately inside the entrance to the room. Provide communication and data connectivity and intercom phone connection. Storage for direct care staff's coats and lockable storage for personal items (e.g. handbags) above the sign-in desk is required. Built in diaper changing station with sink and a 6" lip to prevent infant from rolling off the table along with an unbreakable mirror installed along the back wall is required. Goose neck faucet and wrist blade handles required at sink. Provide an exhaust fan at each diaper changing station. Must provide a solid surface food preparation/art counter with upper and lower cabinets with 2 separate sinks. Provide space and electrical outlet for under-the-counter refrigerator. Room must have an exterior door to accommodate the evacuation of cribs. Door to open at least 110 degrees in the direction of exit travel to ease evacuation. Two (2) pediatric toilets (10" to the rim) with floor drain. Toilets are to be separated with a toilet partition. Toilets shall not be provided with automatic flush valve. Provide an exhaust vent located within the wall directly behind the toilet area Two (2) wall hung child size sinks (1'5" AFF) for hand washing must be provided. Wall hung unbreakable safety mirror to be placed

Item	Mandatory Criteria
	above each sink. Sinks to be opposite toilets. One (1) separate drinking fountain with guarded stream drinking head to be provided in each activity room – 1'5" AFF. Fourteen (14) cubbies to be provided for storage of children's belongings.
Infant Buggy Storage Area(s)	Must provide open area(s) designed for a place to store the "bye-bye" buggies for infants. Buggies are approximately 76" X 26". Storage area(s) to be in close proximity of the infant room(s). One (1) buggy for every 2 infant/pre-toddler/toddler classrooms to be provided. Each buggy storage to accommodate 2 buggies
Preschool/Pre-kindergarten/Kindergarten Activity Rooms	The preschool/pre-kindergarten/kindergarten room has space provided to accommodate up to 24 children. This activity room provides 35 square feet of useable program space per child. Activity space dual functions for eating and sleeping. A sign-in desk to be located immediately inside the entrance to the room. Provide communication and data connectivity and intercom phone connection. Storage for direct care staff's coats and lockable storage for personal items (e.g. handbags) above the sign-in desk is required. Must provide a solid surface food preparation/art counter with upper and lower cabinets with 2 separate sinks. Provide space and electrical outlet for under-the-counter refrigerator. Two (2) pediatric toilets (13" to the rim) with floor drain to be provided. Toilets shall not be provided with automatic flush valve. Child toilet area for this age group must meet ADA requirement. Provide an exhaust vent located within the wall directly behind the toilet area. Two (2) wall hung child size sinks (1'8" AFF) for hand washing must be provided opposite the toilet stalls. Wall hung unbreakable safety mirror to be placed above each sink. Access area to be plumed in for hot/cold water in half wall opposite children's sinks for potential future need of diaper changing table (e.g. special needs children). Cover with access panel. One (1) separate drinking fountain with guarded stream drinking head to be provided in each activity room – 1'8" AFF. Twenty four (24) cubbies to be provided for the Preschool/Pre-Kindergarten/Kindergarten Room. Provide for two (2) additional electrical outlets to accommodate children's computer workstations in each activity room. Each activity room will have a direct exit to the outdoors for play and emergency exit. Doors will swing in the direction of exit travel.

Item	Mandatory Criteria
~~**Active Play Room**~~	~~An indoor play area for children to utilize during inclement weather/temperature extremes. Space is sized for up to 24 children at a minimum of 45 sq. ft. per child. Provide for a seamless, flexible, shock absorbing flooring that can withstand trikes, skates, ball play, etc. Cased opening with area for pediatric toilet (13" to the rim) with toilet partition and sink (1'8" AFF) off the active play room. Direct access to storage for supplies and equipment needed in this space. Exit door to swing in the direction of exit travel.~~
~~**Outreach/Transition Care Room**~~	~~Accommodates children on a short term occasional basis such as for Family Readiness Groups (FRG), Deployment Support, Reunion Care, Respite Care, in-processing of soldiers, etc. Room size/mandatory features are the same as the Preschool/Pre-Kindergarten/ Kindergarten activity room. Diaper changing station to be installed in this room. Toilets are sized 10" and 13" to the rim; sinks are sized 1'5" and 1'8" AFF to accommodate the varying ages of children Infants-Kindergarten.~~
~~**Commercial Grade Kitchen**~~	~~Must provide a commercial grade kitchen. Locate the kitchen on an exterior wall adjacent to the service area with a direct service entrance. Kitchen door to swing out into the corridor for easy exit with food. Door to be provided with locking mechanism. Exterior door from the kitchen leading to the service entrance shall be equipped with an air curtain.~~ ~~Kitchen must include a dry storage area with shelving.~~ ~~Provide communication and data connectivity and intercom phone connection to support communication with the front desk and placing food orders on-line.~~
Janitorial Closet (Bid Option #1)	A janitorial closet is required and equipped with a low mop sink, a place to store janitor's equipment and cleaning supplies, and a rack to promote hanging/air drying of mops. Door must have a locking mechanism and be designed to swing out into the corridor 180 degrees to prevent impeding on emergency egress.
~~**Laundry Room**~~	~~Must provide separate space for heavy duty commercial laundry equipment - washer(s) and dryer(s). Allocation is as follows:~~ ~~* Small CDC – 2 washers and 2 dryers~~ ~~* Medium and Large CDC – 3 washers and 3 dryers~~ ~~Dryer vent shall be individually and directly vented directly to the outside. Laundry room to be secured with locking mechanism. Locate laundry room on an exterior wall to allow for horizontal venting of the dryers. Provide for a laundry tub and self priming floor drain to prevent sewer gases from filtering into the facility. Provide counter for folding clothes with upper and lower cabinets for storage of laundry materials.~~
Vision Panels	All doors, except adult toilets, must have a vision panel. Vision panels in doors to be a minimum of half-height glass and shall be provided with a12" wide side-lite. Vision panels must also be provided in corridor walls and shall extend from normal 6'8" – 7'-0" height to 54 "above the finished floor. Vision panels are integral to

Item	Mandatory Criteria
	visual monitoring and provide an additional risk prevention measure. Tempered glass shall be utilized.
View Windows	View windows are required to provide children the opportunity to look out of or into the activity room. View window shall extend from normal 6'8" -7'0" height to within 18" or 24" above the finished floor. Safety glass shall be provided as required. All doors into activity room shall be provided with a 12" wide side lite (safety glass). Side lites shall extend the height of the door.
Exterior Windows	Exterior windows shall meet the UFC 4-010-01 requirements for ATFP. Windows to open from top only. Individual windows shall be single hung with only the top portion operable. All windows to be screened. Windows to be low enough to enable children to look outside (18"-20" AFF). Window stools to be flush with the walls and/or radiused so there are no sharp edges.
Intercom System	Must have a two-way intercom system capable of allowing program staff to communicate with the main reception desk and other areas of the building. Main reception desk to have capability to contact any and all rooms with the exception of the mechanical, communication, electrical, storage, and camera equipment room. System to enable front desk staff to contact rooms individually or all rooms simultaneously via hand held handset.
Intrusion Alarm	An audible warning device shall be provided at each exterior corridor door leading to an unfenced area ~~with the exception of the main entry and kitchen~~. The audible device shall have a different sound from the fire alarm system. Alarm must be capable of being heard at the reception desk.
Video Monitoring Security System/Closed Circuit Television (CCTV)	Must have video monitoring system to deter and reduce the risk of child abuse and protect staff from unwarranted allegations of abuse. Conduits, power, and cabling are to be installed as indicated on the standard design.
~~**Camera Equipment Room**~~	~~Separate room or area will be provided store the equipment racks for the video monitoring security system. Racks are approximately 48"W x 30"D x 84" H. Special consideration for heat build up is required. Targeted temperature is 70 degrees F. Maximum temperature is 85 degrees F.~~
Playground / Outdoor Play Areas	Outdoor play areas (playgrounds) serve as extensions of classroom spaces and must be provided to support programming. Playground is divided into individual areas to accommodate the different age groups occupying the facility. Separate play areas are required for each age group of children: infant/pre-toddler; toddler; and preschool/pre-kindergarten/kindergarten. Area is capable of supporting 50% of the children at any given period of time at a minimum of 100 sq. ft. per child using the outdoor play space. Playgrounds must meet guidelines contained in the Consumer

Item	Mandatory Criteria
	Products Safety Commission (CPSC) Handbook for Public Playground Safety, the American Society for Testing Materials (ASTM) F-1487-93, and meet ADA guidelines for playgrounds (www.access-board.gov). Specific play areas shall be defined by several elements. Elements include circulation paths, open play areas/natural turf, age appropriate equipment, play structures, attenuation material for use zones, and fencing. Shade in the outdoor play areas is a requirement for certification. A playground safety surface shall be provided throughout all use zones and under all play equipment. Trike paths are a requirement and dual function as an evacuation route, as well as, a play element. Refer to ADA Guidelines for widths of pathways for egress. Outdoor Play Area must be fenced. Fencing will have gates between the play areas. Exit gate to be provided with adult controlled securing device to allow access for emergency and maintenance vehicles as well as egress from building to a safe, open area. Hose bibs, 18" above finished grade, are required in each age group play space and must be of the frost/freeze protective type with removable cut off handles with integral vacuum breakers. Poisonous plants, plants with thorns, and fruit bearing plants are not permitted in the outdoor play areas. Reference: A Field Guide to Venomous Animals and Poisonous Plants (1994) by Steven Foster and Roger Caras.
Exterior Storage Rooms	Must provide secured storage rooms to support the outdoor activity areas. Exterior storage rooms must be an integral part of the facility vs. non permanent structures around the playground.
Parking	Parking for patrons and staff is required. ~~Parking Allocation: 1 parking space per each full time staff; 1 per every 4 patrons.~~ Must provide a sidewalk that leads from the car directly to the front entry without crossing traffic lanes. Crosswalks are allowed but must be limited in their use. ~~School buses to deliver and pick up children curbside on sidewalk that leads directly into the facility.~~
Exterior Lighting	Exterior lighting systems provided for parking areas, sidewalks, service yards, service drives, building entrances and perimeter.
Vehicular Circulation/Service Road/Drives	Must provide site entrances, exits, service drives and special circulation areas sized to accommodate the largest vehicle that uses the area. Service road/drive must be provided on the side of the building adjacent to the mechanical room, providing vehicular access to the ~~kitchen service entry~~, mechanical yard, ~~electrical room and storage room.~~ All vehicular pathways must be kept away from children and pedestrian pathways and outdoor play areas.

Item	Mandatory Criteria
~~**Controlled Entry Access**~~	~~A buzzer security system, with manual override, must be installed to facilitate entry into the facility.~~
~~**Communication Room**~~	~~Provide separate room for communication sized to meet the minimum DOIM requirement for electrical boxes and connections.~~
CATV (Cable Television)	Provide empty boxes and conduits for 1 CATV in the staff lounge.
HVAC	HVAC units will provide heating and air conditioning for the entire facility excluding the Mechanical and Electrical Rooms which require only heating. Each child activity room will have a separate HVAC zone with a wall mounted tamperproof space thermostat with night and weekend set-back to accommodate variations in temperatures.
Mechanical /Electrical Room	Mechanical room to open directly to the exterior of the building with no access to the interior space or direct access to the playground. Mechanical yard must be located away from the playground area for safety, noise, and environmental considerations.
Energy Policy Act 2005 (EPACT 05) and Executive Order 13423 (E.O. 13423)	Child Development Centers shall be designed in compliance with statutory requirements for federal facilities IAW EPACT 05 and E.O. 13423.
Sustainability	Child Development Centers shall be designed to meet current sustainable development and design policy requirements as established by the Department of the Army.

GUIDANCE

Facility Capacity - Capacity could vary depending on installation requirements. Activity rooms allow for flexibility in programming and use.

Facility Site – The Child Development Center (CDC) will be evaluated for security requirements in accordance with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, latest edition.

Grading – The site will be graded to drain away from the new structure to existing drainage ditches or storm drain systems.

~~Utilities – All utilities, except storm water, will be routed from the new structure underground to the existing source.~~

Landscaping – Irrigation of turf and significant landscaping may be required in geographical areas which are arid. Landscaping is an important tool in the implementation of Force Protection measures. Landscaped earth berms shall be used to provide an attractive natural barrier. Shrubs, bushes, trees, flowers, etc. used around the CDC and outdoor activity area shall be evaluated for potential hazard or toxicity. No toxic chemicals or herbicides shall be used to clear the site of ~~unwanted~~ irrigation.

Interior Color Scheme – Standardized interior color schemes have been developed for the Garrison to select from.

Casework – Provide for solid surfacing counter tops and high quality cabinets. Millwork is required as shown in the Standard Design. The construction of the millwork is up to the contractor, with the exception that a solid surface countertop (or better) must be provided. Materials other than solid surfacing would need IMCOM Center of Expertise approval.

Safety Features – All corners on millwork, cabinets, etc. below 48" need to be radiused so as to prevent injury to young children. Wall corners need either to be radiused or provided with cover guards to create the same safety feature. All doors accessible to children, (e.g. activity rooms, storage closets, storage rooms, outdoor storage areas) must have finger guards to prevent injury.

Interior Windows - All interior windows in the children's activity rooms shall be tempered safety glass.

Central and Interior Storage Closets - Shelving to be finished with an appropriate durable finish that renders them smooth and easily cleanable. Storage room will be provided with a ceiling mounted automatic motion light switch and globe light. The interior of the closet to be marked with a red line 1" in width located 18" below the lowest point of the sprinkler head to prevent staff from stacking materials and supplies too close to the sprinkler heads. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked.

Children's Activity Rooms –

- Diaper Changing Station - diaper changing station to be 35 ¾" H X 601/2" W X 24" D, with storage for 14.underneath storage trays to be integral to the diaper changing table. Retractable stairs that lock into place required. An exhaust fan at each diaper changing station to be provided exhausting 100-150 feet per minute (fpm).
- Toilet Partitions – toilet partitions to be no higher than 42" tall with a 12" clear opening at the bottom.
- Food preparation/art counter - The 8' counter to have an integral backsplash with 2 separate stainless steel sinks and GFCI electrical outlets above backsplash.
- Exterior Doors – to have a 34"clear minimum width opening to allow for emergency crib evacuation with low threshold.
- All counter tops will have rounded/radius corners and edges.

- Pediatric toilets – Vent to exhaust 100-150 feet per minute (fpm).
- Cubbies - to be pre-manufactured and will feature a top and bottom space for hats, mittens, shoes and boots and hanging space for jackets and other personal belongings.

~~Kitchen - The all stainless steel kitchen equipment must meet the National Sanitation Foundation standards of practice. All equipment must be designed and installed IAW TB Med 530, Food Service Sanitation. Equipment that is hard wired or connected to a utility is MCA funded.~~

Floor Drains – All toilet and wet areas to include janitor ~~and laundry~~ rooms ~~and multiple locations in the kitchen~~ must have floor drains.

Playgrounds:

- The safety surface will be unitary or poured in place material. The swing fall attenuation material will be engineered wood fiber, with approved rubber matting at foot contact point underneath the swings. Beneath the infant swings, a unitary safety surface will be used.
- All fencing must be vinyl coated chain-link security type minimum 4' high at the perimeter and 4' high to sub-divide play areas by age group.

Exterior Storage Room - Provide a pair of 3 ft x 7 ft doors, with each leaf provided with a minimum of half-height glass panels. No astragals shall be provided. Instead, top and bottom flush bolts are to be provided. Adequate weather stripping shall be provided to prevent access by vermin.

Life Safety - The building fire protection systems, shall be designed in accordance with the applicable standards contained in the Unified Facilities Criteria (UFC) 3-600-01, Fire Protection Engineering for Facilities, TI 800-01, and National Fire Protection Association (NFPA) 101, Life Safety Code. A complete automatic sprinkler system shall be provided in accordance with UFC 3-600-01 and NFPA 13. The fire alarm system shall be designed in accordance with NFPA 72, which will provide pull stations at each exterior exit door, textual (voice) audible and visual (strobes) notification devices and smoke detectors throughout the child development center. Placement of the enunciator panel is a local fire department call. If there is no preferred location, then the panel shall be placed in the entrance of the facility. Where possible the Mass Notification System (UFC 4-021-01) shall be integrated with the fire alarm system.

Electrical Outlets – In all child activity rooms/child accessible areas and the waiting area, all electrical outlets shall be mounted 54 inches above the finished floor, and must be Hospital grade, tamper resistant safety type.

Video Monitoring Security System/Closed Circuit Television (CCTV) - AR 415-15 - Appendix L, Information Systems Support is the source of Army policy for funding of video monitoring equipment. MILCON/MCA dollars are to be used for cabling and fittings, connectors, terminal strips, and similar devices needed to install the cable up to the outlet device plate. Operating Maintenance Army (OMA) dollars are used to purchase and install monitors, cameras, parent viewing monitors, operating consoles, etc. for the video surveillance system. The equipment, external to the outlets, is considered personal property.

Accessibility – The CDC shall be designed in compliance with the Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities and meet both adult and child requirements.

~~Signage – The facility shall be identified as a "Child Development Center". The installation/garrison or community name or geographic location of the facility may be used for public identification purposes. The facility signage is to be in accordance with AR 608-10 and the Installation Design Guide.~~

Antiterrorism/Force Protection – The most current guidance (UFC 4-010-01, Force Protection) must be incorporated into the site layout and standard design using. A Mass Notification System shall also be provided using UFC 4-021-01, Design, and Operation & Maintenance for Mass Notification Systems. To

protect the facility and its occupants, consider a natural approach without degrading the visual surroundings as a method of protection.

UFC 4-740-14, Design: Child Development Center – The Unified Facilities Criteria for Child Development Centers was based on the Army's Standards and the Army Standard Designs and adapted by the other Services. The Army contributed program, design, and construction experience to define the criteria in this document. The Army will use the Department of the Army Standard Design and Army-approved standards for all CDC construction program for children 6 weeks – 5 years of age.

MINIMUM ROOM FINISH SCHEDULE REQUIREMENTS (FOR CHILDREN 6 WEEKS – 5 YEARS OF AGE)

SPACE	FLOOR	WALL	BASE (*)	CEILING (**)
ADMINISTRATION				
~~ENTRY~~	VCT	EPGB		ACT, PDT
~~WAITING AREA~~	VCT	EPGB		ACT
~~RECEPTION/CENTRAL COUNTER~~	VCT	EPGB		ACT, PDT
~~PRIVATE OFFICES~~	VCT	PTD		ACT
OPEN OFFICE	VCT	PTD		ACT
~~ISOLATION ROOM~~	SV	EPGB		ACT
~~ISOLATION TOILET~~	CT	CT		ACT
STAFF SUPPORT				
STAFF LOUNGE	VCT	EPGB		ACT
~~TRAINING ROOM~~	VCT	EPGB		ACT
~~PUBLIC TOILETS~~	CT	CT		ACT
ADULT TOILETS	CT	CT to 48" AFF/ EPGB above 48"		ACT
SUPPORT AREAS				
~~LAUNDRY~~	VCT	CT		VACT
JANITOR	QT	CT		VACT
CORRIDORS	VCT	EPGB		ACT
MECHANICAL	SC	PTD		PTD
~~COMMUNICATIONS~~	SC	PTD		PTD
ELECTRICAL	SC	PTD		PTD
~~KITCHEN~~	QT	CT to 48" AFF/ EPGB above 48"		VACT
CHILD ACTIVITY ROOM				
CHILD ACTIVITY ROOMS	SV	EPGB		ACT
CHILD TOILET AREAS	CT	CT/EPGB		ACT

LEGEND:
SV – SEAMLESS VINYL FLOORING
CT – CERAMIC TILE
QT – QUARRY TILE
VCT – VINYL COMPOSITION TILE
SC – SEALED CONCRETE
PTD – PAINTED GYPSUM WALLBOARD
EPGB – EPOXY PAINTED GYPBOARD
VACT – VINYL FACED ACOUSTICAL CEILING TILE (MOISTURE RESISTANT)
ACT – ACOUSTICAL CEILING TILE

* **Base**: Will be appropriate to the flooring. Base to be sealed with USDA approved caulk (Edible)
** **Ceiling**: 2 ft X 2 ft ACT, VACT

TOILET ACCESSORY SCHEDULE
FOR
CHILD DEVELOPMENT CENTER

FIXTURE TYPE	ADULT TOILETS	ACTIVITY ROOM CHILD TOILETS	ACTIVITY ROOM LAVATORIES (sinks)	DIAPERING STATIONS	FOOD PREPARATION	~~ISOLATION TOILET~~
Mirror+	X		X			
Paper Towel Dispenser*	X		X	X	X	X
Trash Receptacle (user provided)	X		X	X	X	X
Soap Dispenser*	X		User provide store purchase pump soap	User provide store purchase pump soap	X	X
Coat Hook	X					
Toilet Tissue Dispenser*	X	X				X
Handicap Grab Bars	X					X child height ADA

*Soap, toilet paper and paper towel dispensers – coordinate with the garrison/installation and provide in accordance with the service contract. Store-bought soap in pump bottles to be used in child activity rooms.

+Mirrors above children's sinks must be unbreakable

Attachment B

Design Criteria For Child Development Centers (For Children 6 Weeks – 5 Years)

US Army Corps of Engineers
Engineering and Support Center, Huntsville

STANDARD DESIGN CRITERIA
CHILD DEVELOPMENT CENTERS
FOR CHILDREN AGES 6 WEEKS – 5 YEARS

SMALL	126 CAPACITY
MEDIUM	232 CAPACITY
LARGE	338 CAPACITY

ROOM BY ROOM DESCRIPTIONS

September 15, 2010

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

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Child Development Centers
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General Requirements:

- The Child Development Center shall have a residential scale and feeling, but shall be of commercial construction standards.
- All 0-5 CDC facilities shall be protected by an automatic fire suppression system and full detection system to include closets and all conditioned spaces except the kitchen.
- A recycling room may be included in the facility. However, the space must be taken entirely from the Mechanical Room as there is no extra space elsewhere. This room shall open into the corridor and be provided with a door with a half height window.
- Unless noted otherwise in this document, all ceiling heights shall be a nominal 8'-0". Furr-down over the Central Counter may be lower than 8'-0", but no less than 7'-0".
- All exterior doors from the facility shall not have a step in order to allow movement of evacuation cribs in the case of an emergency. The exterior pathways from activity room and corridor doors shall meet ADA requirements and be appropriate for crib evacuation.
- Any Activity Room with a Diaper Changing Station shall have an exterior door hold-open device as part of the self closing device.
- Impermeable wall finishes, such as vinyl wall covering, are not acceptable.
- Corner guards are to be provided on all outside corners of interior walls.
- Radius corners shall be provided on all millwork up to 48" AFF. The intent is to eliminate all sharp corners.
- Unless noted otherwise, interior walls between rooms shall be provided with acoustical batt insulation, or other approved system, to obtain an STC rating of at least 40. Unless noted otherwise, ceiling CAC ratings shall be a minimum of 38.
- Where exterior windows are provided the following requirements shall be met. Shall comply with ATFP requirements. Salient characteristics include easy to clean and able to withstand continuous use. Individual windows shall be single hung, with only the top portion operable; bottom sash shall be fixed. Insect screens shall be provided. Secure insect screens with interior metal clips to preclude children from removing the clips. Windows shall comply with the Army Standard. A minimum of 2 exterior windows shall be provided in each activity room.
- Safety glass shall be provided with a manufacturer's label indicating that the glass is safety glass.
- Refer to the Army Standard for additional information on View Windows and Vision Panels. View Windows extend from 18"-24" above the floor to the height of the top of the door. Vision Panels extend from 54" above the floor to the height of the top of the door.
- The Staff of the CDC shall have complete control of the HVAC Systems in order to be able to maintain the comfort of the children during unpredictable hours of operation.

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

- Wall mounted receptacles shall generally be mounted 18" above finished floor unless otherwise noted. Above counter receptacles shall be mounted in the vertical wall space above the counter-top unless otherwise noted.

- Lighting in the Activity Rooms shall be provided with multi-ballast fixtures to provide lighting flexibility. Lighting shall be controlled by switches located at room entrance door and at the direct exit to the outside.

- Due to child protection regulations, automatic motion light switches are allowed only in the Mechanical, Electrical, and Communication Rooms (rooms that are not accessible to users and staff of the CDC).

- Per code, emergency lighting shall be provided in the Mechanical Room.

- Provide mass notification system in accordance with UFC 4-021-01.

- Electrical circuit breaker panels may be located in the corridors if they are provided with locks.

- Where ceramic or quarry tile is provided, grout shall be non-staining and resistant to liquid absorption.

- In storage rooms where shelves are provided, interior shall be marked with a red line 1 inch in width and located 18 inches below the lowest point of the sprinkler head.

- All caulking used inside the building shall be USDA or NSF approved caulking.

- GFCI outlets shall be installed per electrical code.

- Showers and changing rooms are NOT allowed due to child abuse concerns.

- Toilet partition doors shall include latching hardware, but shall not include coat hooks.

- The maximum temperature for the hot water in child accessible areas is 110 degrees F. Water temperature in the laundry and the kitchen is required to be 140 degrees F, but the pots and pan sink and the dishwasher require 180 degrees F water.

- Automatic flushing toilets and automatic sink faucets are not allowed in child toileting areas.

- If automatic flushing toilets are used in adult toilets, the sensors must be hard wired and not battery operated.

- The child size toilets are available from only a couple of manufacturers, and are in limited stock. There is a possibility these will be a long lead item. Substitutions of larger toilets will NOT be accepted. Please take long lead times into consideration when ordering.

- ~~The building may be rotated or mirrored on the site.~~

- CORRECTIONS TO THE ARMY STANDARD:

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

The following items are clarifications or updates to the information in the Army Standard. Where there is a conflict between the information in subparagraphs through below and the Army Standard, the information below governs.

a. The finish schedule on page 10 replaces the finish schedule provided as guidance in the Army Standard.

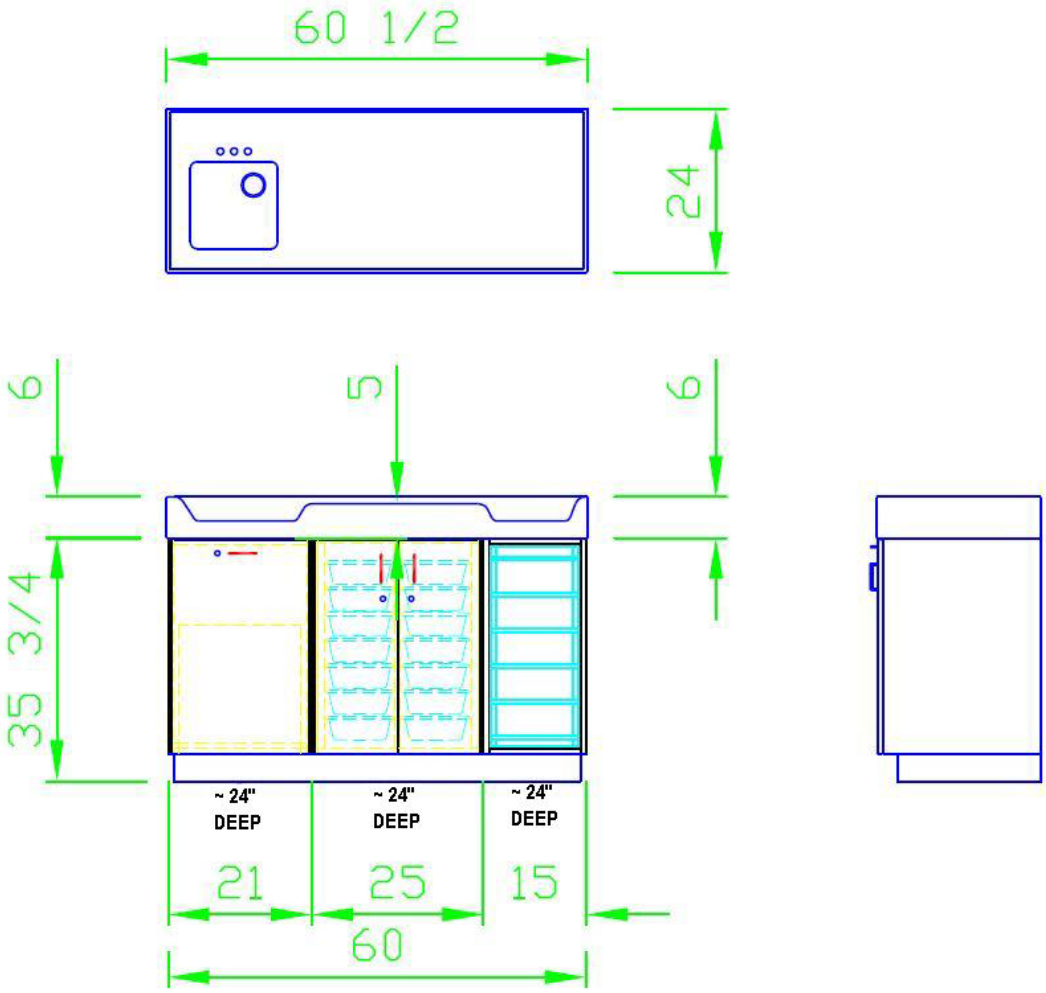
b. In the references listed in the Army Standard, replace “AR 415-5 – Appendix L” with “AR 420-1, Section VII.

c. CCTV requirements at the Control Desk (Central Counter/Reception Desk in the Army Standard) are provided in this document.

d. The requirement for automatic motion light switch in the storage rooms has been updated in this document. As stated above, automatic motion light switches are only permitted in spaces that are not accessible by CDC staff or patrons (Mechanical, Electrical, and Communication Rooms).

- The typical Diaper Changing Station is illustrated below. The diagrams and photos are not meant to illustrate a specific model or manufacturer, but instead illustrate the desired sizes and features:

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)



Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

Standard Design Criteria
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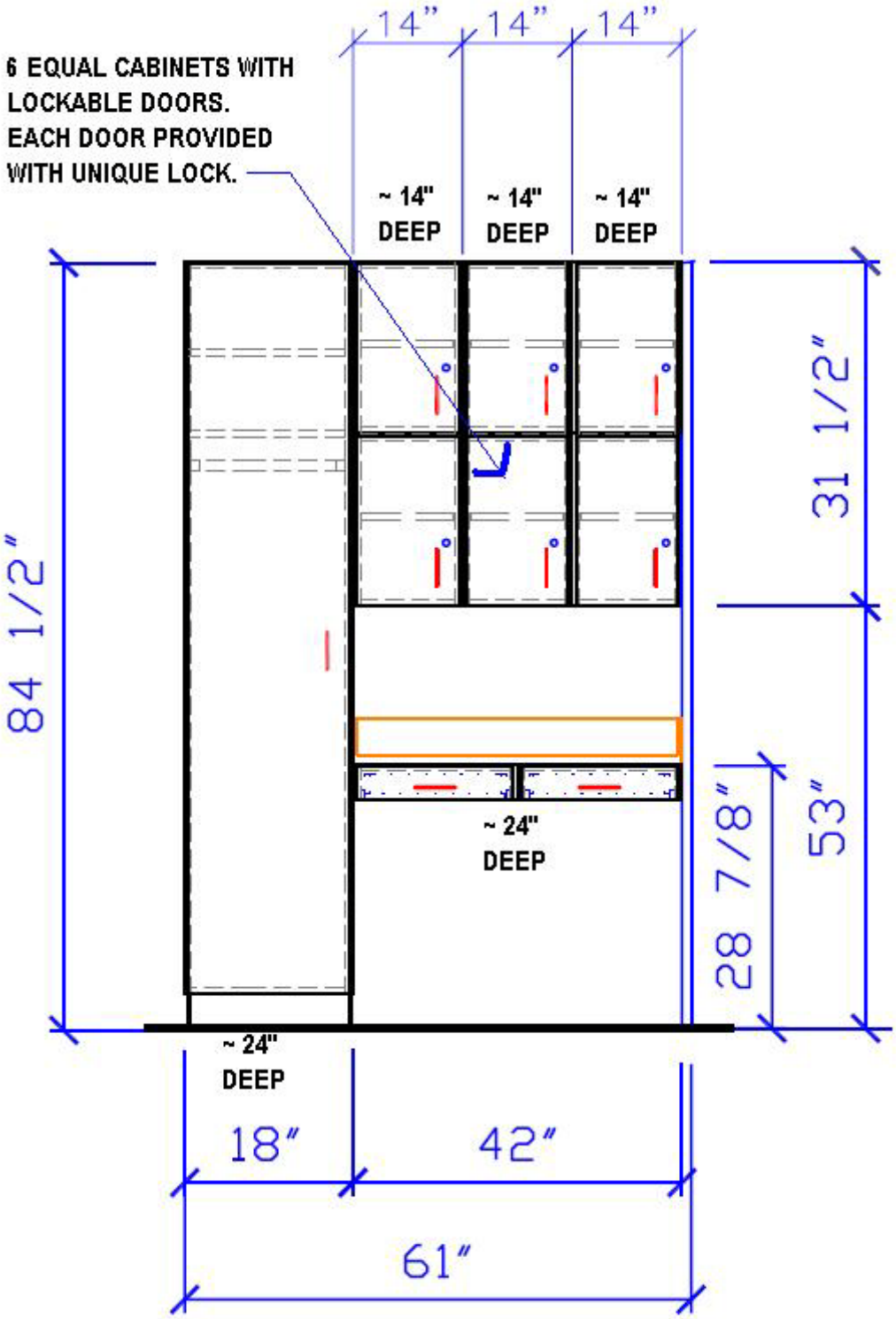
(For Children 6 Weeks – 5 Years)

- The typical Sign-in Desk in the Activity Rooms is illustrated below:



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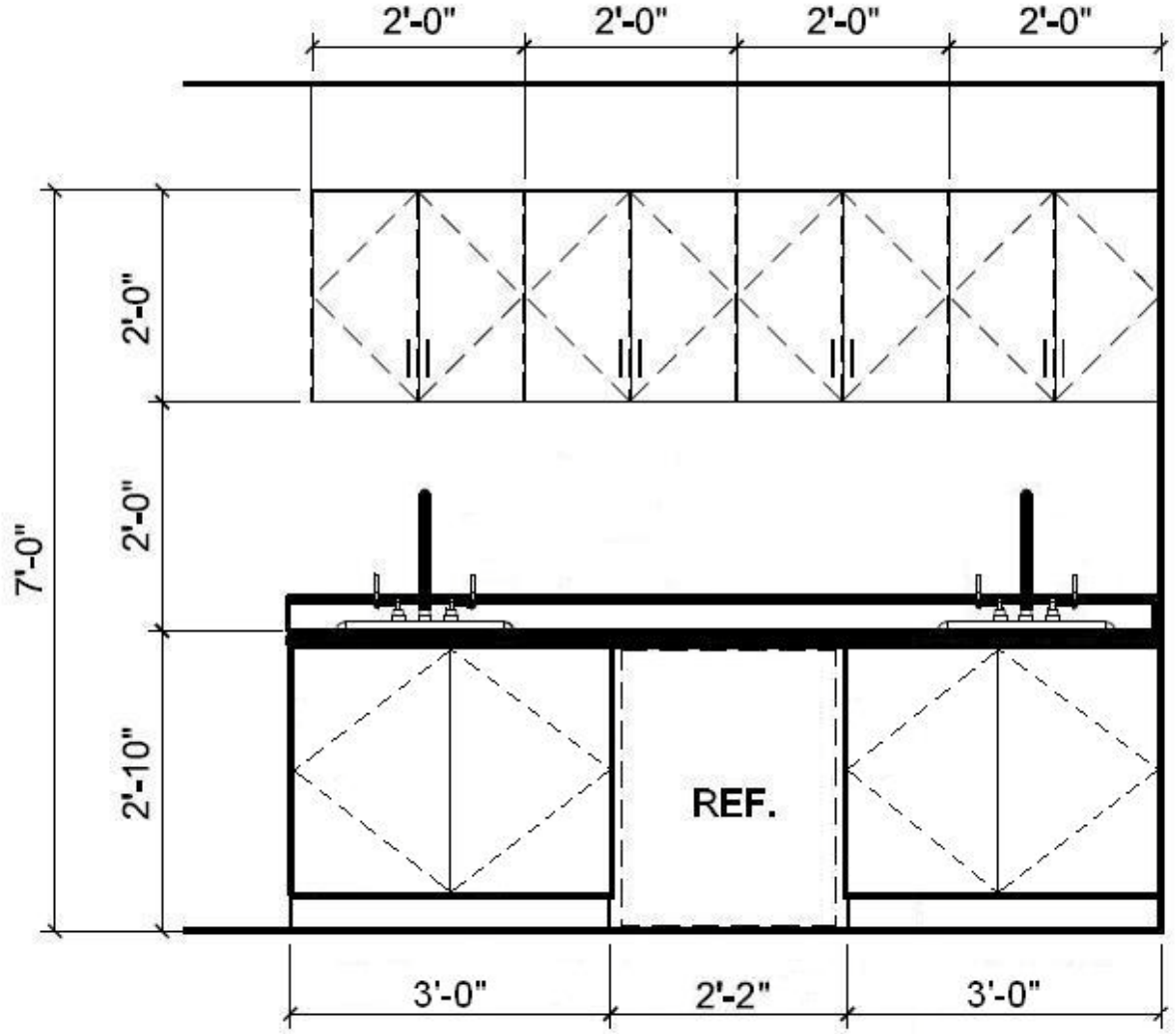
Child Development Centers
(For Children 6 Weeks – 5 Years)

- A recommended solution for the Food Prep/Arts and Crafts cabinets in the Activity Rooms is shown below:



Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

MINIMUM ROOM FINISH SCHEDULE REQUIREMENTS

SPACE	FLOOR	WALL (*)	CEILING
ADMINISTRATION			
~~ENTRY~~	~~VCT~~	~~EPGB~~	~~ACT, PTD~~
~~WAITING AREA~~	~~VCT~~	~~EPGB~~	~~ACT~~
~~RECEPTION COUNTER~~	~~VCT~~	~~EPGB~~	~~ACT, PTD~~
~~PRIVATE OFFICES~~	~~VCT~~	~~PTD~~	~~ACT~~
OPEN OFFICE	VCT	PTD	ACT
~~ISOLATION ROOM~~	~~SV~~	~~EPGB~~	~~ACT~~
~~ISOLATION TOILET~~	~~CT~~	~~CT~~	~~ACT~~
STAFF SUPPORT			
STAFF LOUNGE	VCT	EPGB	ACT
~~TRAINING ROOM~~	~~VCT~~	~~EPGB~~	~~ACT~~
~~PUBLIC TOILETS~~	~~CT~~	~~CT~~	~~ACT~~
ADULT TOILETS	CT	CT to 48” AFF/ EPGB above 48”	ACT
SUPPORT AREAS			
~~LAUNDRY~~	~~QT~~	~~EPGB~~	~~EPGB~~
JANITOR	QT	CT	VACT
CORRIDORS	VCT	EPGB	ACT
MECHANICAL	SC	PTD	PTD
~~COMMUNICATIONS~~	~~SC~~	~~PTD~~	~~PTD~~
ELECTRICAL	SC	PTD	PTD
~~KITCHEN~~	~~QT~~	~~See section 23 below~~	~~VACT~~
CHILD ACTIVITY ROOM			
CHILD ACTIVITY ROOMS	SV	EPGB	ACT
CHILD TOILET AREAS	CT	CT/EPGB	ACT

LEGEND:
SV – SEAMLESS VINYL FLOORING
CT – CERAMIC TILE
QT – QUARRY TILE
VCT – VINYL COMPOSITION TILE
CA - CARPET
SC – SEALED CONCRETE
PTD – PAINTED GYPSUM WALLBOARD
EPGB – EPOXY PAINTED GYPBOARD
VACT – VINYL FACED ACOUSTICAL CEILING TILE (MOISTURE RESISTANT) (2 ft x 2 ft)
ACT – ACOUSTICAL CEILING TILE (2 ft x 2 ft)

(*) **Base**: Will be appropriate to the flooring. Base to be sealed with USDA approved caulk (Edible)

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

TOILET ACCESSORY SCHEDULE

FIXTURE TYPE	ADULT TOILETS	ACTIVITY ROOM CHILD TOILETS	ACTIVITY ROOM LAVATORIES (sinks)	DIAPERING STATIONS	FOOD PREPARATION	~~ISOLATION TOILET~~
Mirror+	X		X			
Paper Towel Dispenser*	X		X	X	X	X
Trash Receptacle (user provided)	X		X	X	X	X
Soap Dispenser*	X		User provide store purchase pump soap	User provide store purchase pump soap	X	X
Coat Hook	X					
Toilet Tissue Dispenser*	X	X				X
Handicap Grab Bars	X					X child height ADA

* Soap, toilet paper and paper towel dispensers – coordinate with the installation and provide in accordance with the service contract. Store bought soap in pump bottles to be used in child activity rooms.

\+ Mirrors above children's sinks must be unbreakable

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~1. SPACE:~~ ~~Entry~~

- ~~**FUNCTIONAL DESCRIPTION:** Minimize mechanical air transfer of high traffic doors. Flooring serves to promote cleanliness by removing excess dirt from shoes. High traffic area for patrons with strollers, etc.~~

- ~~**ADJACENCIES:** Entry shall be on direct path from parking and drop-off areas. The entry shall have direct visual contact with the reception desk for access control.~~

- ~~**OCCUPANTS:** CDC users.~~

- ~~**MINUMUM AREA:** 75 SF, Net.~~

- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, durable (able to withstand wet and dirty conditions), easily repairable, and easy to maintain. Flooring shall be non-slip. A base material, appropriate for the flooring material used, is required.~~

- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable.~~

- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include resistance to environmental conditions, such as changes in air pressure and high humidity, and shall be durable.~~

- ~~**DOORS/FRAME:** Salient characteristics include easy to clean, ability to withstand continuous use, easy to maintain and repair, and compliance to building codes. Two sets of storefront double 3 foot by 7 foot doors, with flush panic hardware, shall be provided on the outside and inside of the entry vestibule. To ensure maximum visibility, doors shall be fully glazed. Doors shall be provided with closers.~~

- ~~**ENTRY DOOR REQUIREMENTS:**~~

  - ~~**SPECIAL HARDWARE AND ELECTRICAL REQUIREMENTS:** Provide buzzer type access system at entry including following features:~~
    1. ~~Buzzer that sounds at reception desk.~~
    2. ~~Intercom system for communication between reception desk and entry.~~
    3. ~~Electronic lock system.~~

    ~~Features of electronic lock system shall include:~~
    1. ~~Control of access into facility at reception desk.~~
    2. ~~Manual override of electronic lock by key from the outside.~~
    3. ~~Manual override to allow the doors to unlock from the interior.~~
    4. ~~Ensure the locking mechanism does not negate the use of the panic hardware during emergency evacuation. The fire department shall be provided with a key to the manual override.~~

  - ~~**AUTOMATIC DOOR OPERATION REQUIREMENT:** Provide ADA approved automatic door operators at outer and inner doors for handicapped accessibility. The automatic door operators at inner door shall be interlocked with Buzzer Access System controls.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

- ~~**SPECIAL ELECTRICAL REQUIREMENTS**: Provide a buzzer at inner set of doors that sounds at the reception desk. Provide intercom connection with Reception Desk. Provide power for lock mechanism at inner doors.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~2. SPACE: Waiting Area~~

- ~~**FUNCTIONAL DESCRIPTION:** A waiting area for parents, children, and visitors. High traffic area for patrons with strollers, etc. Provides an area for seating.~~

- ~~**ADJACENCIES:** Shall be adjacent to the central reception desk and the entry. Shall also have direct access to the public toilets.~~

- ~~**OCCUPANTS:** Parents, children, and visitors.~~

- ~~**MINIMUM AREA:** Small: 100 SF, Net. Medium: 260 SF, Net. Large: 260 SF, Net.~~

- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, durable, easily repairable, and easy to maintain. A base material, appropriate for the flooring material used, is required~~

- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall material shall have the ability to absorb pushpins. Wall surface shall be able to withstand tape peeling.~~

- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects. A "designer" ceiling system may be used in this area.~~

- ~~**PLUMBING:** Provide a total of 2 electric water coolers, one adult ADA height, and one at 20" AFF.~~

- ~~**ELECTRICAL:** Hospital grade, tamper resistant safety electrical outlets shall be placed at 18" above finished floor.~~
  ~~Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.)~~

- ~~**SPECIAL REQUIREMENTS:** A CCTV (security video) monitor shall be mounted on the wall so that it is visible from the reception desk, as shown in the Security and Monitoring Plans.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~3. SPACE: Central Counter/Reception Desk~~

- ~~**FUNCTIONAL DESCRIPTION:** The main access control point with direct visual contact with the entry, waiting area, and public toilets. This area will view/observe the flow of children, parents, and visitors. Patrons will sign in/out. Payments are received at the desk. Location of central intercom system, along with the location of the front (entry) door buzzer and electronic lock release. The central intercom system shall be able to contact each room individually, or all rooms at one time. A duress alarm shall be provided, which must alert the MP station. The desk provides direct line of sight of the isolation area and toilet. Area shall accommodate computers, printers, fax machine, copier, etc.~~

- ~~**ADJACENCIES:** Adjacent to waiting area and entry. Shall have direct visual control of the entry. Shall have direct visual and physical access to the Isolation Area and Isolation Toilet. Shall have direct, controllable access to corridor. The desk shall have visual oversight of CCTV (video security) monitor which is located in the waiting area. A general office storage room shall be accessible from this area or from the Open Office area.~~

- ~~**OCCUPANTS:** CDC Staff~~

- ~~**MINUMUM AREA:** Small: 90 SF, Net. Medium: 130 SF, Net. Large: 130 SF, Net.~~

- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, durable, and easy to maintain and repair. A base material, appropriate for the flooring material used, is required.~~

- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall surface shall have the ability to absorb pushpins and to withstand tape peeling.~~

- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects. Shall have a minimum CAC rating of 40. A "designer" ceiling system may be used in this area.~~

- ~~**DOORS/FRAME:** Salient characteristics include durability. Counter height swing gates are required. Gates to match reception desk in finish and material. Swing of gate shall not interfere with corridor traffic.~~

- ~~**CABINET CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain and repair. Cabinets shall be durable and be able to withstand impacts from carts, strollers, buggies, etc., without showing damage. Cabinets shall be a minimum of Architectural Woodworking Institute (AWI) 400B, Custom Grade. Counter tops shall be provided at both standing height and ADA height. Work surfaces behind counter tops shall be at standard working height, and shall allow for mobile pedestals to be placed under the work surface. Do not provide built-in pedestals or drawers other than pencil drawers noted below. Countertop shall be appropriate as a writing surface, and shall be solid surfacing. For safety, all edges, vertical and horizontal, shall be eased or rounded. No sharp edges may be provided. Two equally spaced grommets with covers shall be provided in each of the raised counter areas. Grommets with covers are to be provided in the lower counter area directly below the grommets in the upper counter. In addition, one grommet~~

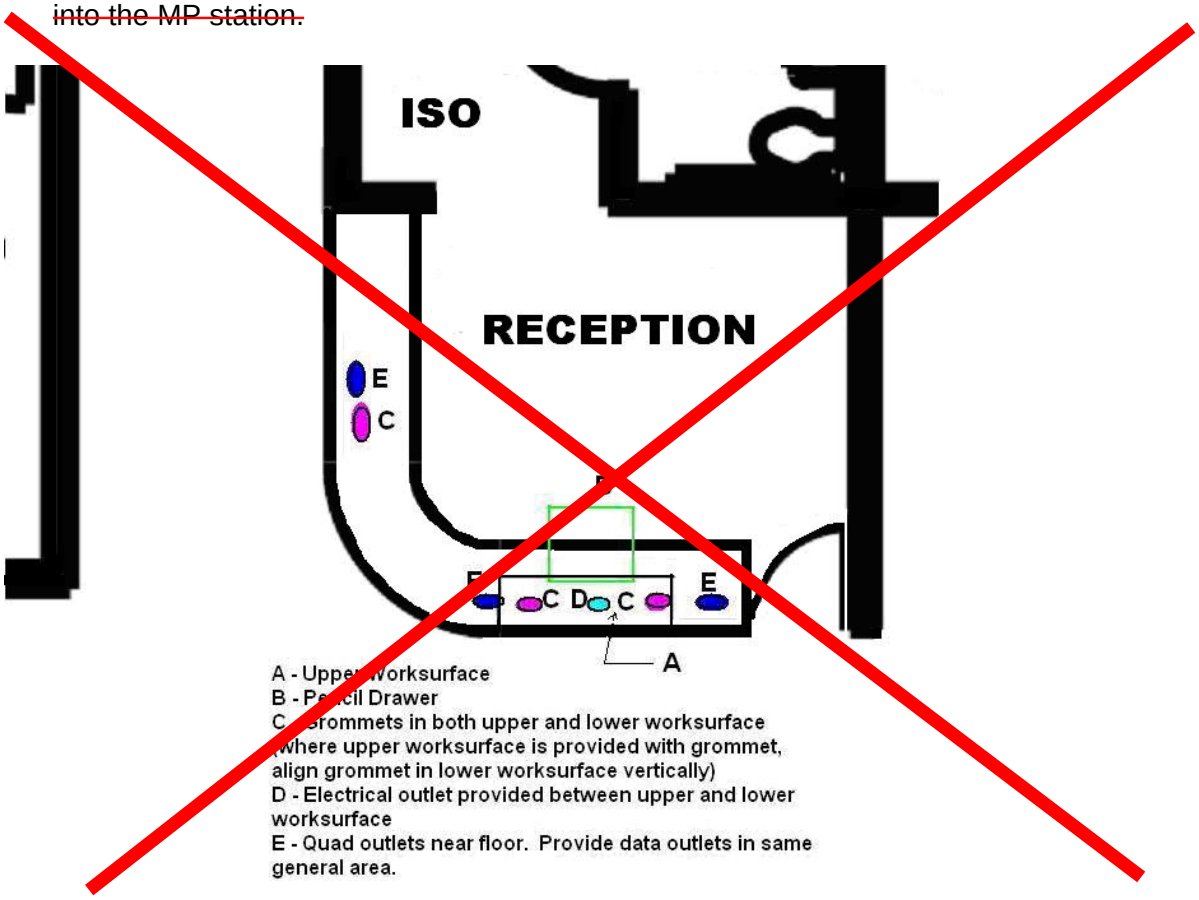
Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~with cover shall be provided in the lower counter on the side where no upper counter is provided. One pencil drawer shall be built-in in the small facility, and two pencil drawers shall be provided in the medium and large facility. Area between upper and lower work surfaces shall be closed. See drawings below for recommended outlet, grommet, pencil drawer, and standing height counter locations.~~

- ~~**ELECTRICAL:** A minimum of 3 quad outlets shall be provided in the small, 5 quad outlets in the medium and large. In addition, a duplex outlet shall be provided in each area with the raised counter for convenience. A minimum of 3 data outlets shall be provided in the small, and 5 in the medium and large. These electrical and data outlets shall be located evenly spaced along the reception counter, and are in addition to the wall outlets required by code. If outlets are provided on the wall opposite of the reception desk, in the public area, these outlets shall be hospital grade, tamper resistant, safety electrical outlets mounted 54" above finished floor.~~

  ~~Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.)~~

- ~~**SPECIAL REQUIREMENTS:** Reception desk shall be delineated through the use of special lighting and architectural features, such as furr-downs, etc. An intercom system shall be provided with the buzzer to allow communication with the entry vestibule. A duress alarm must be provided – provide conduit, cabling, electrical, and the capability to tie directly into the MP station.~~



Standard Design Criteria
Child Development Centers
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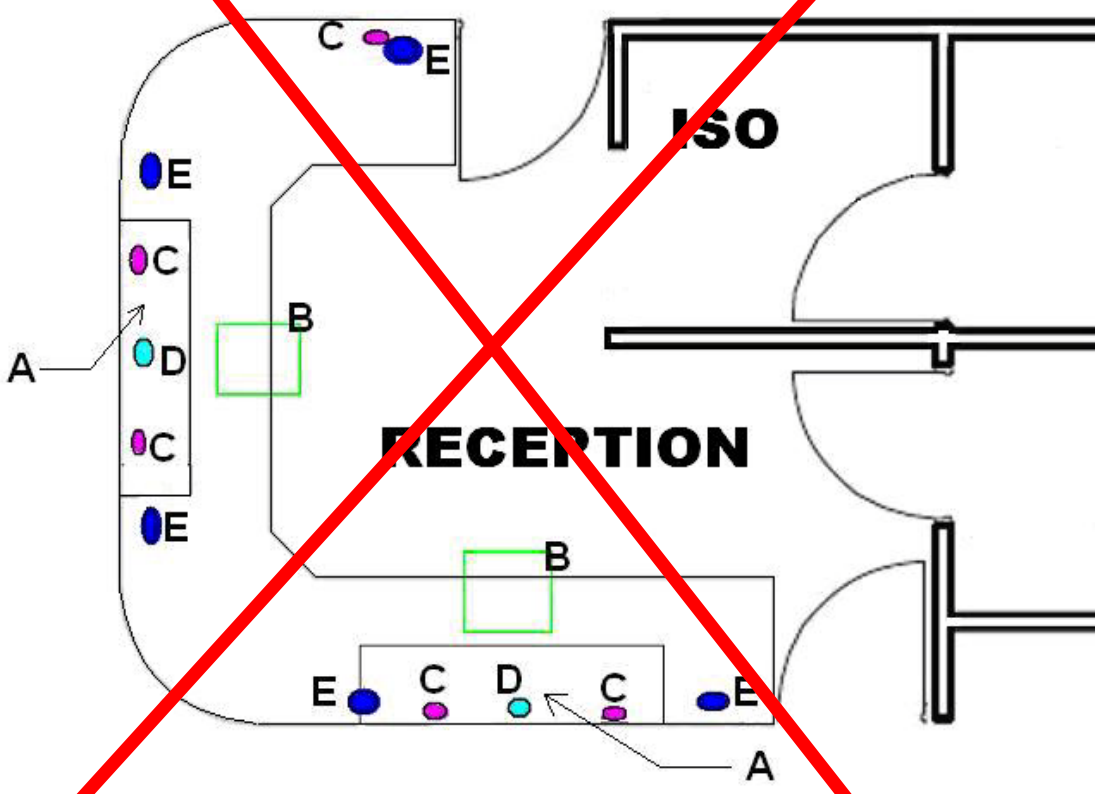
~~Recommended counter arrangement – Small facility~~

~~NOTE: Data outlets indicate both voice and data.~~

A - Upper worksurface
B - Pencil Drawer
C - Grommets in both upper and lower worksurface (where upper worksurface is provided with grommet, align grommet in lower worksurface vertically).
D - Electrical outlets provided between upper and lower worksurfaces.
E - Quad outlets near floor. Provide data outlets in same general area.



~~Recommended counter arrangement – Medium and Large facility~~

~~NOTE: Data outlets indicate both voice and data.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

4. SPACE: Admin Storage

- **FUNCTIONAL DESCRIPTION:** General storage for office supplies and other supplies.

- **ADJACENCIES:** Located adjacent to the ~~Reception Desk and/or~~ Open Office Area. Other storage rooms shall be adjacent to the areas they serve (such as Training Room, etc.)

- **OCCUPANTS:** CDC Staff

- **MINIMUM AREA:** Small: 25 SF, Net, total. ~~Medium and Large: 40 SF, Net, total~~.

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to repair, easy to maintain, and durable.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.

- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be provided with self-closing device. Doors shall be a minimum of half-height glass.

- **SPECIAL REQUIREMENTS:**
  (a) A minimum of 4 adjustable shelves with heavy duty standards and brackets will be provided. Provide shelves on as many walls of the storage rooms as possible while maintaining adequate circulation space. Shelving shall be able to support 100 pounds per lineal foot.
  (b) Space for a 1.7 – 2.0 cu. ft. refrigerator for medication, with electrical outlet, is required in the storage room closest to the isolation area. Door shall be lockable.

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~5. SPACE: Isolation Area~~

- ~~**FUNCTIONAL DESCRIPTION:** Serves as a rest area for sick children.~~
- ~~**ADJACENCIES:** Shall be adjacent to the Isolation Toilet and the Reception Desk. Shall be within direct observation of the reception area staff.~~
- ~~**OCCUPANTS:** Sick child and 1 staff.~~
- ~~**MINIMUM AREA:** 53 SF, Net.~~
- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include seamless, easy to clean and maintain. A base material, appropriate for the flooring material used, is required. Base shall be seamless except at inside corners. Base shall be sealed to floor with USDA or NSF approved caulking.~~
- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall surface shall have the ability to absorb pushpins and to withstand tape peeling.~~
- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.~~
- ~~**ELECTRICAL:** All electrical outlets shall be mounted 54" above the finish floor, and shall be Hospital grade, tamper resistant safety type.~~
- ~~**SPECIAL REQUIREMENTS:** Required Items: Space for small cot and a lockable wall cabinet for first aid supplies.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~6. SPACE: Isolation Area Toilet~~

- ~~**FUNCTIONAL DESCRIPTION:** ADA compliant toilet room for use by sick children. Surfaces will be subjected to strong disinfectants on occasion.~~
- ~~**ADJACENCIES:** Shall be adjacent to the Isolation Area.~~
- ~~**OCCUPANTS:** Sick child and staff.~~
- ~~**MINIMUM AREA:** 45 SF, Net.~~
- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. A base material, appropriate for the flooring material used, is required.~~
- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. On all walls, a minimum 48" tall wainscot is required that is impervious to water and be able to withstand daily sanitizing.~~
- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.~~
- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. One 3' x 7' door is required, and door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked.~~
- ~~**HVAC:** Local exhaust vent above toilet.~~
- ~~**PLUMBING:** Provide a single occupant child height ADA wall-mounted lavatory (20" to rim) and floor-mounted water closet (15" to rim) with grab bars. Room shall be provided with a floor drain. Due to the limited use of this space, floor drain shall be self priming, or designed to prevent sewer gases from entering the occupied space by a proven and maintenance-free design.~~
- ~~**ELECTRICAL:** Provide 1 (one) GFCI outlet near the lavatory. Outlet shall be mounted 54" above the finish floor, and shall be Hospital grade, tamper resistant safety type.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

7. SPACE: Administrative Offices

- **FUNCTIONAL DESCRIPTION:** Offices for the CDC management staff. Includes ~~a private office for the CDC Director, a private office for the CDC Assistant Director, and~~ an open office area.

- ~~**ADJACENCIES:** Shall be adjacent to the Waiting Area and Reception Desk. Private office shall open off of the Open Office area. A general office storage room shall be accessible from this area or from the Reception Desk.~~

- **OCCUPANTS:** CDC staff members.

- **MINIMUM AREA:**
  ~~Director's Office: 120 SF, Net.~~
  ~~Assistant Director's Office: 90 SF, Net.~~
  ~~Open Office: Small: 130 SF, Net. Medium: 300 SF, Net. Large: 300 SF, Net. (Includes circulation to the private offices.~~

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to repair, easy to maintain, and durable. Wall material shall have the ability to absorb pushpins. Wall surface shall be able to withstand tape peeling.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.

- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. ~~Doors into the Director's Office and the Assistant Director's Office shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked~~. Doors shall be provided with self-closing device. Doors shall be a minimum of half-height glass and shall be provided with a 12" wide sidelite.

- **ELECTRICAL:** Multiple electrical and voice/data outlets spaced 5' apart to be provided in all administrative offices/open office area to accommodate computers and other office equipment. ~~A CCTV (video security) monitor will also be located in the Director's office.~~

  Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.)

- ~~**DESIGNER OPTION:** If desired by the installation, one or two more private offices, not to exceed 90 net square feet, may be provided in the open office area. The addition of these offices shall not affect the arrangement or size of any other function or space.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

8. SPACE: Infant/Pre-Tod/Toddler Activity Room

- **FUNCTIONAL DESCRIPTION:** Activity Room which functions for child care, that includes eating, sleeping, playing, and other activities.

- **ADJACENCIES:** Shall be adjacent to the corridor and shall have direct access to the exterior. Direct access to age-appropriate playground is also required. Shall have direct access to storage room.

- **OCCUPANTS:** Two Program Assistants and a maximum of 14 Children (depending upon age of children).

- **MINIMUM AREA:** Minimum Program Area of 490 net SF, which is approximately 626 net square feet. Program Area may NOT be any less than net 490 SF. See attached drawing for calculation of net Program Area. Hatched area indicates portions of room that can be included in the minimum net Program Area. Program area is NOT the same as net area or gross area.

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include seamless, easy to clean and maintain. A base material, appropriate for the flooring material used, is required. Base shall be seamless except at inside corners. Base shall be sealed to floor with USDA or NSF approved caulking.

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall material shall have the ability to absorb pushpins. Wall surface shall be able to withstand tape peeling. Where drinking fountains and/or lavatories are provided within the Activity Room space, a minimum 48” tall wainscot that is impervious to water and able to withstand daily sanitizing is required. This material shall extend to the floor and at least 18” horizontally in both directions from the centerline of the equipment.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.

- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with finger guards at the hinges, on the Activity Room side, up to a minimum height of 48”. Finger guard shall be roll type. On exterior doors, finger guards shall not conflict with weather stripping. Interior doors shall be a minimum of half-height glass, with a clear width opening of 34 inches and shall be provided with a 12-inch wide side lite on the latch side of the door. Exterior door shall be provided with flush panic hardware, shall have a clear width opening of 34 inches, open at least 110 degrees to ensure ease of crib emergency evacuation, and direct exiting onto the outdoor play space. Interior and exterior doors shall swing in the direction of exit travel. Door thresholds and hardware will be designed to facilitate the exit of a crib containing five infants by a single adult. The thresholds will have a low profile. Doors shall be provided with self-closing device.

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

- **VISION PANELS/VIEW WINDOWS:** Shall be in accordance with the Army Standard. At least 1 view window must be provided between this space and the corridor. In addition, not less than 2 vision panels must be provided between the activity space and the corridor.

- **CABINETRY:** Salient characteristics include easy to clean, maintain, and repair. Cabinets shall be durable and be able to withstand impacts (examples: food carts, push toys, etc.), without showing damage. Cabinets shall be a minimum of Architectural Woodworking Institute (AWI) 400B, Custom Grade, High Pressure Laminate clad. Counter top shall have integral back splash, and shall be solid surfacing, solid phenolic, or better. Counter tops of cabinets will have rounded/radius corners and edges.
  (a) A 3'-6" wide sign-in desk with 6 lockable storage units (each keyed separately) in an overhead cabinet, and an adjacent 18 inch wide coat closet. Refer to illustrations under General Requirements.
  (b) 8 foot wide base and wall cabinets with 2 stainless steel sinks. Sinks shall be separated as much as possible, and shall be provided with gooseneck faucets. Sink bowls shall be a minimum of 21" W x 15-3/4" D x 8" H. Space shall be provided for an undercounter refrigerator. Consider providing 2 – 36" W base cabinets with a 2' space between for the refrigerator. Base cabinets shall be lockable, and may not have a protruding handle. All base cabinets in the facility shall be keyed alike.
  (c) 14-15 pre-school cubbies, 8"-12" wide x 15" deep x 46"-49" tall permanently attached to walls (pre-manufactured). Provided by Building Contractor.
  (d) One diaper changing station approximately 2 foot wide by 5 foot long cabinet with sink integral to diaper changing surface, and retractable stairs. Refer to illustrations under General Requirements. Provided by Building Contractor.

- **HVAC:** An exhaust providing 100 to 150 cubic feet per minute shall be provided directly over the diaper changing station. Room temperature shall be measured and maintained at 1 foot above finished floor. Temperature will be designed for 68 °F in the winter and for 78 °F in the summer.

  Humidity Control. A relative humidity of between 35 and 50 percent will be maintained in CDC child activity rooms to prevent drying of mucous membranes, to control the spread of diseases, and to prevent mold growth.

- **ELECTRICAL:** All electrical outlets, except for those mounted above countertops, shall be mounted 54" above the finish floor, and shall be Hospital grade, tamper resistant safety type. Outlets provided above countertops shall be located no less than 18" from the edge of the countertop. Two electrical outlets to be provided above the backsplash (food preparation/art counter/sink), one over each open counter area. Electrical outlet to be provided for under the counter refrigerator. Electrical outlet, data port and intercom phone connection at sign in desk to be provided. Provide task lighting at sign in desk, installed on underside of upper cabinets. A minimum of 1 (one) outlet will be provided above the cubbies in the program area and will be mounted horizontally. A minimum of 3 (three) duplex outlets will be installed, evenly spaced, on the exterior wall and the wall opposite the toilet area. In addition, provide 2 (two) voice/data outlets in the activity area. A minimum of 5 (five) blank outlet covers will be provided but not installed.

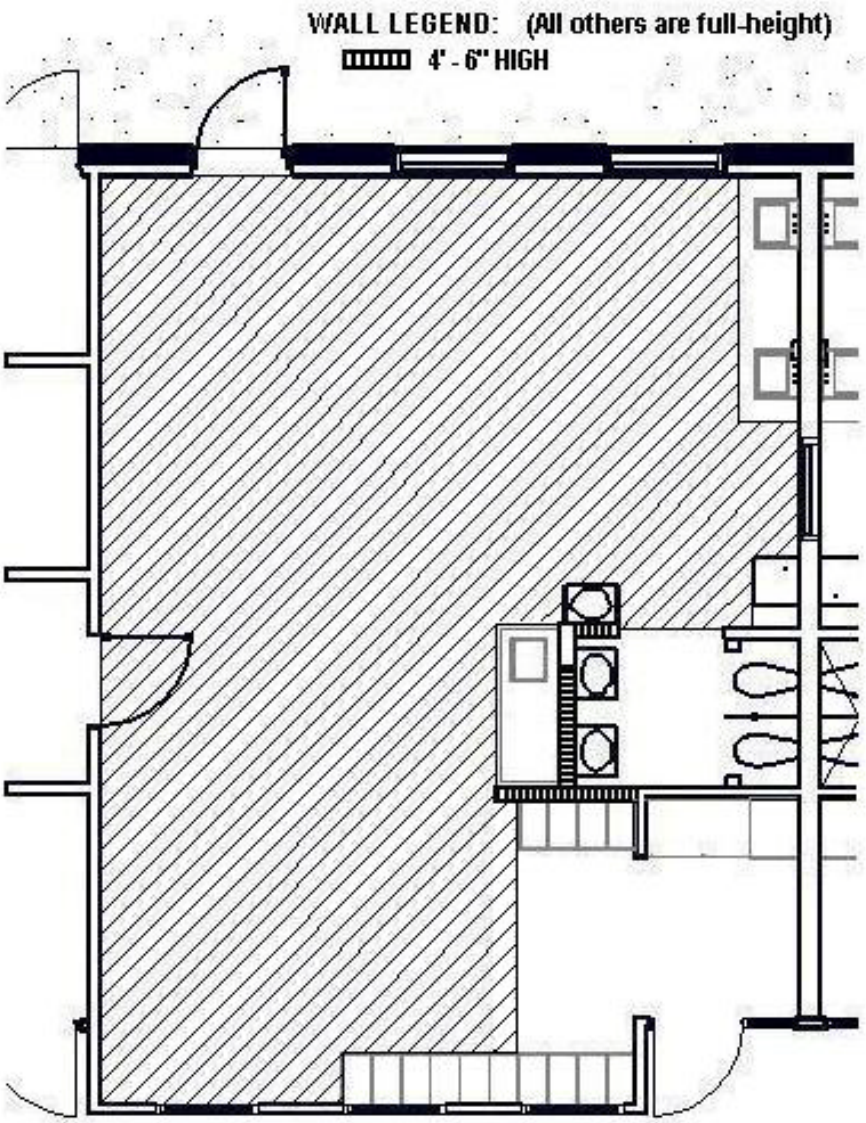
  Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.) Lighting within the child activity

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

rooms must; sign-in desk and toilet be zoned together; and either an additional 2 zones or lamp control within the acticity space, to allow different lighting levels for nap time and activity times. A minimum of .1 foot candle must be maintained in the activity room to allow for camera operation.

In rooms where cribs will be located, electrical outlets shall be provided and shall be wired for future receptacles, but will be provided with blank outlet plates. This will be coordinated with the users during design. The receptacles shall be provided to the building users.

- **PLUMBING:** A drinking fountain (non-refrigerated, similar to Halsey Taylor model HRFG-E) is required on the wall between the toilet area and the cabinets, mounted so that top of drinking fountain is 17" above finished floor. Plumbing for toilet/lavatory area, diaper changing table, and food preparation/art counter/sink area is also required.



Infant/Pre-Tod/Toddler Activity Room

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

Net Program Area

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

9. SPACE: Infant/Pre-Tod/Toddler Storage Room

- **FUNCTIONAL DESCRIPTION:** Storage room to support the Infant/Pre-Tod/Toddler Activity Room.
- **ADJACENCIES:** Shall be directly accessible from the Activity Room
- **OCCUPANTS:** CDC Staff.
- **MINIMUM AREA:** 45 SF, Net.
- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.
- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable.
- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.
- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with self-closing device. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be a minimum of half-height glass.
- **ELECTRICAL:** A minimum of 1 (one) electrical outlet is required.
- **SPECIAL REQUIREMENTS:** A minimum of three adjustable shelves with heavy-duty standards and brackets will be provided on 3 walls. At least one 18” deep shelf and two 12” deep shelves shall be provided. Shelving shall be able to support 100 pounds per lineal foot

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

10. SPACE: Infant/Pre-Tod/Toddler Toilet Area

- **FUNCTIONAL DESCRIPTION:** Toilet area for CDC children.
- **ADJACENCIES:** Shall be directly accessible from the Activity Room
- **OCCUPANTS:** CDC Children with staff assistance.
- **MINIMUM AREA:** 38 SF, Net.
- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. A base material, appropriate for the flooring material used, is required.
- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. On all walls, a minimum 48" tall wainscot is required that is impervious to water and be able to withstand daily sanitizing.
- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.
- **TOILET PARTITION:** Salient characteristics include easy to clean and maintain, and shall be durable. Top of toilet partitions shall be no higher than 42" tall with 12" clear opening at bottom. Floor mounted partitions are preferred. Partitions shall be color-through phenolic. If ceiling hung partitions are requested, partitions shall be color-through phenolic or solid plastic.
- **PLUMBING:** Two (2) pediatric floor mounted water closets (10" to rim), and two (2) child wall mounted lavatories (17" to rim) to be located opposite the water closets. A floor drain is required in this area that shall be self priming, or designed to prevent sewer gases from entering the occupied space by a proven and maintenance-free design. An additional child-height wall mounted lavatory to be provided on the other side of the wall, directly accessible from the activity area, as shown in the previous diagram. Provide continuous, or closed front toilet seats. Dual flush toilets are allowed; however, automatic flush valves are not allowed.

  For the sinks in the toilet area (NOT the sinks in the food prep/arts and crafts area), faucets shall be pre-mixed single push control that meets ADA requirements. Water shall run for 15 seconds.
- **HVAC:** An exhaust over the water closet area
- **ELECTRICAL:** No electrical receptacles are allowed in this area.
- **SPECIAL REQUIREMENTS:** Unbreakable lavatory mirrors required above each lavatory.

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Child Development Centers
(For Children 6 Weeks – 5 Years)

11. SPACE: Preschool/Pre-K/Kindergarten Activity Room

- **FUNCTIONAL DESCRIPTION:** Activity Room which functions for child care, which includes eating, sleeping, playing, and other activities.

- **ADJACENCIES:** Shall be adjacent to the corridor and shall have direct access to the exterior. Direct access to age-appropriate playground is also required. Shall have direct access to storage room.

- **OCCUPANTS:** Two Program Assistants and a maximum of 24 Children (depending upon age of children).

- **MINIMUM AREA:** Minimum Program Area of 840 net SF, which is approximately 1023 net square feet. Program Area may NOT be any less than 840 net SF. See attached drawing for calculation of net Program Area. Hatched area indicates portions of room that can be included in the minimum net Program Area. Program area is NOT the same as net area or gross area.

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include seamless, easy to clean and maintain. A base material, appropriate for the flooring material used, is required. Base shall be seamless except at inside corners. Base shall be sealed to floor with USDA or NSF approved caulking.

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall material shall have the ability to absorb pushpins. Wall surface shall be able to withstand tape peeling. Where drinking fountains and/or lavatories are provided within the Activity Room space, a minimum 48” tall wainscot that is impervious to water and able to withstand daily sanitizing is required. This material shall extend to the floor and at least 18” horizontally in both directions from the centerline of the equipment.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.

- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with finger guards at the hinges, on the Activity Room side, up to a minimum height of 48”. Finger guard shall be roll type. On exterior doors, finger guards shall not conflict with weather stripping. Interior doors shall be a minimum of half-height glass, with a clear width opening of 34 inches and shall be provided with a 12 inch wide side lite on the latch side of the door. Exterior door shall be provided with flush panic hardware, shall have a clear width opening of 34 inches, open at least 110 degrees to ensure ease of crib emergency evacuation, and direct exiting onto the outdoor play space. Interior and exterior doors shall swing in the direction of exit travel. Doors shall be provided with self-closing device.

- **VISION PANELS/VIEW WINDOWS:** Shall be in accordance with the Army Standard. At least 1 view window must be provided between this space and the corridor. In addition, not less than 2 vision panels must be provided between the activity space and the corridor.

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

- **CABINETRY:** Salient characteristics include easy to clean, maintain and repair. Cabinets shall be durable and be able to withstand impact (example: food carts), without showing damage. Cabinets shall be a minimum of Architectural Woodworking Institute (AWI) 400B, Custom Grade, High Pressure Laminate clad. Counter top shall have integral back splash, and shall be appropriate solid surfacing, solid phenolic, or better. Counter tops of cabinets will have rounded/radius corners and edges.
  (a) A 3'-6" wide sign-in desk with 6 lockable storage units (each keyed separately) in an overhead cabinet, and an adjacent 18 inch wide coat closet. Refer to illustrations under General Requirements.
  (b) 8 foot wide base and wall cabinets with 2 stainless steel sinks. Sinks shall be separated as much as possible, and shall be provided with gooseneck faucets. Sink bowls shall be a minimum of 21" W x 15-3/4" D x 8" H. Space shall be provided for an undercounter refrigerator. Consider providing 2 – 36" W base cabinets with a 2' space between for the refrigerator. Base cabinets shall be lockable, and may not have a protruding handle. All base cabinets in the facility shall be keyed alike.
  (c) 24-25 pre-school cubbies, 8"-12" wide x 15" deep x 46"-49" tall permanently attached to walls (pre-manufactured). Provided by Building Contractor.
  (d) One diaper changing station approximately 2 foot wide by 5 foot long cabinet with sink integral to diaper changing surface, and retractable stairs. Refer to illustrations under General Requirements. Provided by Building Contractor.

- **HVAC:** An exhaust providing 100 to 150 cubic feet per minute shall be provided directly over the diaper changing station. Room temperature shall be measured and maintained at 1 foot above finished floor. Temperature will be designed for 68 °F in the winter and for 78 °F in the summer.

  Humidity Control. A relative humidity of between 35 and 50 percent will be maintained in CDC child activity rooms to prevent drying of mucous membranes, to control the spread of diseases, and to prevent mold growth.

- **ELECTRICAL:** All electrical outlets, except for those mounted above countertops, shall be mounted 54" above the finish floor, and shall be Hospital grade, tamper resistant safety type. Outlets provided above countertops shall be located no less than 18" from the edge of the countertop. Two electrical outlets to be provided above the backsplash (food preparation/art counter/sink), one over each open counter area. Electrical outlet to be provided for under the counter refrigerator. Electrical outlet, data port and intercom phone connection at sign in desk to be provided. Provide task lighting at sign in desk, installed on underside of upper cabinets. A minimum of 2 (two) outlets will be provided above the cubbies in the program area and will be mounted horizontally. A minimum of 4 (four) duplex outlets will be installed, evenly spaced, on the exterior wall and the wall opposite the toilet area. In addition, provide 2 (two) voice/data outlets in the activity area. A minimum of 5 (five) blank outlet covers will be provided but not installed.

  Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.) Lighting within the child activity rooms must; sign-in desk and toilet be zoned together; and either an additional 2 zones or lamp control within the acticity space, to allow different lighting levels for nap time and activity times. A minimum of .1 foot candle must be maintained in the activity room to allow for camera operation.

Standard Design Criteria
Child Development Centers
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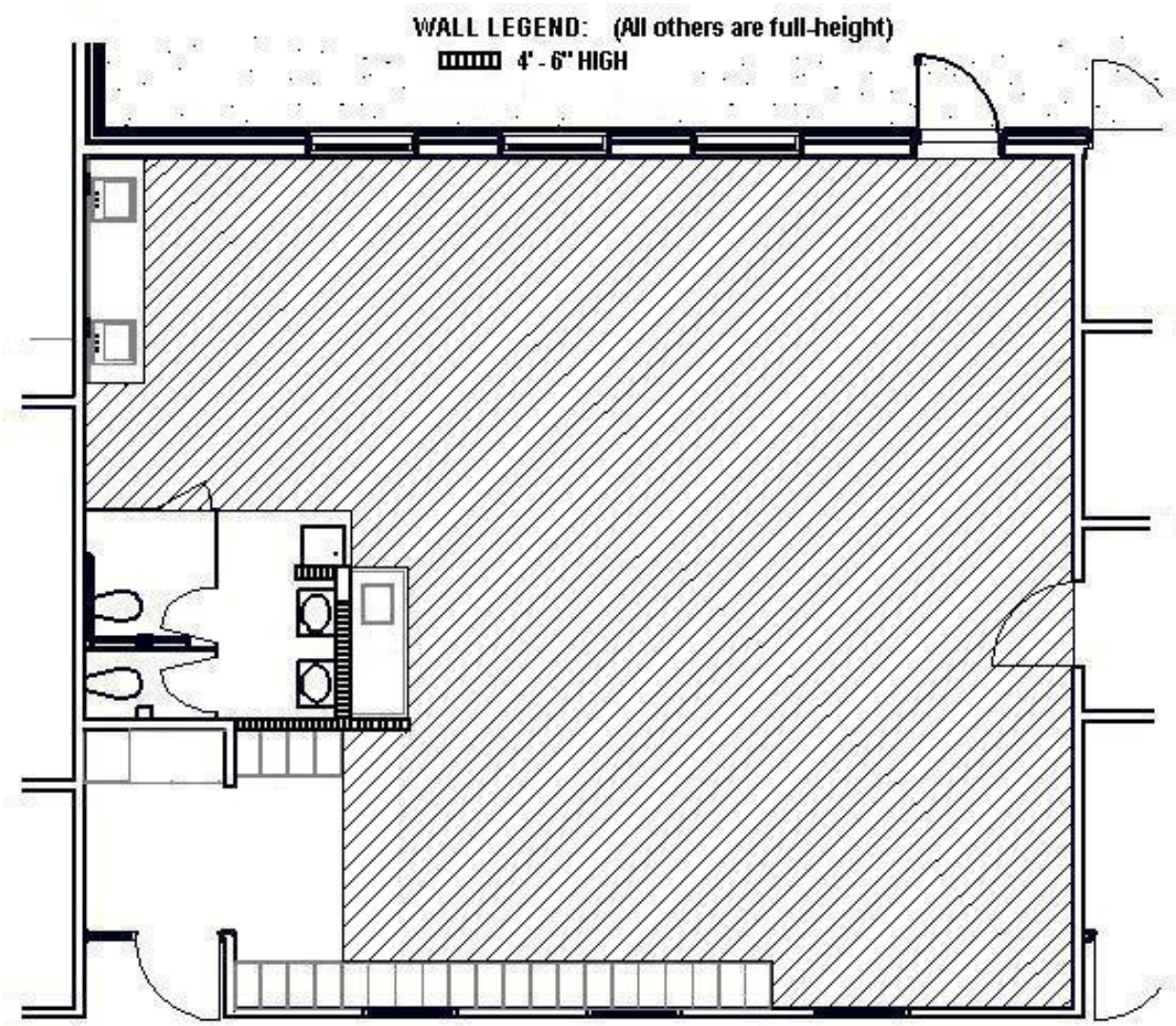
- **PLUMBING:** A drinking fountain (non-refrigerated, similar to Halsey Taylor model HRFG-E) is required on the wall outside the toilet area, as shown in the following diagram, mounted so that top of drinking fountain is 20" above finished floor. Plumbing for toilet/lavatory area, diaper changing table, and food preparation/art counter/sink area is also required.



Preschool/Pre-K/Kindergarten Activity Room
Net Program Area

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

12. SPACE: Preschool/Pre-K/Kindergarten Storage Room

- **FUNCTIONAL DESCRIPTION:** Storage room to support the Preschool/Pre-K/Kindergarten Activity Room.
- **ADJACENCIES:** Shall be directly accessible from the Activity Room.
- **OCCUPANTS:** CDC Staff.
- **MINIMUM AREA:** 45 SF, Net.
- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.
- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable.
- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.
- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with self-closing device. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be a minimum of half-height glass.
- **ELECTRICAL:** A minimum of 1 (one) electrical outlet is required.
- **SPECIAL REQUIREMENTS:** A minimum of three adjustable shelves with heavy-duty standards and brackets will be provided on 3 walls. At least one 18” deep shelf and two 12” deep shelves shall be provided. Shelving shall be able to support 100 pounds per lineal foot.

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

13. SPACE: Preschool/Pre-K/Kindergarten Toilet Area

- **FUNCTIONAL DESCRIPTION:** Toilet area for CDC children.

- **ADJACENCIES:** Shall be directly accessible from the Activity Room.

- **OCCUPANTS:** CDC Children with staff assistance.

- **MINIMUM AREA:** 62 SF, Net.

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. A base material, appropriate for the flooring material used, is required.

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. On all walls, a minimum 48" tall wainscot is required that is impervious to water and be able to withstand daily sanitizing.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.

- **TOILET PARTITION:** Salient characteristics include easy to clean and maintain, and shall be durable. Top of toilet partitions shall be no higher than 48" tall with 12" clear opening at bottom. Stall doors to be provided. Floor mounted partitions are preferred. Partitions shall be color-through phenolic. If ceiling hung partitions are requested, partitions shall be color-through phenolic or solid plastic.

- **PLUMBING:** Two (2) pediatric floor mounted water closets (13" to rim), and two (2) child wall mounted lavatories (20" to rim) to be located opposite the water closets. A floor drain is required in this area that shall be self priming, or designed to prevent sewer gases from entering the occupied space by a proven and maintenance-free design. Provide continuous, or closed front toilet seats. Dual flush valve toilets are allowed; however, automatic flush valves are not allowed.

  For the sinks in the toilet area (NOT the sinks in the food prep/arts and crafts area), faucets shall be pre-mixed single push control that meets ADA requirements. Water shall run for 15 seconds.

- **HVAC:** An exhaust over the water closet area

- **ELECTRICAL:** No electrical receptacles are allowed in this area.

- **SPECIAL REQUIREMENTS:** Unbreakable lavatory mirrors required above each lavatory.

  One of the toilet stalls and one of the lavatories shall meet child ADA requirements. Reference the floor plan for accessible door location. Distance between toilet partition and lavatory shall be 33" to facilitate side approach.

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14. SPACE: Buggy Storage

- **FUNCTIONAL DESCRIPTION:** A storage area to accommodate 2 infant "bye-bye" buggies. Buggies are approximately 76 inches by 26 inches.

- **ADJACENCIES:** Shall be directly accessible from the corridor, and should be located near to the Infant/Pre-Tod/Toddler Rooms.

- **MINIMUM AREA:** 45 SF, Net.

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, durable, easily repairable, and easy to maintain. A base material, appropriate for the flooring material used, is required

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. In addition, vertical strips of wood, rubber, or other resilient material shall be placed 16" apart, and attached to studs, shall be provided on all walls of this area. Strips shall be 3' tall, and shall start at the top of the base. Strips to function as bye-bye buggy bumpers.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.

- **ELECTRICAL:** A lighting fixture shall be provided, and controlled by the corridor.

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15. SPACE: Public and Staff Toilets

- **FUNCTIONAL DESCRIPTION:** ADA compliant toilet area for staff, parents and visitors. ~~A separate men's and women's toilet will be provided in the medium and large facilities.~~

- **ADJACENCIES:** ~~Public toilets shall be located directly adjacent to the Waiting Area.~~ Staff toilets shall be accessible from the corridors, ~~and should be spread out around the facility.~~

- **OCCUPANTS:** 1 person.

- **MINIMUM AREA:** 48 SF, Net.

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. A base material, appropriate for the flooring material used, is required.

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. On all walls, a minimum 48" tall wainscot is required that is impervious to water and be able to withstand daily sanitizing.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.

- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be provided with self-closing device.

- **PLUMBING:** 1 adult ADA compliant water closet, and 1 adult ADA compliant lavatory in each. A floor drain is required in this area that shall be self priming, or designed to prevent sewer gases from entering the occupied space by a proven and maintenance-free design.

- **HVAC:** Local exhaust vent above toilet. Provide one exhaust fan directly over the fold-down diaper changing station. This exhaust fan can be switched to operate only when the diaper station is opened for use.

- **ELECTRICAL:** Ensure appropriate lighting is provided above the mirror.

  Provide 1 (one) GFCI outlet near the lavatory.

- **SPECIAL REQUIREMENTS:** A wall-mounted fold-down diaper station shall be provided in each public toilet room(s) adjacent to the Waiting Area.

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16. SPACE: Exterior Storage Room

- **FUNCTIONAL DESCRIPTION:** Store playground toys and equipment. Equipment that is stored in these rooms will often times be dirty and/or wet.

- **ADJACENCIES:** Directly accessible from the exterior of the building. Shall be easily accessible from playground area.

- **MINIMUM AREA:** 40 SF, Net.

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, durable (able to withstand wet and dirty conditions), such as sealed concrete. A base material, appropriate for the flooring material used, is required.

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Design walls to avoid energy loss from the surrounding conditioned spaces.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include resistance to environmental conditions, such as changes in air pressure and high humidity, and shall be durable. Design the ceiling to avoid energy loss from the surrounding conditioned spaces.

- **DOORS/FRAME:** Salient characteristics include easy to clean, able to withstand continuous use, and easy to maintain and repair. Each room to be provided with a pair of 3 foot by 7 foot doors, with each leaf provided with minimum of half-height glass panels. No astragals shall be provided. Instead, top and bottom flush bolts are to be provided on the inactive leaf. Adequate weather-stripping shall be provided to prevent access by vermin. Doors shall be fitted with a locking mechanism that allows the door to be opened from the inside while locked.

- **HVAC:** Minimal conditioning of this space to be provided in extreme climates.

- **ELECTRICAL:** Provide a minimum of 1 (one) GFCI outlet in each storage room.

- **SPECIAL REQUIREMENTS:** Four adjustable shelves with heavy duty standards and brackets will be provided on the back wall. Shelves shall be a minimum of 18” deep. Shelves shall be able to support 100 pounds per lineal foot.

- **FIRE PROTECTION:** A smoke detector is required in each Exterior Storage Room.

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17. SPACE: Janitor Closet

- **FUNCTIONAL DESCRIPTION:** Space to store janitor's equipment and cleaning supplies.
- **ADJACENCIES:** Directly accessible from the corridor.
- **MINIMUM AREA:** 45 SF, Net.
- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. A base material, appropriate for the flooring material used, is required.
- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. Walls shall be able to withstand moving of mop buckets and other janitorial supplies, and shall be able to resist damage due to moisture.
- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects. Shall have a minimum CAC rating of 40.
- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Door shall be provided with minimum half-height glass. Door shall open 180 degrees into the corridor. Doors shall be provided with self-closing device.
- **HVAC:** Local exhaust vent required.
- **PLUMBING:** A janitor's floor mop sink is required. Floor drain is required in this area. A vacuum breaker is required.
- **ELECTRICAL:** A minimum of 1 (one) GFCI electrical outlet is required.
- **SPECIAL REQUIREMENTS:** Adjustable with heavy duty standards and brackets shelves will be provided on at least one wall. Shelves shall be able to support 100 pounds per lineal foot.

  Provide a wall-mounted rack for hanging mops.

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18. SPACE: Stroller/Car Seat Area

- **FUNCTIONAL DESCRIPTION:** Space for patron's car seats and strollers.
- **ADJACENCIES:** Directly accessible from the corridor and accessible from the waiting area.
- **MINIMUM AREA:** Small: 50 SF, Net. ~~Medium: 60 SF, Net. Large: 100 SF, Net~~
- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, durable, easily repairable, and easy to maintain. A base material, appropriate for the flooring material used, is required
- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall surface shall be durable so that impacts from strollers do not damage the wall.
- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.
- **DOORS/FRAME:** If a door is provided, the door shall be provided with minimum half-height glass and shall be self-closing with a magnetic hold-open device that is tied into the fire alarm system.
- **ELECTRICAL:** The area shall have lighting controlled by the corridor lighting circuit.
- **SPECIAL REQUIREMENTS:** Adjustable shelves with heavy-duty standards and brackets will be provided on two walls for storage of car seats. Provide a rod and shelving along one wall for hanging umbrella strollers and car seats. Shelves shall be 24" deep. Standards for shelves shall be located so that the top shelf can be no closer than 3 feet from the ceiling.

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~~19. SPACE: Training Room~~

- ~~**FUNCTIONAL DESCRIPTION:** To facilitate training/distance learning by CDC staff.~~
- ~~**ADJACENCIES:** Directly accessible from the corridor.~~
- ~~**OCCUPANTS:** CDC staff. Training and Curriculum Specialist(s) (TACS) will work in this space. Several workstations will be set up for others to come and train.~~
- ~~**MINIMUM AREA:** Small: 260 SF, Net. Medium: 460 SF, Net. Large: 660 SF, Net.~~
- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.~~
- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to repair, easy to maintain, and durable. Wall surface shall have the ability to absorb pushpins and to withstand tape peeling. Shall have a minimum STC rating of 45.~~
- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects. Shall have a minimum CAC rating of 40.~~
- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with self-closing device. Doors shall be a minimum of half-height glass.~~
- ~~**WINDOWS:** Salient characteristics include easy to clean and able to withstand continuous use. Individual windows shall be single hung, with only the top portion operable. Screens shall be provided. (Applicable to Small facility only.)~~
- ~~**ELECTRICAL**: Electrical outlets, data ports, phone lines and intercom connection to be provided. A minimum of 8 (small facilities) and 12 (medium and large facilities) voice/data ports, and 6 quad-plex electrical outlets shall be provided, evenly spaced along the walls of the room.~~

  ~~Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.)~~

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~~20. SPACE: Training Room Storage~~

- ~~**FUNCTIONAL DESCRIPTION:** General storage for office supplies and other supplies.~~
- ~~**ADJACENCIES:** Located adjacent to the Training Room~~
- ~~**OCCUPANTS:** CDC Staff~~
- ~~**MINIMUM AREA:** Small: 30 SF, Net, total. Medium and Large: 50 SF, Net, total.~~
- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.~~
- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to repair, easy to maintain, and durable.~~
- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.~~
- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be provided with self-closing device. Doors shall be a minimum of half-height glass.~~
- ~~**SPECIAL REQUIREMENTS:** A minimum of 4 adjustable shelves with heavy duty standards and brackets will be provided. Provide shelves on as many walls of the storage rooms as possible while maintaining adequate circulation space. Shelving shall be able to support 100 pounds per lineal foot.~~

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21. SPACE: Staff Lounge

- **FUNCTIONAL DESCRIPTION:** Staff beak area.
- **ADJACENCIES:** Directly accessible from the corridor.
- **OCCUPANTS:** CDC staff.
- **MINIMUM AREA:** Small: 300 SF, Net. ~~Medium: 400 SF, Net. Large: 600 SF, Net.~~
- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, durable, easily repairable, and easy to maintain. A base material, appropriate for the flooring material used, is required
- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall surface shall have the ability to absorb pushpins and to withstand tape peeling. Shall have a minimum STC rating of 45.
- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects. Shall have a minimum CAC rating of 40.
- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with self-closing device. Doors shall be a minimum of half-height glass.
- **CABINETRY:** A minimum 8 foot wide base and wall cabinets with 1 stainless steel sink with space adjacent to counter for a refrigerator (minimum 22 cu. ft. top mount refrigerator). Counter top shall have integral back splash, and shall be appropriate solid surfacing, solid phenolic, or better.
- **ELECTRICAL:** Provide outlets above backsplash for home type appliances (coffee pot, microwave, etc.). Provide outlet for refrigerator. Electrical outlets, phone lines, and intercom connection to be provided. A minimum of 4 voice/data ports (1 per wall) shall be provided.
- **SPECIAL REQUIREMENTS:** Provide space, plumbing, and electrical for vending machines. Half-height, “z-locker”, lockable wall lockers, secured to the wall, with a minimum foot print of 15” x 15”, shall be provided in this area (total of 10 lockers in the small CDC, 14 lockers in the medium CDC, and 16 lockers in the large CDC). Each locker unit shall be 72” H.

  Provide water for icemaker in refrigerator.

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22. SPACE: Central Storage

- **FUNCTIONAL DESCRIPTION:** Space for storage of program material.
- **ADJACENCIES:** Directly accessible from the corridor.
- **MINIMUM AREA:** Small: 40 SF, Net. ~~Medium: 80 SF, Net. Large: 120 SF, Net.~~
- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.
- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable.
- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.
- **DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with closers. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be a minimum of half-height glass.
- **ELECTRICAL:** The Storage Room shall contain a ceiling mounted automatic motion light switch with manual override.
- **SPECIAL REQUIREMENTS:** Four adjustable shelves with heavy-duty standards and brackets will be provided. Two 18” deep shelves and two 12” deep shelves shall be provided on at least 2 walls. Shelving shall be able to support 100 pounds per lineal foot.

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~~23. SPACE: Camera Equipment Room (a.k.a. Video Room)~~

- ~~**FUNCTIONAL DESCRIPTION:** Room to accommodate Closed Circuit TV video equipment for video camera system throughout the facility.~~

- ~~**ADJACENCIES:** Shall be directly accessible from the corridor.~~

- ~~**MINIMUM AREA:** 60 SF, Net.~~

- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.~~

- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable.~~

- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.~~

- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with closers. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be a minimum of half-height glass.~~

- ~~**HVAC:** Due to heat generated, additional cooling shall be provided.~~

- ~~**ELECTRICAL:** The Camera Equipment Room shall contain a ceiling mounted automatic motion light switch with manual override.~~

- ~~**ADDITIONAL INFORMATION:** The building construction contractor provides the conduit, boxes and power to the camera location indicated on your standard layout. FMWRC-CYS coordinates the installation of the CYS VSS to include installing cameras, head-end unit and other equipment for the operation of the video security system. The Navy (SPAWARS) contracts to have the system installed just after the building is turned over. Installation typically takes around 4 weeks, and is usually done during non-use hours (at night).~~

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~~24. SPACE:~~ ~~Kitchen~~

- ~~**FUNCTIONAL DESCRIPTION:** Commercial grade facility designed for use by staff to meet the food service needs of children, 6 weeks to 5 years of age, in accordance with the United States Department of Agriculture and Preventive Medicine Regulations~~

- ~~**ADJACENCIES:** Directly accessible from the corridor. Direct access to exterior.~~

- ~~**OCCUPANTS:** CDC kitchen staff.~~

- ~~**MINIMUM AREA:** Small: 906 SF, Net. Medium and Large: 982 SF, Net.~~

- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be durable, easy to clean and maintain, resist slipping, and be easy to repair. A base material, appropriate for the flooring material used, is required.~~

- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:**~~
  - ~~**(a)** Walls and ceiling of all areas where food establishment operations are conducted will be designed, constructed, and installed so they are:~~
    - ~~**1)** Smooth with smooth junctures~~
    - ~~**2)** Nonabsorbent~~
    - ~~**3)** Durable~~
    - ~~**4)** Light-colored~~
    - ~~**5)** Easily cleanable (sealed ceramic tile, or other approved material)~~
  - ~~**(b)** Binding cement, mortar, or grout (epoxy) jointed materials will be waterproof, grease proof, and erosion resistant.~~
  - ~~**(c)** Gypsum wallboard or similar previous pervious material will not be used~~
    - ~~**1)** On steel studs in food preparation, serving, storage, self-servicing areas, warewashing, and pot and pan washing areas, or other areas subject to water damage or high humidity~~
    - ~~**2)** In areas used by mobile food service equipment~~
  - ~~**(d)** Water-resistant gypsum wallboard protected by a cement backerboard or green board and ceramic tile may be used to sheath stud walls.~~
  - ~~**(e)** Except in areas used only for dry storage, concrete, porous blocks, or bricks used for indoor wall construction will be finished and sealed to provide a smooth, nonabsorbent, easily cleanable surface.~~
  - ~~**(f)** Acoustical materials used in areas exposed to grease or high humidity will be constructed and installed to provide a reasonably nonabsorbent, easily cleanable surface. These materials require periodic replacement to maintain sanitary standards.~~
  - ~~**(g)** Exposed corners of glazed structural units, concrete masonry unit partitions, and columns subject to damage from portable food service equipment shall be protected through use of corner protective guards. These guards should extend at least 72" above the finished floor.~~

- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, ease of accessibility to mechanical system above ceiling, and ease of repair. Aluminum Acoustical Ceiling Grid with the size not exceeding 2 feet by 2 feet and supporting 5/8" vinyl faced gypsum panels.~~

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- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with closers. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be a minimum of half-height glass. Door shall have self-closing device and be smoke tight. Exterior door from the kitchen leading to the service entrance shall be equipped with an air curtain. Hold-open devices shall not be used on any kitchen doors.~~

- ~~**HVAC:** Two ventilation exhaust hoods are required. One condensation hood over the dishwashing machine, and one over the cooking equipment. Ensure adequate make up air is provided.~~

- ~~**ELECTRICAL:** In addition to electrical requirements for kitchen equipment, electrical outlet and voice/data port to be provided to accommodate a computer in kitchen for placing food orders on-line. An intercom phone system and a Class A phone are required. Fluorescent lighting that allows an accurate assessment of food coloration shall be provided.~~

- ~~**PLUMBING:** Hot and cold water shall be provided for 3 compartment ware washing sink, 2 compartment food preparation sink, 2 each hand washing sinks, cart washing area, dishwasher, convection steamers, 2 booster heaters, garbage grinder, and garbage disposal. Water shall be provided for a commercial icemaker. Floor drains, to include floor sinks, shall be provided.~~

  ~~The requirements for grease traps will be determined by the installation. If provided, grease traps shall not be located inside the building without prior written approval of the MEDCEN/MEDDAC Commander. Grease traps must be located in a thermal mass. Also, the grease trap shall not be located within the fenced area.~~

- ~~**SPECIAL REQUIREMENTS:**~~
  - ~~**(a)** A dry storage area with shelving for food to be incorporated within the kitchen area. Requirements for dry storage include: Floor shall be sheet vinyl with welded seams which is easy to clean and maintain. A base material, appropriate for the flooring material used, is required. Base shall be seamless except at inside corners. An appropriate transition (such as bull-nose) shall be provided. Walls shall be easy to clean and maintain, and shall be durable.~~
  - ~~**(b)** All storage room interiors shall be marked with a red line, 1 inch in width, located 18 inches below the lowest point of the sprinkler head.~~
  - ~~**(c)** Kitchen equipment shall be commercial equipment, NSF approved. This will require compliance with all NFPA documents, to include 96.~~
  - ~~**(d)** Maintenance: Maintain walls and ceilings, including doors, windows, skylights, and similar closures, in good repair. Asbestos material will be handled per TB MED 513.~~
  - ~~**(e)** Exposed Construction: Studs, joints, and rafters, or other unfinished building materials will not be exposed. However, if exposed in areas outside the food establishment operations, they will be finished to provide a smooth, easily cleanbable surface.~~
  - ~~**(f)** Attachment: Light fixtures, vent covers, wall-mounted fans, poster boards, blackboards, decorative materials, and similar equipment attached to walls and ceilings will be:~~
    - ~~**1)** Easily cleanable~~
    - ~~**2)** Maintained in good repair~~

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~~**3)** Mounted so as to minimized harborage or entrance to the unit.~~

~~**(g)** Kitchen plans and schedules are provided below. The kitchen may be flipped in plan if desired.~~

~~**(h)** A milk dispenser may be provided (Government Furnished, Government Installed) if desired by the Installation. It would be located on Work Table 11 (A11, B11, C11).~~

~~**(i)** A preferred option is to replace the Steamer and the Convection Oven with two (2) Combi-Ovens (which functions as both a steamer and a convection oven). In the plans below, these are items A20, A21, B20, B21, C20, C21.~~

~~**(j)** Electric range is preferable.~~

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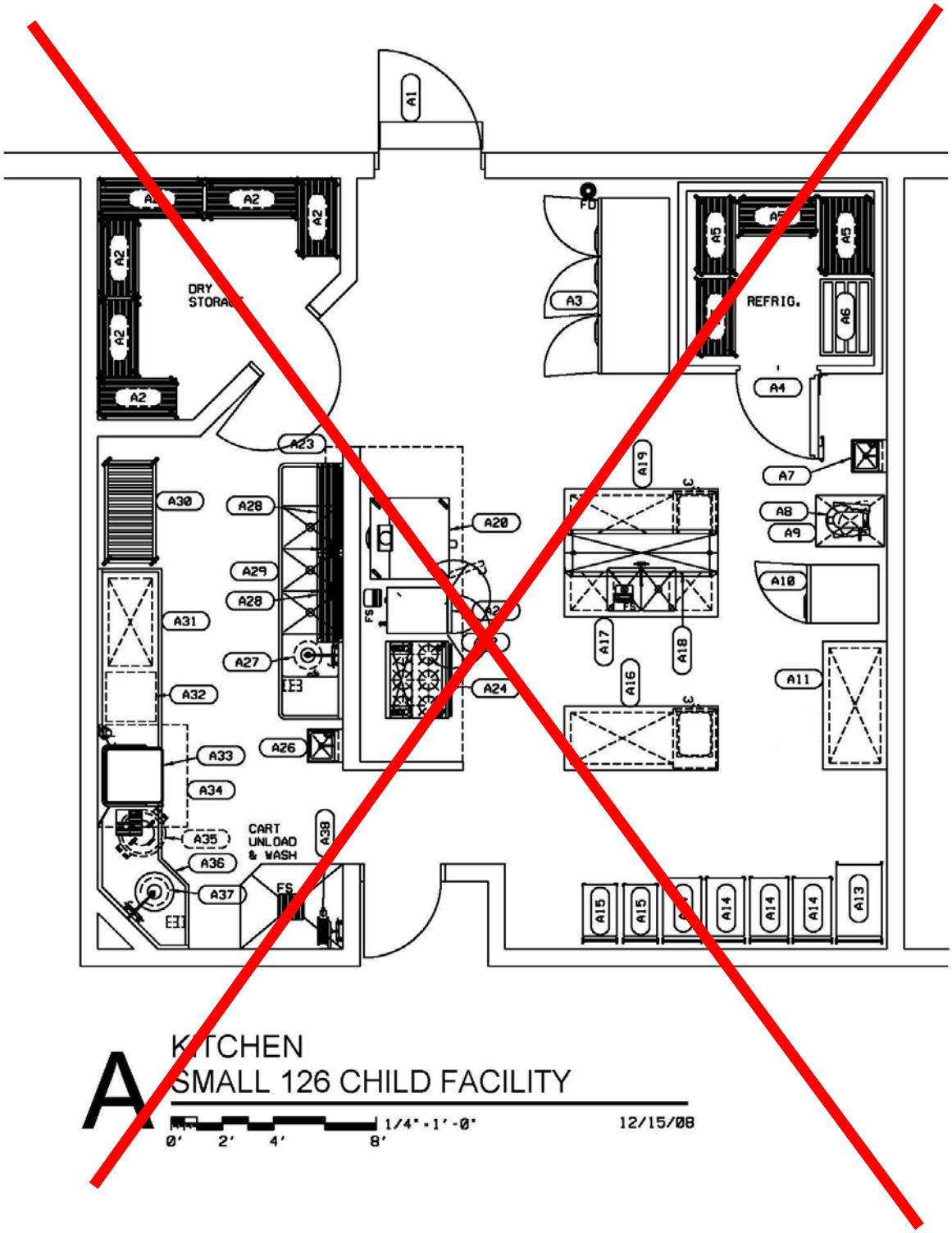

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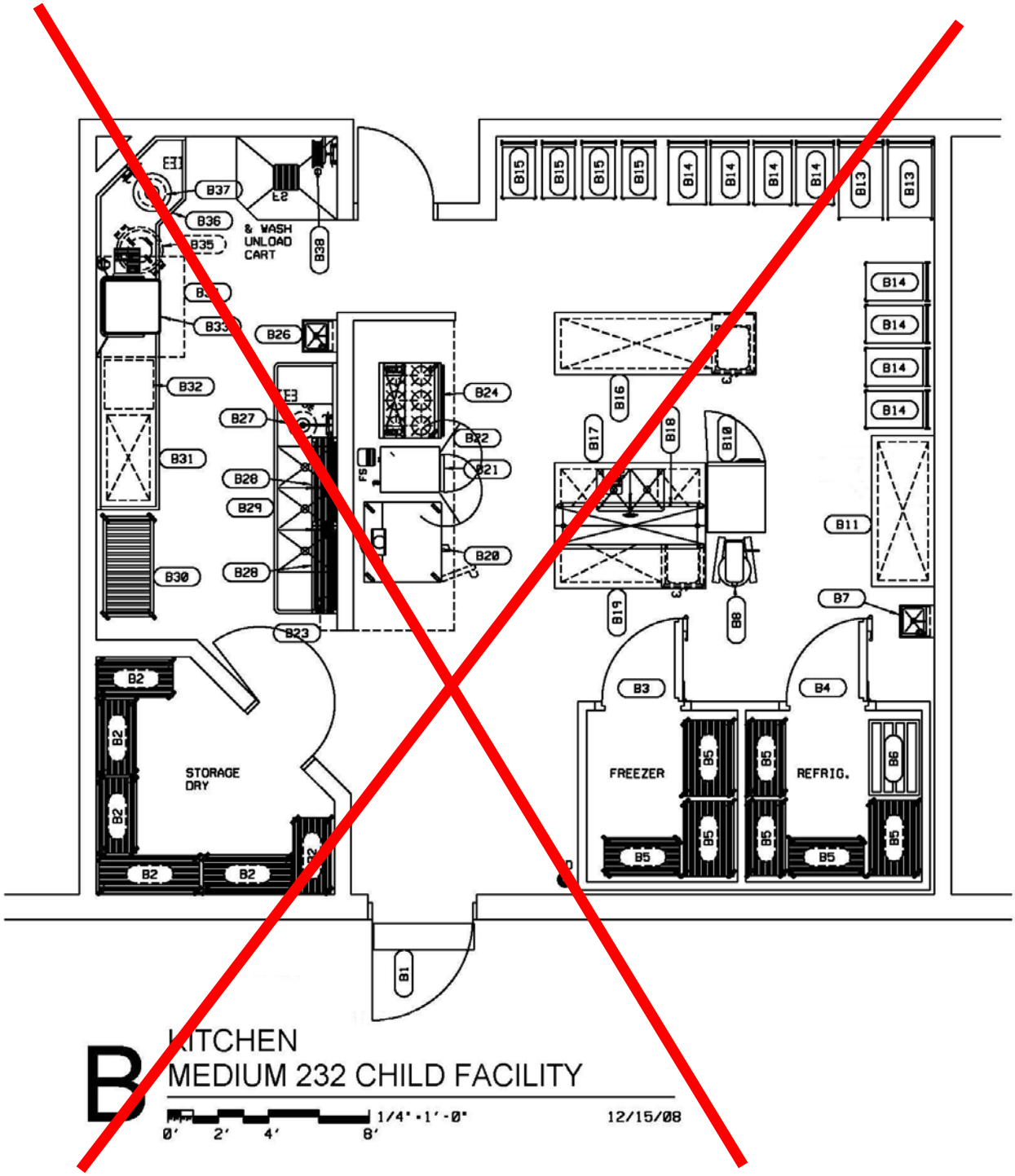
EQUIPMENT LIST			
ITEM NO	QTY	DESCRIPTION	REMARKS
A1		AIR CURTAIN: UNHEATED	
A2	3	SHELVING: CHROME WIRE	18" X 36"
A2	1	SHELVING: CHROME WIRE	18" X 42"
A2	1	SHELVING: CHROME WIRE	18" X 48"
A2	1	SHELVING: CHROME WIRE	18" X 36"
A3	1	FREEZER: 3 SECT REACH-IN	
A4	1	WALK-IN REFRIGERATOR	8'-0"WX7'-6"DX8'-6"H/ALUM IN & OUT
A5	1	SHELVING: EPOXY WIRE	24" X 36"
A5	3	SHELVING: EPOXY WIRE	18" X 36"
A6	1	DUNNAGE RACK: SNGL TIER MILK CRATE	
A7	1	HAND SINK: FOOD PREP	
A8	1	MIXER: 20 QT.	
A9	1	STAND: MIXER	
A10	1	REFRIGERATOR: 1 SECT REACH-IN	
A11	1	TABLE: WORK W/ UNDER SHELF	30"W. X 96"L. X 36"H.
A12	1	NOT USED	
A13	1	CART: (4) SHELF PRE-SCHOOL	
A14	4	CART: 3 SHELF TODDLER	
A15	2	CART: 3 SHELF INFANT	
A16	1	TABLE: WORK W/ DRW'S-U SHELF	30"D X 72"L X 36"H
A17	1	TABLE: WORK W/ DBL. SINK-U SHELF	30"D X 72"L X 36"H
A18	1	ELEV. SHELF W/ UTENSIL RACK	22"W X 72"L X 7'-6"H
A19	1	TABLE: WORK W/ DRW'S-U SHELF	30"D X 72"L X 36"H
A20	1	OVEN: SINGLE CONVECTION	
A21	1	STEAMER: ELECT 1 COMPT 3 PAN	
A22	1	VENT HOOD: TYPE 1/FACE DISCHARGE	13'-0"L X 4'-0"D X 2'-0"H
A23	1	FIRE SUPPRESSION SYS.	
A24	1	RANGE: 6 BURNER STD OVEN	
A25		NOT USED	
A26	1	HAND SINK: WARE WASHING	
A27		NOT USED	
A28	2	WALL SHELF: S/S WIRE	
A29	1	SINK: 3 COMPARTMENT	10'-0"L X 2'-6"W X 2'-10"H
A30	1	RACK: ALUMINUM POT & PAN	
A31	1	DISH TABLE: CLEAN	30"D X 84"L X 34"H TO TOP
A32	1	BOOSTER HEATER: ELECTRIC	
A33	1	DISH MACHINE: TALL SNGL RACK	
A34		CONDENSATE HOOD: TYPE 11	48"W X 42"D X 24"H
A35	1	U-COUNTER WASTE BARREL	
A36	1	DISH TABLE: SOILED CORNER	40" & 50" X 30"D X 34"H
A37	1	DISPOSAL: 1.5 HP WASTE & PRE-RINSE	
A38	1	HOSE REEL: WALL MOUNT	

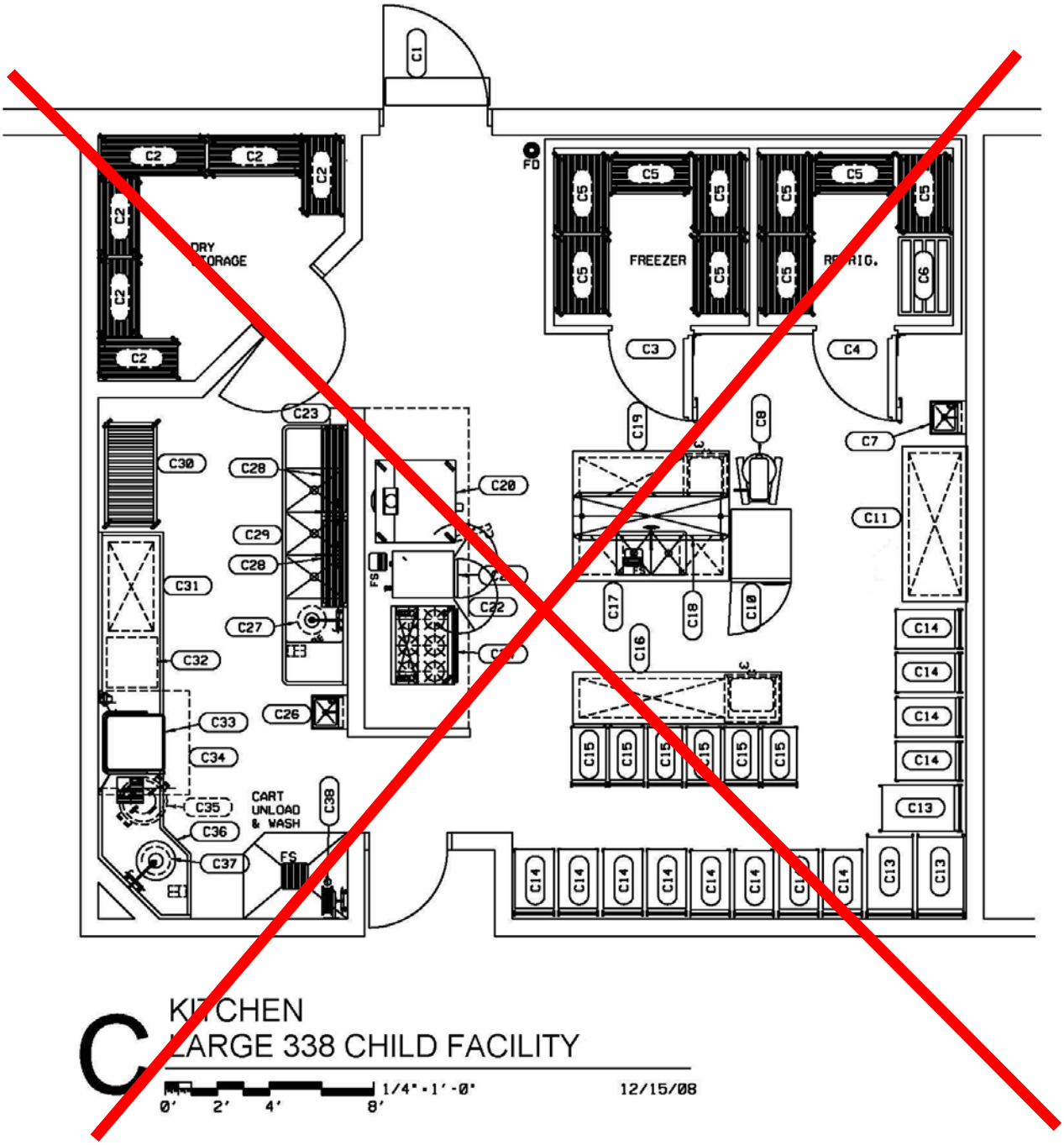
Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)



Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

EQUIPMENT LIST			
ITEM NO	QTY	DESCRIPTION	REMARKS
B1	1	AIR CURTAIN, UNHEATED	
B2	3	SHELVING: CHROME WIRE	18" X 36"
B2	1	SHELVING: CHROME WIRE	18" X 42"
B2	1	SHELVING: CHROME WIRE	18" X 48"
B2	1	SHELVING: CHROME WIRE	18" X 36"
B3	1	WALK-IN FREEZER	ID-6'-0"W X 6'-10"D X 7'-6"H
B4	1	WALK-IN REFRIGERATOR	ID-7'-0"W X 7'-10"D X 7'-6"H
B5	1	SHELVING: EPOXY WIRE	24" X 36"
B5	4	SHELVING: EPOXY WIRE	18" X 36"
B5	2	SHELVING: EPOXY WIRE	24" X 36"
B6	1	DUNNAGE RACK: SNGL TIER MILK CRATE	
B7	1	HAND SINK: FOOD PREP	
B8	1	MIXER: 30 QT. FLOOR	
B9		NOT USED	
B10	1	REFRIGERATOR: 1 SECT REACH-IN	
B11	1	TABLE: WORK W/ UNDER SHELF	30"W. X 72"L. X 36"H.
B12	1	NOT USED	
B13	2	CART: (4) SHELF PRE-SCHOOL	
B14	8	CART: 3 SHELF TODDLER	
B15	4	CART: 3 SHELF INFANT	
B16	1	TABLE: WORK W/ DRW'S-U SHELF	30"D X 96"L X 36"H
B17	1	TABLE: WORK W/ DBL. SINK-U SHELF	30"D X 72"L X 36"H
B18	1	ELEV. SHELF W/ UTENSIL RACK	22"W X 72"L X 7'-6"H
B19	1	TABLE: WORK W/ DRW'S-U SHELF	30"D X 72"L X 36"H
B20	1	OVEN: SINGLE CONVECTION	
B21	1	STEAMER: ELECT 1 COMPT 3 PAN	
B22	1	VENT HOOD: TYPE 1 SURFACE DISCHARGE	13'-0"L X 4'-0"D X 2'-0"H
B23	1	FIRE SUPPRESSION SYS.	
B24	1	RANGE: 6 BURNER STD OVEN	
B25		NOT USED	
B26	1	HAND SINK: WARE WASHING	
B27		NOT USED	
B28	2	WALL SHELF: S/S WIRE	
B29	1	SINK: 3 COMPARTMENT	10'-0"L X 2'-6"D X 2'-10"H
B30	1	RACK: ALUMINUM POT & PAN	
B31	1	DISH TABLE: CLEAN	30"D X 84"L X 34"H TO TOP
B32	1	BOOSTER HEATER: ELECTRIC	
B33	1	DISH MACHINE: TALL SNGL RACK	
B34	1	CONDENSATE HOOD: TYPE 11	48"W X 42"D X 24"H
B35	1	U-COUNTER WASTE BARREL	
B36	1	DISH TABLE: SOILED CORNER	40" & 50" X 30"D X 34"H
B37	1	DISPOSAL: 1.5 HP & PRE-RINSE SPRAY	
B38	1	HOSE REEL: WALL MOUNT	

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)



Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

E Q U I P M E N T L I S T			
ITEM NO	QTY	DESCRIPTION	REMARKS
C1	1	AIR CURTAIN, UNHEATED	
C2	3	SHELVING: CHROME WIRE	18" X 36"
C2	1	SHELVING: CHROME WIRE	18" X 42"
C2	1	SHELVING: CHROME WIRE	18" X 48"
C2	1	SHELVING: CHROME WIRE	18" X 36"
C3	1	WALK-IN FREEZER	ID-7'-6"W X 6'-10"D X 7'-6"H
C4	1	WALK-IN REFRIGERATOR	ID-7'-6"W X 6'-10"D X 7'-6"H
C5	7	SHELVING: EPOXY WIRE	24" X 36"
C5	2	SHELVING: EPOXY WIRE	18" X 36"
C6	1	DUNNAGE RACK: SNGL TIER MILK CRATE	
C7	1	HAND SINK: FOOD PREP	
C8	1	MIXER: 30 QT. FLOOR	
C9		NOT USED	
C10	1	REFRIGERATOR: 1 SECT REACH-IN	
C11	1	TABLE: WORK W/ UNDER SHELF	30"W. X 72"L. X 36"H.
C12		NOT USED	
C13	3	CART: (4) SHELF PRE-SCHOOL	
C14	12	CART: 3 SHELF TODDLER	
C15	6	CART: 3 SHELF INFANT	
C16	1	TABLE: WORK W/ DRW'S-U SHELF	24"D X 96"L X 36"H
C17	1	TABLE: WORK W/ DBL. SINK-U SHELF	30"D X 72"L X 36"H
C18	1	ELEV. SHELF W/ UTENSIL RACK	22"W X 72"L X 7'-6"H
C19	1	TABLE: WORK W/ DRW'S-U SHELF	30"D X 72"L X 36"H
C20	1	OVEN: DBL CONVECTION	
C21	1	STEAMER: ELECT 1 COMPT 3 PAN	
C22	1	VENT HOOD: TYPE 1/PLACE DISCHARGE	1[illegible]'-0"L X 4'-0"D X 2'-0"H
C23	1	FIRE SUPPRESSION SYS.	
C24	1	RANGE: 6 BURNER STD OVEN	
C25		NOT USED	
C26	1	HAND SINK: WARE WASHING	
C27		NOT USED	
C28	2	WALL SHELF: S/S WIRE	
C29	1	SINK: 1 COMPARTMENT	10'-0"L X 2'-6"W X 2'-10"H
C30	1	RACK: ALUMINUM POT & PAN	
C31	1	DISH TABLE: CLEAN	30"D X 84"L X 34"H TO TOP
C32	1	BOOSTER HEATER: ELECTRIC	
C33	1	DISH MACHINE: TALL SNGL RACK	
C34		CONDENSATE HOOD: TYPE 11	48"W X 42"D X 24"H
C35	1	U-COUNTER WASTE BARREL	
C36	1	DISH TABLE: SOILED CORNER	40" & 50" X 30"D X 34"H
C37	1	DISPOSAL: 1.5 HP & PRE-RINSE SPRAY	
C38	1	HOSE REEL: WALL MOUNT	

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

Kitchen Equipment

Description								Notes
Name	Service	Dimensions			Equipment Count			
		Width	Length	Height	Small	Medium	Large	
Air Curtain, Unheated	Exterior Door	-	-	-	1	1	1	CFCI
Cart, Mobile; 3 Shelf		-	-	-	6	12	18	GFGI; Provide applicable space allocation
Cart, Mobile; 4 Shelf		-	-	-	1	2	3	GFGI; Provide applicable space allocation
Dish Table, Clean		?	?	?				CFCI
Dish Table, Clean		30"	84"	34"	1	1	1	CFCI
Dish Table, Soiled; Corner Design		40" & 50"	30"	34"	1	1	1	CFCI
Dish Table, Soiled; SS		?	?	?				CFCI
Dishwasher; Tall Sink Rack		-	-	-	1	1	1	CFCI
Dishwasher, Undercounter		-	-	-				CFCI
Disposal; 1.5 HP, Waste & Pre-Rinse	3 Compartment Sink	-	-	-	1	1	1	CFCI
Disposal; 1.5 HP, Waste & Pre-Rinse	Dish Table, Soiled	-	-	-	1	1	1	CFCI
Dunnage Rack; Single Tier Milk Crate	Walk-In Freezers	-	-	-		1	1	CFCI
Exhaust Hood		?	?	?				CFCI
Exhaust Hood; Type I/Face Discharge	Range, Steamer, Oven	13'-0"	4'-0"	2'-0"	1	1	1	CFCI
Exhaust Hood; Type II	Dishwasher	48"		24"	1	1	1	CFCI
Freezer, Reach-In		59"	38"	85"				GFGI; Provide applicable utilities and space allocation
Freezer, Reach-In; 1 Door			-					GFGI; Provide applicable utilities and space allocation
Freezer, Reach-In; 3 Section		-	-	-	1			GFGI; Provide applicable utilities and space allocation
Freezer, Walk-In		8'-0"	7'-6"	8'-6"	1			CFCI
Freezer, Walk-In		7'-0"	6'-10"	7'-6"				CFCI
Freezer, Walk-In		7'-6"	6'-10"	7'-6"			1	CFCI
Hose Reel; Wall-Mounted	Cart Unloading Wash	-	-	-	1	1		CFCI
Ice Machine, Undercounter; SS		-	-	-				GFGI; Provide applicable utilities and space allocation
Microwave	Snack Bar	-	-	-				GFGI; Provide applicable utilities and space allocation
Mixer; 20 Quart; Floor		-	-	-	1			GFGI; Provide applicable utilities and space allocation
Mixer; 30 Quart; Floor		-	-	-		1	1	GFGI; Provide applicable utilities and space allocation
Oven/Heated Cabinet	Food Prep	-	-	-				CFCI
Oven, Electric		40"	39"	65"				CFCI
Oven; Double Convection		-	-	-			1	CFCI
Oven; Single Convection		-	-	-	1	1		CFCI
Rack; Aluminum	Pot and Pan Storage, Clean	-	-	-	1	1	1	CFCI
Range, Electric		36"	38"	36"				CFCI
Range; 6 Burner, Std Oven		-	-	-	1	1	1	CFCI

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

Kitchen Equipment

Description								Notes
Name	Service	Dimensions			Equipment Count			
		Width	Length	Height	Small	Medium	Large	
Refrigerator, Under Counter	Activity Rooms	-	-	-	8	15	22	GFGI; Provide applicable utilities and space allocation
Refrigerator, Reach-In; Production		-	-	-	1	1	1	GFGI; Provide applicable utilities and space allocation
Refrigerator, Reach-In; 2 Vertical Doors	Food Prep	-	-	-				GFGI; Provide applicable utilities and space allocation
Refrigerator, Side-by-side or top mount, with built-in icemaker	Break Room	-	-	-	1	1	1	GFGI; Provide applicable utilities and space allocation
Refrigerator, Walk-In		5'-10"	7'-9"	7'-1"				CFCI
Refrigerator, Walk-In		6'-0"	6'-10"	7'-6"		1		CFCI
Refrigerator, Walk-In		7'-6"	6'-10"	7'-6"			1	CFCI
Shelf; Elevated, w/Utensil Rack	Food Prep	22"	72"	7'-6"	1	1	1	CFCI
Shelf	Food Prep	12"	72"	-				CFCI
Shelf		18"	96"	-				CFCI
Shelf	Dry Storage	12"	114"	-				CFCI
Shelf, Wire	Dry Storage	24"	48"	-				CFCI
Shelf, Wire	Dry Storage	24"	54"	-				CFCI
Shelf, Chrome Wire	Dry Storage	1[illegible]	36"	-		4	4	CFCI
Shelf, Chrome Wire	Dry Storage	18"	42"	-	1	1	1	CFCI
Shelf, Chrome Wire	Dry Storage	18"	4[illegible]	-	1	1	1	CFCI
Shelf, Epoxy Wire	Walk-In Freezers/Refrigerators	24"	[illegible]	[illegible]	1	3	7	CFCI
Shelf, Epoxy Wire	Walk-In Freezers/Refrigerators	18"	36"	-	3	4	2	CFCI
Shelving	Dry Storage		?	?				CFCI
Sink, 3-Compartment		10'-0"	2'-6"	2'-10"	1	1	1	CFCI
Sink, Hand; Food Prep		-	-	-	1	1	1	CFCI
Sink, Hand; Ware Washing		-	-	-	1	1	1	CFCI
Spray Assembly, Pre-Rinse; GooseNeck		-	-	-				CFCI
Stand	Supports 20 Quart Mixer	-	-	-	1			CFCI
Steamer, Electric; 1 Compartment, 3 Pan		-	-	-	1	1	1	CFCI
Table, Work; w/Double Sinks	Food Prep	30"	72"	36"	1	1	1	CFCI
Table, Work; w/Drawers Under Shelf	Food Prep	30"	72"	36"	2	1	1	CFCI
Table, Work; w/Drawers Under Shelf	Food Prep	30"	96"	36"		1	1	CFCI
Table; w/Drawers Under Shelf	Milk Dispenser	30"	60"	36"	1			CFCI
Table; w/Drawers Under Shelf	Milk Dispenser	30"	72"	36"		1	1	CFCI
Wall Shelf; Stainless Steel Wire	3 Compartment Sink	12"	36"	-	2	2	2	CFCI
Waste Barrel	Dish Table, Soiled	-	-	-	1	1	1	GFGI; Provide space allocation

Acronyms:

CFCI Contractor Furnished, Contractor Installed
GFGI Government Furnished, Government Install

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~25. SPACE: Laundry Room~~

- ~~**FUNCTIONAL DESCRIPTION:** Area to include commercial quality laundry equipment. Small facilities will have 2 washers and 2 dryers. Medium and large facilities will have 3 washers and 3 dryers. In addition, a counter for folding clothes with upper and lower cabinets for storage of laundry materials and a laundry sink shall be provided.~~

- ~~**MINIMUM AREA:** Small: 100 SF, Net. Medium and Large: 180 SF, Net.~~

- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include seamless, easy to clean and maintain, and slip resistant. Floors shall be able to withstand the warm humid environment, shall be able to withstand rolling carts, and shall be able to keep water from getting under the flooring material. A base material, appropriate for the flooring material used, is required. Base shall be seamless except at inside corners. Base shall be sealed to the flooring. A preferred option is a quarry tile floor and base.~~

- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Walls shall be able to withstand the warm humid environment, and shall be able to withstand being bumped by laundry carts.~~

- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, ease of access to mechanical system above ceiling, moisture resistant, and easy to repair.~~

- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with closers. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be a minimum of half-height glass.~~

- ~~**PLUMBING:** Plumbing for laundry tub and washers. A floor drain is required in this area that shall be self priming, or designed to prevent sewer gases from entering the occupied space by a proven and maintenance-free design.~~

- ~~**SPECIAL REQUIREMENTS:** Dryer vents shall be individually and directly vented to the outside through a chase in the mechanical room as shown on the drawings. A booster fan will be provided in the dryer vent when the travel distance exceeds 20 feet to the exterior.~~

- ~~**FIRE PROTECTION:** Must be a 1-hour fire rated enclosure. Door and hardware to have a 45 minute fire rating. A smoke detector is required in the Laundry Room.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~26. SPACE: Outreach/Transitional Care Activity Room~~

- ~~**FUNCTIONAL DESCRIPTION:** Activity Room which functions for child care, which includes eating, sleeping, playing, and other activities. Room accommodates children on a short term occasional basis (e.g. child care for deployment support, Family Readiness Groups, etc).~~

- ~~**ADJACENCIES:** Shall be adjacent to the corridor and shall have direct access to the exterior. Direct access to age-appropriate playground is also required. Shall have direct access to storage room.~~

- ~~**OCCUPANTS:** Two Program Assistants and a maximum of 24 Children (depending upon age of children).~~

- ~~**MINIMUM AREA:** Minimum Program Area of 840 net SF, which is approximately 1023 net square feet. Program Area may NOT be any less than 840 net SF. See attached drawing for calculation of net Program Area. Hatched area indicates portions of room that can be included in the minimum net Program Area. Program area is NOT the same as net area or gross area.~~

- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include seamless, easy to clean and maintain. A base material, appropriate for the flooring material used, is required. Base shall be seamless except at inside corners. Base shall be sealed to floor with USDA or NSF approved caulking.~~

- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall material shall have the ability to absorb pushpins. Wall surface shall be able to withstand tape peeling. Where drinking fountains and/or lavatories are provided within the Activity Room space, a minimum 48" tall wainscot that is impervious to water and able to withstand daily sanitizing is required. This material shall extend to the floor and at least 18" horizontally in both directions from the centerline of the equipment.~~

- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.~~

- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with finger guards at the hinges, on the Activity Room side, up to a minimum height of 48". Finger guard shall be roll type. On exterior doors, finger guards shall not conflict with weather stripping. Interior doors shall be a minimum of half-height glass, with a clear width opening of 34 inches and shall be provided with a 12 inch wide side lite on the latch side of the door. Exterior door shall be provided with flush panic hardware, shall have a clear width opening of 34 inches, open at least 110 degrees to ensure ease of crib emergency evacuation, and direct exiting onto the outdoor play space. Interior and exterior doors shall swing in the direction of exit travel. Door thresholds and hardware will be designed to facilitate the exit of a crib containing five infants by a single adult. The thresholds will have a low profile. Doors shall be provided with self-closing device.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

- ~~**VISION PANELS/VIEW WINDOWS:** Shall be in accordance with the Army Standard. At least 1 view window must be provided between this space and the corridor. In addition, not less than 2 vision panels must be provided between the activity space and the corridor.~~

- ~~**CABINETRY:** Salient characteristics include easy to clean, maintain and repair. Cabinets shall be durable and be able to withstand impacts (example: food carts), without showing damage. Cabinets shall be a minimum of Architectural Woodworking Institute (AWI) 400B, Custom Grade, High Pressure Laminate clad. Counter top shall have integral back splash, and shall be solid surfacing, solid phenolic, or better. Counter tops of cabinets will have rounded/radius corners and edges.~~
  ~~**a)** A 3'-6" wide sign-in desk with 6 lockable storage units (each keyed separately) in an overhead cabinet, and an adjacent 18 inch wide coat closet. Refer to illustrations under General Requirements.~~
  ~~**(b)** 8 foot wide base and wall cabinets with 2 stainless steel sinks. Sinks shall be separated as much as possible, and shall be provided with gooseneck faucets. Sink bowls shall be a minimum of 21" W x 15-3/4" D x 8" H. Space shall be provided for an undercounter refrigerator. Consider providing 2 – 36" W base cabinets with a 2' space between for the refrigerator. Base cabinets shall be lockable, and may not have a protruding handle. All base cabinets in the facility shall be keyed alike.~~
  ~~**(c)** 24-25 pre-school cubbies, 8"-12" wide x 15" deep x 46"-49" tall permanently attached to walls (pre-manufactured). Provided by Building Contractor.~~
  ~~**(d)** One diaper changing station approximately 2 foot wide by 5 foot long cabinet with sink integral to diaper changing surface, and retractable stairs. Refer to illustrations under General Requirements. Provided by Building Contractor.~~

- ~~**HVAC:** An exhaust providing 100 to 150 cubic feet per minute shall be provided directly over the diaper changing station. Room temperature shall be measured and maintained at 1 foot above finished floor. Temperature will be designed for 68 °F in the winter and for 78 °F in the summer.~~

  ~~Humidity Control. A relative humidity of between 35 and 50 percent will be maintained in CDC child activity rooms to prevent drying of mucous membranes, to control the spread of diseases, and to prevent mold growth.~~

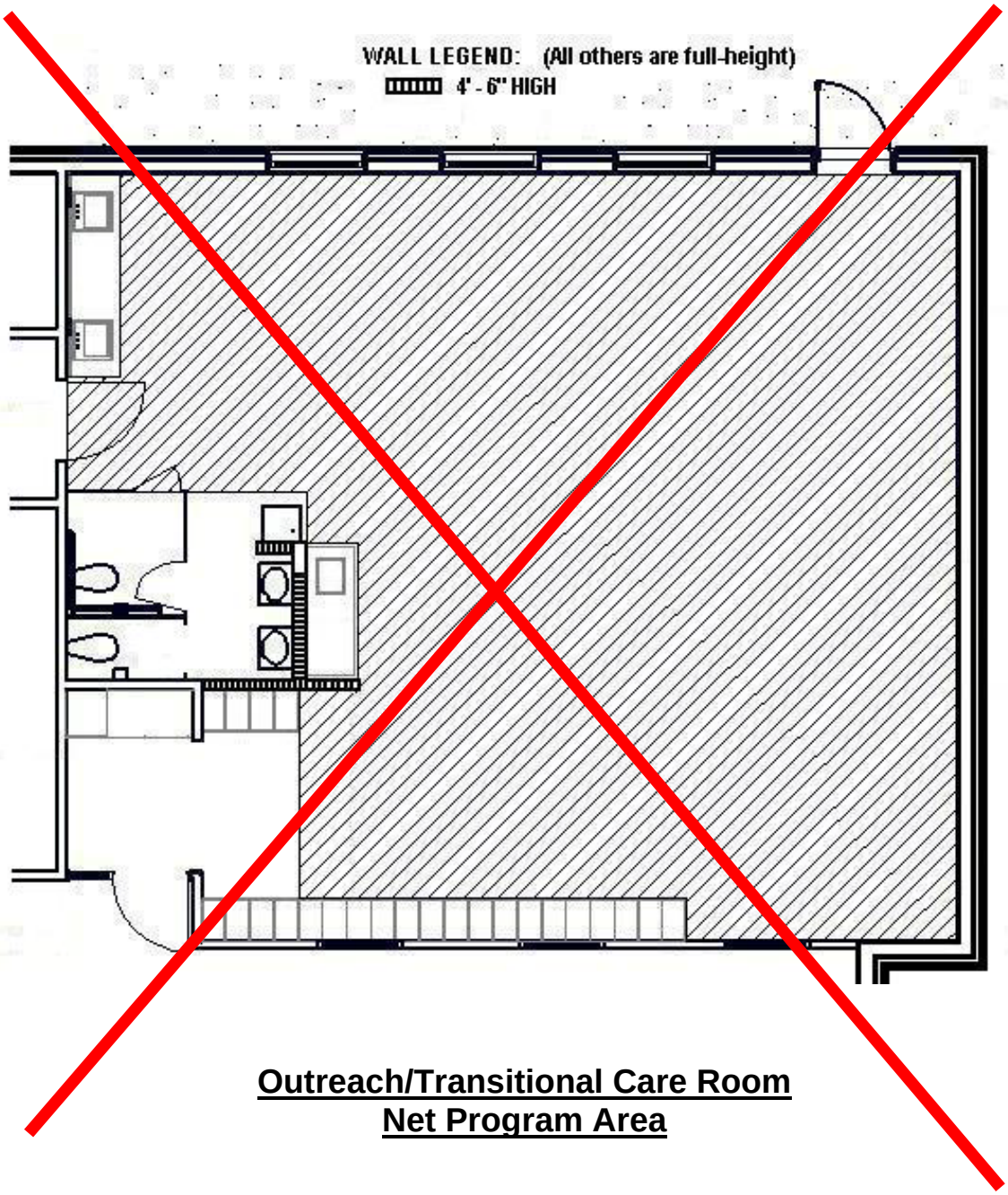
- ~~**ELECTRICAL:** All electrical outlets, except for those mounted above countertops, shall be mounted 54" above the finish floor, and shall be hospital grade, tamper resistant safety type. Outlets provided above countertops shall be located no less than 18" from the edge of the countertop. Two electrical outlets to be provided above the backsplash (food preparation/art counter/sink), one over each open counter area. Electrical outlet to be provided for under the counter refrigerator. Electrical outlet, data port and intercom phone connection at sign in desk to be provided. Provide task lighting at sign in desk, installed on underside of upper cabinets. A minimum of 2 (two) outlets will be provided above the cubbies in the program area and will be mounted horizontally. A minimum of 4 (four) duplex outlets will be installed, evenly spaced, on the exterior wall and the wall opposite the toilet area. In addition, provide 2 (two) voice/data outlets in the activity area. A minimum of 5 (five) blank outlet covers will be provided but not installed.~~

  ~~Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.) Lighting within the child activity~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~rooms must; sign-in desk and toilet be zoned together; and either an additional 2 zones or lamp control within the acticity space, to allow different lighting levels for nap time and activity times. A minimum of .1 foot candle must be maintained in the activity room to allow for camera operation.~~

- ~~**PLUMBING:** Plumbing for toilet/lavatory area, diaper changing table, and food preparation/art counter/sink area is required. A drinking fountain (non-refrigerated, similar to Halsey Taylor model HRFG-E), mounted so that top of drinking fountain is 17" above finished floor, to be provided on the other side of the wall, directly accessible from the activity area, as shown in the following diagram.~~



Outreach/Transitional Care Room
Net Program Area

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~27. SPACE: Outreach/Transitional Care Storage Room~~

- ~~**FUNCTIONAL DESCRIPTION:** Storage room to support the Outreach/Transitional Care Room.~~
- ~~**ADJACENCIES:** Shall be directly accessible from the Activity Room~~
- ~~**OCCUPANTS:** CDC Staff.~~
- ~~**MINIMUM AREA:** 45 SF, Net.~~
- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.~~
- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable.~~
- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.~~
- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with self-closing device. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be a minimum of half-height glass.~~
- ~~**ELECTRICAL:** A minimum of 1 (one) electrical outlet is required.~~
- ~~**SPECIAL REQUIREMENTS:** A minimum of three adjustable shelves with heavy-duty standards and brackets will be provided on 3 walls. At least one 18" deep shelf and two 12" deep shelves shall be provided. Shelving shall be able to support 100 pounds per lineal foot.~~

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

~~28. SPACE: Outreach/Transitional Care Toilet Area~~

- ~~**FUNCTIONAL DESCRIPTION:** Toilet area for CDC children.~~
- ~~**ADJACENCIES:** Shall be directly accessible from the Outreach/Transitional Care Room~~
- ~~**OCCUPANTS:** CDC Children with staff assistance.~~
- ~~**MINIMUM AREA:** 62 SF, Net.~~
- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. A base material, appropriate for the flooring material used, is required.~~
- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. On all walls, a minimum 48" tall wainscot is required that is impervious to water and be able to withstand daily sanitizing.~~
- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects.~~
- ~~**TOILET PARTITION:** Salient characteristics include easy to clean and maintain, and shall be durable. Top of toilet partitions shall be no higher than 48" tall with 12" clear opening at bottom. A stall door shall NOT be provided on the smaller toilet stall. Floor mounted partitions are preferred. Partitions shall be color-through phenolic. If ceiling hung partitions are requested, partitions shall be color-through phenolic or solid plastic.~~
- ~~**PLUMBING:** Two (2) pediatric floor mounted water closets (one 10" to rim, one 13" to rim), and two (2) child wall mounted lavatories (one 17" AFF, one 20" AFF) to be located opposite the water closets. Stall doors shall be provided as shown in the drawing. The 10" water closet to be located in the smaller stall, with the 17" lavatory located across from the same stall. A floor drain is required in this area that shall be self priming, or designed to prevent sewer gases from entering the occupied space by a proven and maintenance-free design. Provide continuous, or closed front toilet seats. Dual flush valve toilets are allowed; however, automatic flush valves are not allowed.~~

  ~~For the sinks in the toilet area (NOT the sinks in the food prep/arts and crafts area), faucets shall be pre-mixed single push control that meets ADA requirements. Water shall run for 15 seconds.~~
- ~~**HVAC:** An exhaust over the water closet area~~
- ~~**ELECTRICAL:** No electrical receptacles are allowed in this area.~~
- ~~**SPECIAL REQUIREMENTS:** Unbreakable lavatory mirrors required above each lavatory.~~

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~~One of the toilet stalls and one of the lavatories shall meet child ADA requirements. Reference the floor plan for accessible door location. Distance between toilet partition and lavatory shall be 33" to facilitate side approach.~~

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~~29. SPACE:~~ ~~Active Play Room~~

- ~~**FUNCTIONAL DESCRIPTION:** An active indoor play area for CDC children to utilize during inclement weather/temperature extremes.~~

- ~~**OCCUPANTS:** Two Program Assistants and CDC children appropriate to the specific age group to maintain proper adult/child ratio.~~

- ~~**MINIMUM AREA:** Minimum Program Area of 1080 net SF. Program Area may NOT be any less than 1080 net SF. See attached drawing for calculation of net Program Area. Hatched area indicates portions of room that can be included in the minimum net Program Area. For this space, program area is the same as net area.~~

- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include seamless, easy to clean and maintain. A base material, appropriate for the flooring material used, is required. Base shall be seamless except at inside corners. Base shall be sealed to floor with USDA or NSF approved caulking.~~

- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall surface shall be able to withstand tape peeling. Walls shall be hardened to withstand impacts from balls, trikes, etc. Where walls of the Active Play Room are shared with other activity rooms or Training Room, they shall be designed to have a minimum STC rating of 55.~~

- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include durability to withstand impact from balls. In addition, ceiling shall provide acoustical control. Some portion (at least 50%) of the ceiling shall be at least 9' high.~~

- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with finger guards at the hinges, on the Activity Room side, up to a minimum height of 48". Finger guard shall be roll type. On exterior doors, finger guards shall not conflict with weather stripping. Interior doors shall be a minimum of half-height glass, with a clear width opening of 34 inches and shall be provided with a 12 inch wide side lite on the latch side of the door. Exterior door shall be provided with flush panic hardware, shall have a clear width opening of 34 inches, and direct exiting onto the outdoor play space. Interior and exterior doors shall swing in the direction of exit travel. Doors shall be provided with self-closing device.~~

- ~~**VISION PANELS/VIEW WINDOWS:** Shall be in accordance with the Army Standard. At least 1 view window and 2 vision panels must be provided between this space and the corridor.~~

- ~~**HVAC:** Room temperature to be measured and maintained at 1' AFF. Temperature will be designed for 68 °F in the winter and for 78 °F in the summer.~~

  ~~Humidity Control. A relative humidity of between 35 and 50 percent will be maintained in CDC child activity rooms to prevent drying of mucous membranes, to control the spread of diseases, and to prevent mold growth.~~

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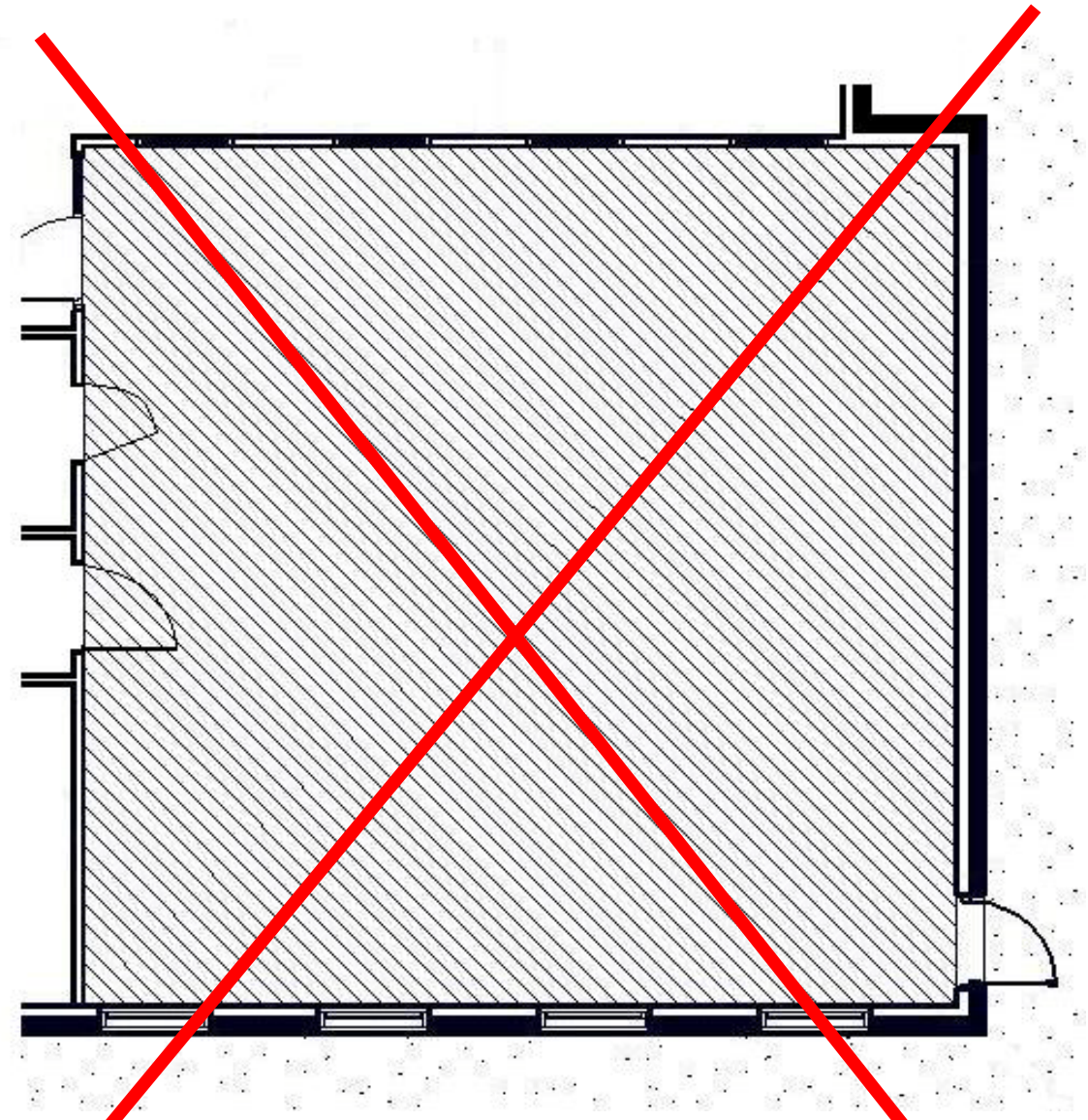
- ~~**ELECTRICAL:** All electrical outlets shall be hospital grade tamper resistant safety electrical outlets, mounted 54 inches above the finish floor. An intercom phone connection is required. The location of the intercom shall be in the corner by the door.~~

  ~~Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.)~~

- ~~**SPECIAL REQUIREMENTS:** For safety reasons, no outside corners may occur in this space. Cased openings shall be provided with resilient corner guards or shall be rounded. Door hardware shall be designed to reduce injury from impact.~~



Active Play Room
Net Program Area

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~~30. SPACE: Active Play Storage Room~~

- ~~**FUNCTIONAL DESCRIPTION:** Storage room to support the Active Play Room.~~
- ~~**ADJACENCIES:** Shall be directly accessible from the Activity Room~~
- ~~**OCCUPANTS:** CDC Staff.~~
- ~~**MINIMUM AREA:** 90 SF, Net.~~
- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, maintain, and repair. A base material, appropriate for the flooring material used, is required.~~
- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable.~~
- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.~~
- ~~**DOORS/FRAME:** Salient characteristics include durability. Doors, frames, and hardware shall be able to withstand constant opening and closing. Doors shall be provided with self-closing device. Door shall be fitted with a locking mechanism and lever type handle that allows the door to be opened from the inside while locked. Doors shall be a minimum of half-height glass. Glass shall be able to withstand impact from balls and play equipment. Hardware on the Active Play Room side of the door shall be designed to reduce injury from impact.~~
- ~~**SPECIAL REQUIREMENTS:** A minimum of four adjustable shelves with heavy-duty standards and brackets will be provided on 3 walls. At least two 18" deep shelves and two 12" deep shelves shall be provided. Shelving shall be able to support 100 pounds per lineal foot~~.

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~~31. SPACE:~~ ~~Active Play Toilet Area~~

- ~~**FUNCTIONAL DESCRIPTION:** Toilet area for CDC children.~~
- ~~**ADJACENCIES:** Shall be directly accessible from the Active Play Room~~
- ~~**OCCUPANTS:** CDC Children with staff assistance.~~
- ~~**MINIMUM AREA:** 45 SF, Net.~~
- ~~**MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. A base material, appropriate for the flooring material used, is required.~~
- ~~**MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include shall be easy to clean and maintain, and shall be durable. On all walls, a minimum 48" tall wainscot is required that is impervious to water and be able to withstand daily sanitizing.~~
- ~~**MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and free of sags or other defects.~~
- ~~**TOILET PARTITION DOOR:** A toilet partition door will be used in lieu of a standard door at the entrance to the Active Play Room Toilet. No toilet partitions are required within the toilet room. Salient characteristics include easy to clean and maintain, and shall be durable. Top of toilet partition door shall be no higher than 48" tall with 12" clear opening at bottom. Partitions shall be color-through phenolic. If ceiling hung partitions are requested, partitions shall be color-through phenolic or solid plastic.~~
- ~~**PLUMBING:** One (1) pediatric water closet (13" to rim), and one (1) child lavatory (20" to rim). A floor drain is required in this area that shall be self priming, or designed to prevent sewer gases from entering the occupied space by a proven and maintenance-free design. Provide continuous, or closed front toilet seats. Dual flush valve toilets are allowed; however, automatic flush valves are not allowed.~~
- ~~**HVAC:** An exhaust in the toilet area.~~
- ~~**ELECTRICAL:** No electrical outlets are allowed in this area.~~
- ~~**SPECIAL REQUIREMENTS:** Unbreakable lavatory mirrors required above each lavatory.~~

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32. SPACE: Corridor

- **FUNCTIONAL DESCRIPTION:** Main Circulation Space

- **MINIMUM FLOOR and BASE CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, durable, easily repairable, and easy to maintain. A base material, appropriate for the flooring material used, is required. Base shall be seamless except at inside corners.

- **MINIMUM WALL CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include easy to clean, repairable, easy to maintain, and durable. Wall material shall have the ability to absorb pushpins. Wall surface shall be able to withstand tape peeling. Also, wall surface shall be durable so that impacts from buggies and carts do not damage the wall.

- **MINIMUM CEILING CONSTRUCTION/SURFACE PERFORMANCE:** Salient characteristics include ease of accessibility to mechanical system above ceiling, durable, and shall provide an aesthetically pleasing surface, free of sags or other defects. Shall have a minimum STC rating of 45.

- **DOORS/FRAME:** All doors that open into the corridor, that are not located within a recessed alcove, must swing 180 degrees to avoid reducing the usable corridor width. Only infrequently-used doors, such as janitor's closet, may open into the corridor without a recess. Doors leading to the outside from the corridor must also be provided with a side lite.

- **ELECTRICAL:** Outlets to be mounted 18" AFF.

  Provide lighting with dimming (continuous, flicker-free dimming from 100% to 10%) or a multilevel switching scheme (with one inboard lamp switched separately from outboard lamps to provide distinct, evenly distributed lighting levels.)

- **PLUMBING:** Provide an electric water cooler, ~~17" AFF, near the Active Play Room~~ as shown on the drawings.

- **SPECIAL REQUIREMENTS:** Corridor SHALL have a minimum clear width of NO LESS THAN 6'-0". To allow for bulletin boards and other projections, recommend maintaining a clear width between walls of at least 6'-2".

- **INTRUSION ALARM:** Exit notification system with keyed manual override is required where doors do not exit into fenced area.

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33. SPACE: Security & Monitoring General Information

POWER - CCTV SYSTEM:

CAMERA POWER SUPPLY: Power for the CCTV cameras shall be distributed from the SER rack mount power supply to each camera location (Class 2 limited power source - low voltage system - 24VAC to the cameras). The number of cameras provided for each facility shall be as indicated ~~on the SECURITY & MONITORING PLAN included in the Child Development Center (CDC) for Children 6 Weeks - 5 Years Old Standard Plans (Attachment F).~~

SURVEILLANCE EQUIPMENT RACK (SER): The circuit shall be terminated with a 3-prong receptacle (L5-30P3W125V) recess-mounted in the location designated for the SER.

~~Small Facility -~~ One (1) 120VAC/30-AMP circuit shall be supplied to the location designated for the CCTV SER.

~~Medium And Large Facilities - Two (2) 120VAC/30-AMP circuit shall be supplied to the location designated for the CCTV SER.~~

~~PARENTAL VIEWING MONITOR (PVM): A standard 110 VAC receptacle shall be installed at the location designated for the PVMs. The receptacle shall be mounted above the drop ceiling and can be tied to any circuit in the facility.~~

~~PVM WORKSTATION (PWS): A standard110 VAC outlet shall be made available at the reception desk, for the PVM workstation.~~

ELECTRICAL METALLIC TUBING (EMT): EMT shall be sized in accordance with the National Electric Code (NEC) based upon the type, gauge and quantity of cabling and wiring installed within the EMT. The conduit fill rate shall conform to the NEC standard.

POWER CABLE: The camera power cable shall be 2-conductor AWG 18 gauge stranded unshielded, plenum rated cable type. The preferred wire is pre-marked SmartWire^{tm} security access control cable 2-conductor 18 AWG bare copper, non-shielded plenum. Color combination to be determined by Contractor as required.

Un-terminated power cables shall be identified by either the camera number, the specification of the power run, or in a manner determined by the Contractor.

All power cables shall be one continuous run. Splicing is not acceptable.

In the location designated for the SER leave 20' excess coil of power cable.

VIDEO CAMERA CABLE: The camera video cable shall be RG-59U type CCTV plenum coax cable type. The preferred cable is pre-marked SmartWire^{tm} RG-59 video surveillance cable plenum. Color combination to be determined by Contractor as required.

Un-terminated video cables shall be identified by either the camera number, the specific location of the video run or in a manner determined by the Contractor.

All video cables shall be one continuous run. Splicing is not acceptable.

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In the location designated for the SER leave 20' excess coil of video cable.

CEILING INSTALLATIONS: In areas with drop ceilings, run conduit (w/ video and power cabling) above the ceiling from SER location to each camera location. Leave 6' excess coil of power and video cable tied up at the camera location.

In areas w/o dropped ceilings, run conduit (w/ video and power cabling) above ceiling from SER location to each camera location. Provide one (1) single gang receptacle box, recess mounted, on the wall no more than 12', and no less than 8', above the fixed floor at each camera location (the closer to 12' is preferable for greater field of view.) All receptacle boxes in the same area shall be mounted at the same distance from the fixed floor.

In areas with exposed conduit, provide one (1) octagon box surface mounted on the wall no more than 12', and no less than 8', above the fixed floor at each camera location (the closer to 12' is preferable for greater field of view). All receptacle boxes in the same area shall be mounted at the same distance from the fixed floor.

EXTERIOR CAMERAS: In areas where cameras are to be installed on building exterior, run conduit (w/ video and power cabling) from SER location to the adjacent interior location. Leave the requested 6' excess coil of power and video cable tied up at the location. Do not penetrate the wall, if required, a 4"x 4" junction box and sleeve will be installed during camera installation. Request a #12 solid ground wire at each designated exterior camera location. Suggested grounding options are:

Grounding wire(s) to be attached to a grounded conduit run, or

Run grounding wire from communication room/SER location to exterior cameras. If option #2 is the method of grounding, provide a #6 or #8 ground wire from communication room/SER location to a power panel.

~~**CAT-6 CABLE AND CONNECTION:** A 10/100/1000 Base-T CAT-6 circuit shall be provided between the facilities administrator's office and the SER location. A second 10/100/1000 Base-T CAT-6 circuit shall be provided between the PVM workstation location at the reception desk and the SER. This shall include a terminated RJ-45 receptacle at the administrator's office and the PVM workstation location. At the SER, both circuits shall be un-terminated with 20' excess coiled in overhead.~~

~~**PULL BOX:** A pull box shall be installed at the PVM with an EMT wire path between it and the PVM workstation location. All EMT shall be a minimum of one (1) inch in diameter.~~

DIFFUSERS/REGISTER/GRILLES: Do not install diffusers, registers, or grilles above a location designated for SER. Forced heat during winter months may cause over-heating of equipment.

CABLE TRAYS: If the facility has cable trays, recommend using tray to get camera wires as close to the camera locations as possible. Then run conduit to the exact locations using the most direct route.

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34. SPACE: Playground/Outdoor Play Areas

- Outdoor play areas (playground) serve as extensions of classroom spaces and must be provided to support programming. Playground is to be divided into individual areas to accommodate the different age groups occupying the facility. ~~Three~~ separate play areas are required for various age groups of children. In general, these areas will serve: infant/pre-toddler, toddler/preschool, and pre-kindergarten/kindergarten. Installation in put is required to finalize the age groups to be served by each playground. The playground area is capable of supporting 50% of the children at any given period of time at a minimum of 100 sq. ft. per child using the outdoor play space. Playgrounds must meet guidelines contained in the Consumer Products Safety Commission (CPSC) Handbook for Public Playground Safety, the American Society for Testing Materials (ASTM) F-1487-93, and meet ADA guidelines for playgrounds (www.access-board.gov). Specific play areas may be defined by several elements. Elements include circulation paths, open play areas/natural turf, age appropriate equipment, play structures, attenuation material for use zones, and fencing. Shade in the outdoor play areas is a requirement for certification.

- All Activity Rooms (Infant/Pre-Toddler/Toddler, Pre-school/Pre-K/Kindergarten, ~~Transitional Care, and Active Play Room)~~ MUST exit directly to the fenced playground area.

- The ~~three~~ playgrounds must be connected within the overall fenced area, but must be separated by fencing and gates.

- A playground safety surface shall be provided throughout all use zones and under all play equipment. The safety surface will be ~~unitary or~~ poured in place material. ~~The swing fall attenuation material may be engineered wood fiber, with approved rubber matting at foot contact point underneath the swings, if requested by the installation. Beneath the infant swings, a unitary safety surface will be used.~~

- Trike paths are a requirement and dual function as an evacuation route, as well as, a play element. Refer to ADA Guidelines for widths of pathways for egress. A portion of the trike path must provide direct access to a gate in the exterior fence. This gate must be located no less than 50' from the building in any direction. The portion of the trike path leading to this gate must be smooth. Trike paths must be a minimum of 5' wide.

- Outdoor Play Area must be fenced. All fencing must be vinyl coated chain-link security type minimum 4' high at the perimeter and 4' high to sub-divide play areas by age group. Fencing will have gates between the play areas. Exit gate to be provided with adult controlled securing device to allow access for emergency and maintenance vehicles as well as egress from building to a safe, open area. Bolt threads, nuts, and ends of wire fasteners shall face away from the playgrounds. Where fence fabric bolt threads and nuts are required to face a playground (generally between play areas), bolts will be trimmed to two exposed threads and sharp edges will be dressed with a file. Additionally, all wire fasteners used to secure the fence fabric to piping (poles, etc.), where the cut ends face an outdoor activity area, will be flush cut to reduce the introduction of knife edges on the ends of the wires. A top rail is required on the fence.

- Poisonous plants, plants with thorns, and fruit bearing plants are not permitted in the outdoor play areas. Reference: A Field Guide to Venomous Animals and Poisonous Plants (1994)

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- Fire alarm audio and visual devices shall be provided for each playground.

- Playground design must be reviewed by garrison CYS staff and approved by FMWRC. Playground installation must be in accordance with the Consumer Products Safety Commission (CPSC) and all applicable American Society for Testing and materials (ASTM) standards. Contractor shall provide written documentation that playground meets those standards and has been inspected by a Certified Playground Safety Inspector (CPSI) prior to turning over to the Government. Documentation of installation and inspection shall be sent to the Center of Expertise and the originals shall be maintained by the garrison CYS staff.

- Due to maintenance concerns, exterior drinking fountains or electric water coolers will NOT be provided in the playgrounds.

- **NOTE: The following drawings are for the ~~Medium size (232 capacity)~~ 0-5 CDC only. After the drawings is a chart that lists the recommended playground equipment for the Small ~~and the Large~~ sizes. Use the design concepts shown in the drawings ~~for the Medium~~ to design a Small ~~or Large~~ playground, providing the equipment required within the authorized square footage.**

- **NOTE: Manufacturers and model numbers provided on the following pages are provided for information only to illustrate the types, sizes and capacities required. Other play structures and activities may be provided as long as they fit within the same use zones, provide similar activities, and have a capacity equal to or greater than those shown.**

Standard Design Criteria
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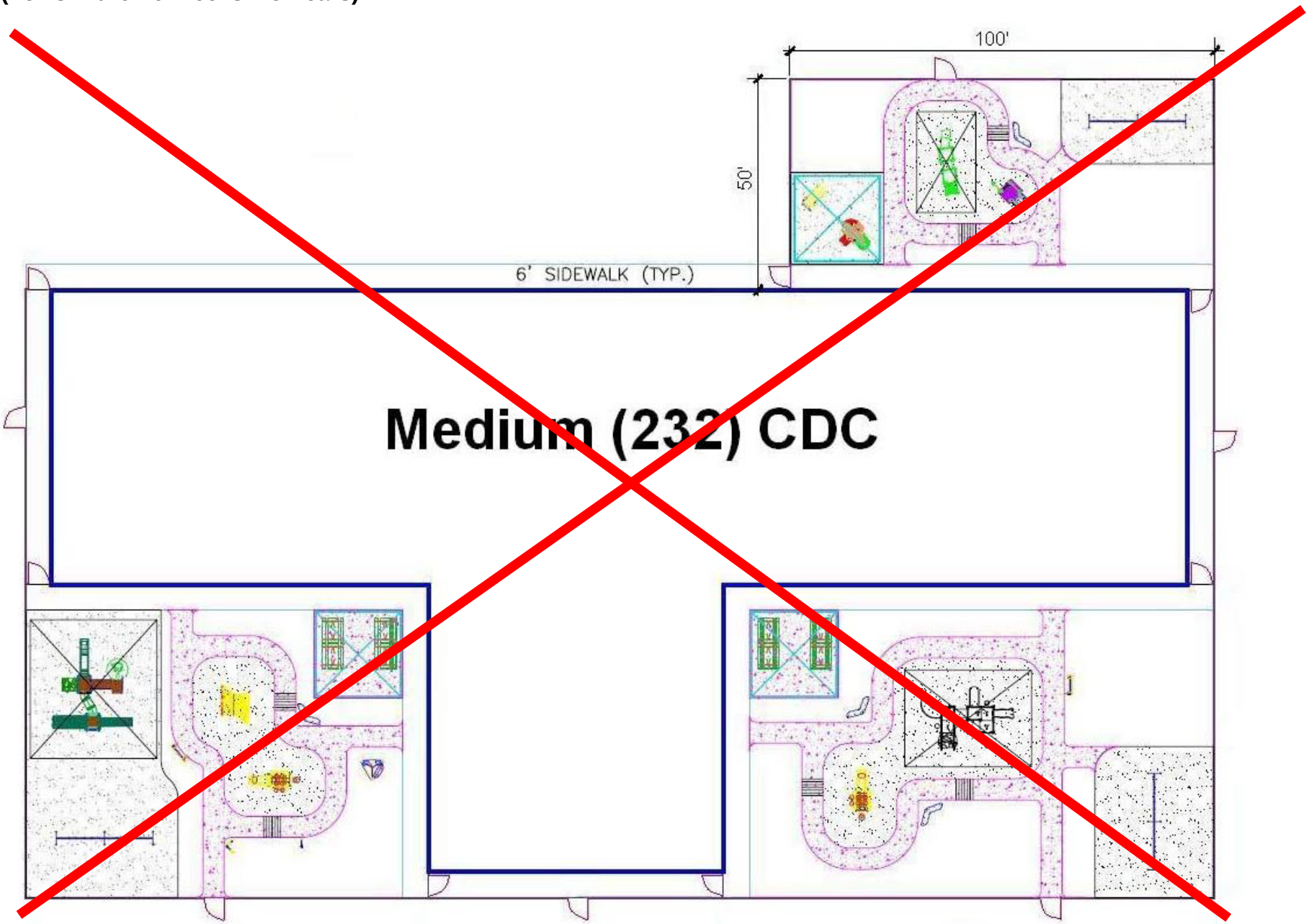

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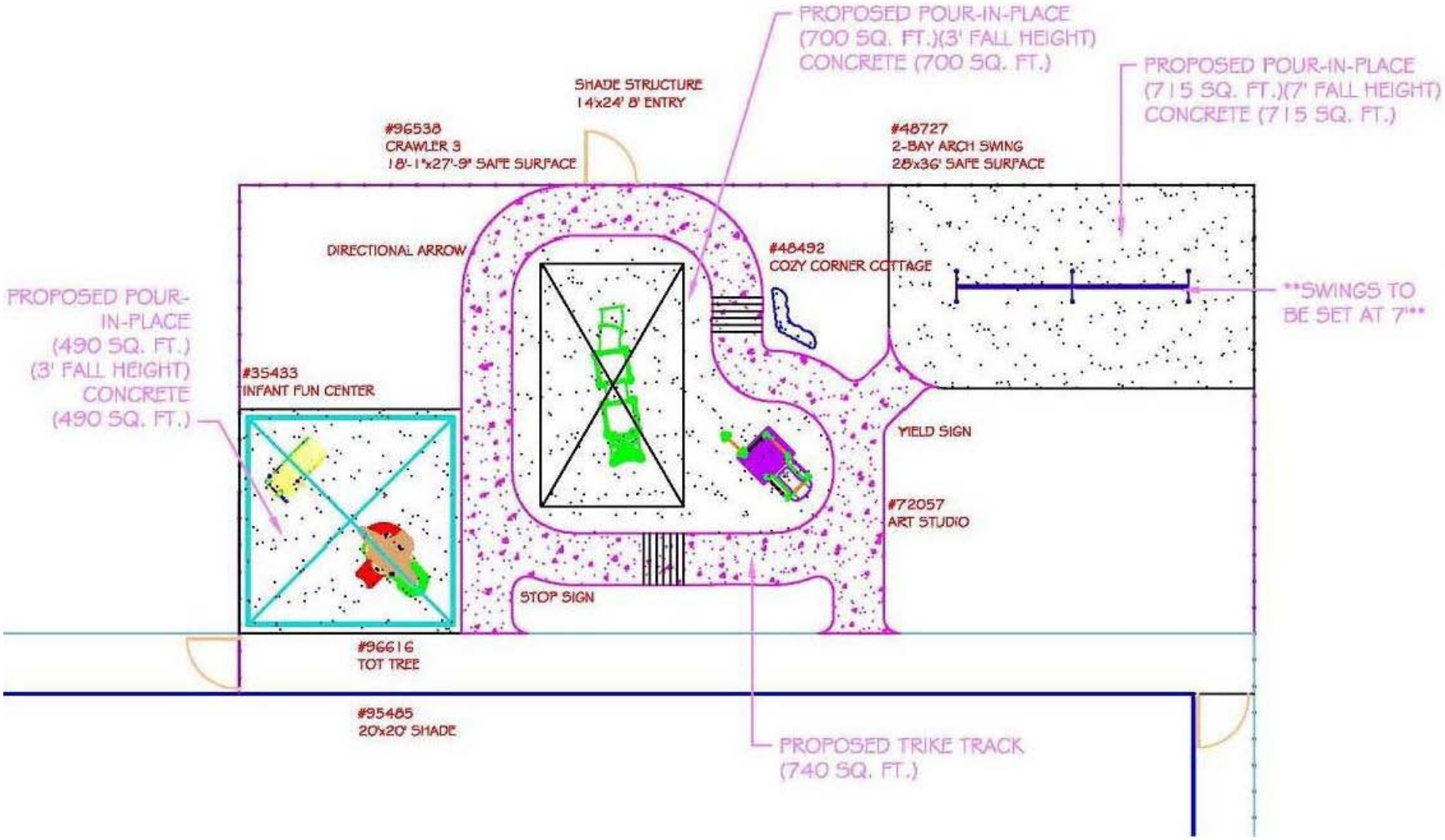

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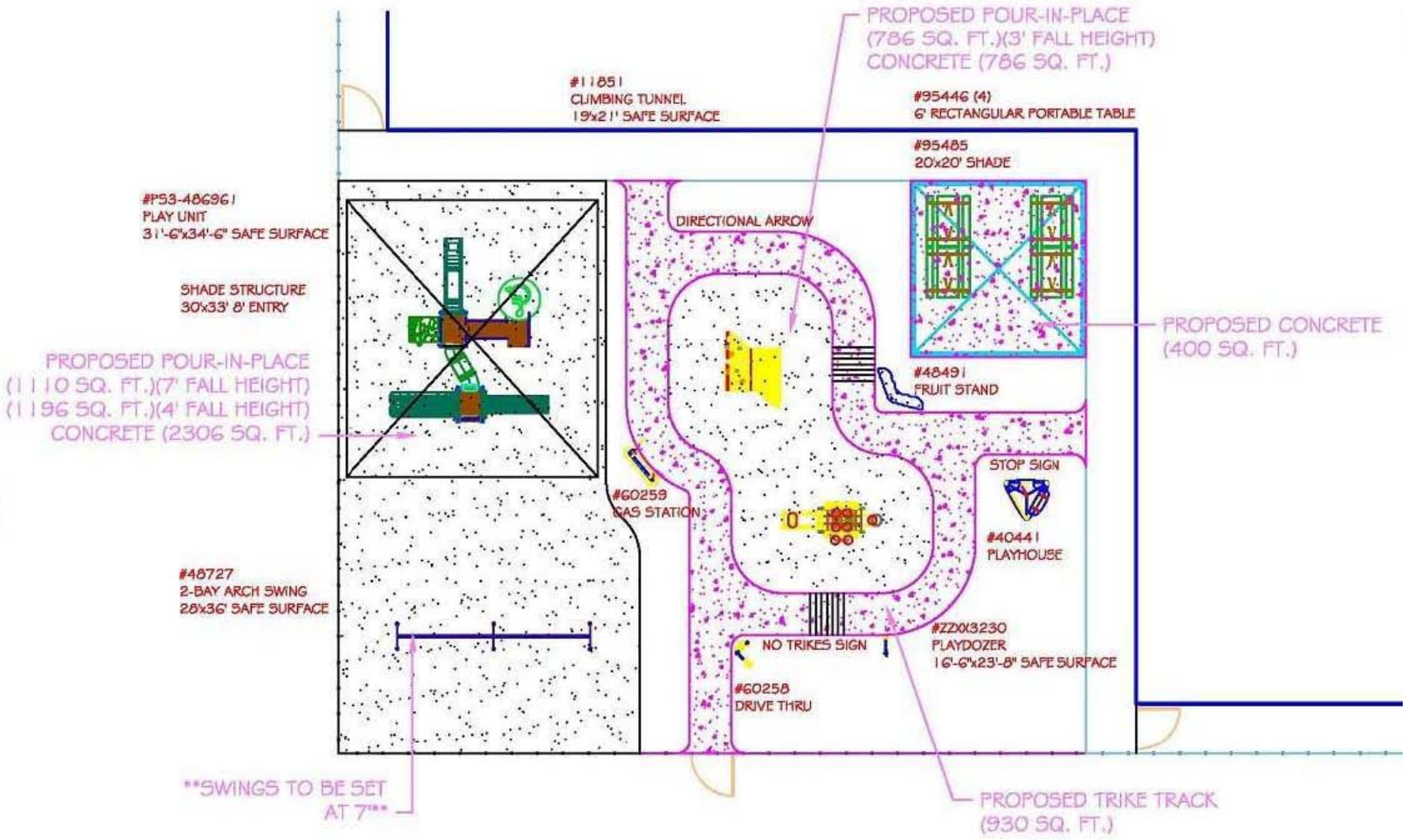

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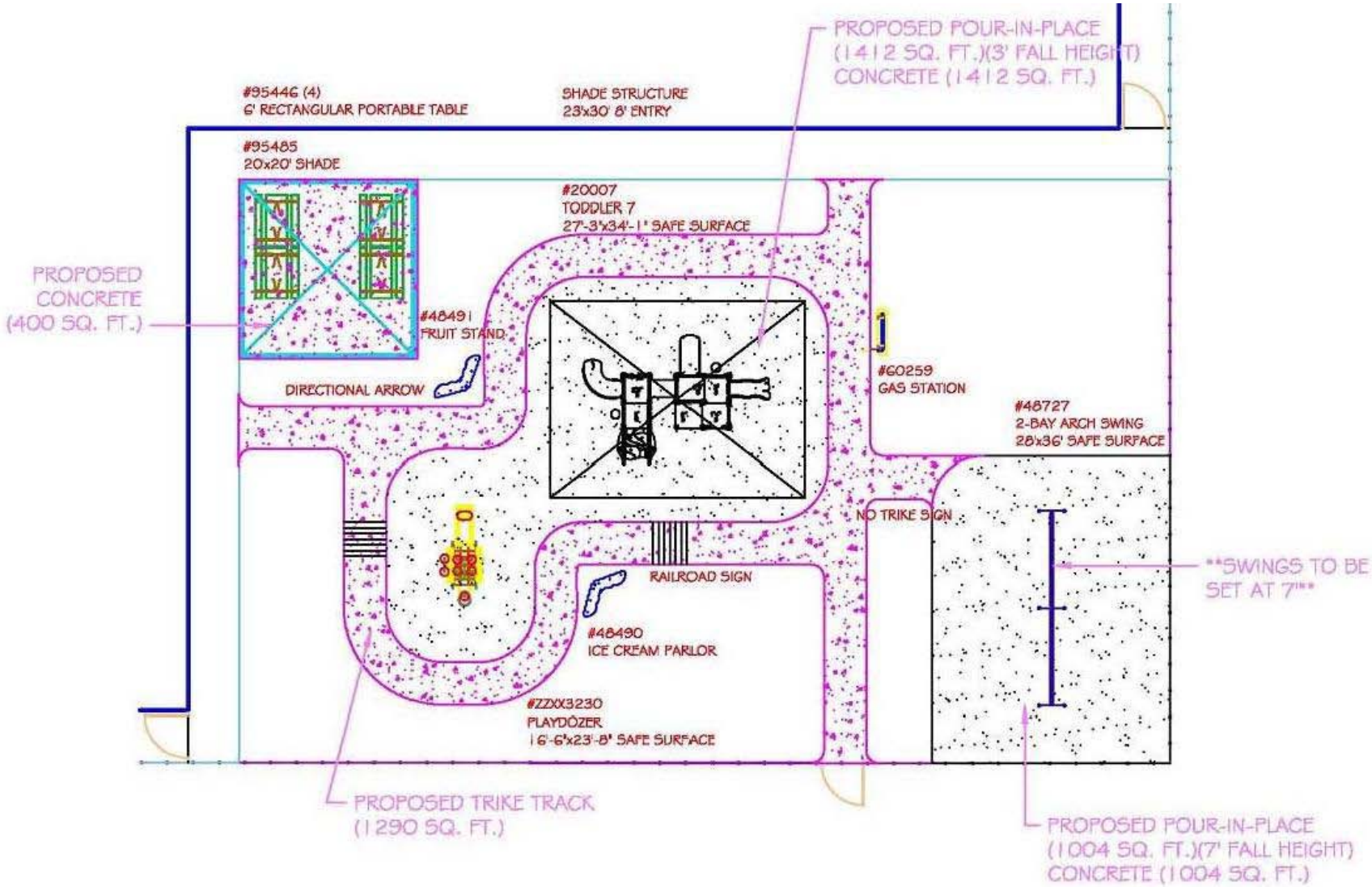

Standard Design Criteria
Child Development Centers
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Playgrounds	**Small CDC Facility**	**Medium CDC Facility**	**Large CDC Facility**	**Additional Notes**
		PLAY STRUCTURE		
Infant/Pre-Tod	Art Studio - Play Designs ** May be on turf Crawler 2 - Game Time InfantFun Center - Little Tykes tot tree - Little Tykes	Art Studio - Play Designs - may be on turf, but concept developed has it on surfacing Crawler 3 - Game Time tot tree - Little Tykes Infant Fun Center - Little Tykes	Art Studio - Play Designs Crawler 3 - Game Time tot tree - Little Tykes Infant Fun Center - Little Tykes	NO EXPOSED WOOD ADA COMPLIANT UNLESS NOTED OTHERWISE, ON PLAY SURFACE
Tod/Pre-School (Designed for the youngest of the 2-5 age group)	680 sq. ft of use zone (resilient surfacing). Two slides or One slide and tunnel Minimum of two play panels Step/crawl or transfer point Minimum of 2 platforms Highest platform at maximum of 32" H Must accommodate minimum of 16 children at one time.	2 different pieces: 1a. 980 sq. ft. of use zone Three slides Minimum of 6 play panels Tunnel Step/Crawler Minimum of 5 platforms Highest platform at maximum of 32" H Must accommodate minimum of 42 children at one time. 1b. 400 sq. ft. of use zone Interactive/pretend-creative play Bulldozer/Firetruck/ark/train, etc. Includes steps, benches, panels, and possibly slides and other active features If possible, relate to local heritage (ie. Covered Wagons in KS) Must accommodate minimum of 5 children at one time.	1a. 680 sq. ft of use zone Two slides Minimum of 4 play panels Step/crawl Minimum of 3 different height platforms Highest platform at maximum of 32" Must accommodate minimum of 30 children at one time. 1b. 400 sq. ft. of use zone Interactive/pretend-creative play Bulldozer/Firetruck/ark/train, etc. Includes steps, benches, panels, and possibly slides and other active features If possible, relate to local heritage (ie. Covered Wagons in KS) Must accommodate minimum of 5 children at one time. 2a. 820 sq. ft of safety zone Spiral slide Straight Slide/Tunnel Rock crawl/climber Minimum of 3 different height platforms Minimum of 1 play panel Highest platform at maximum of 48" Must accommodate minimum of 30 children at one time 2b. 400 sq. ft. of use zone Interactive/pretend-creative play element that is	Small: Toddler Two - Game Time Medium: Toddler Seven - Game Time 200007 Large: Toddler Six - Game Time & Amigo Island - BCI Burke #907

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Playgrounds	**Small CDC Facility**	**Medium CDC Facility**	**Large CDC Facility**	**Additional Notes**
Pre-K/Kinder	1000 sq. ft. of use zone Three Slides Rock climber or other challenging climber Tunnel Minimum of 3 play panels Minimum of 4 platforms Highest platform at maximum of 48" H Must accommodate minimum of 20 children at one time.	3 different pieces: 1a. 1000 sq. ft. of use zone Three Slides Rock climber or other challenging climber Tunnel Minimum of 3 play panels Minimum of 4 platforms Highest platform at maximum of 48" H Must accommodate minimum of 20 children at one time. 1b. 400 sq. ft. of use zone Climbing Tunnel/Rock climbing challenge 1c. 400 sq. ft. of use zone Interactive/pretend/creative play Bulldozer/Firetruck/ark/train, etc. Includes steps, benches, panels, and possibly slides and other active features If possible, relate to local heritage (ie. Covered Wagons in KS) Must accommodate minimum of 5 children at one time.	4 different pieces: 1a. 1350 sq. ft. of use zone Minimum of 3 slides, at least 1 wave and 1 curved Minimum of 4 play panels Rock climbing Other challenging climb structure Minimum of 4 different height platforms Highest platform at maximum of 48" Must accommodate minimum of 32 children at one time. 1b. 400 sq. ft. of use zone Climbing Tunnel/Rock climbing challenge 1c. 400 sq. ft. of use zone Interactive/pretend/creative play Bulldozer/Firetruck/ark/train, etc. Includes steps, benches, panels, and possibly slides and other active features If possible, relate to local heritage (ie. Covered Wagons in KS) Must accommodate minimum of 5 children at one time.	Small: Firefly - BYO; 5281 - Kidstuff Playsystems Medium: same as small
		SWINGS (Poured in place surfacing)		
Infant/Pre-Tod	2-seat full-bucket arch-swing, 7' H crossbar, minimum 3.5" dia beams and legs	4-seat full-bucket arch-swing, 7' H crossbar, minimum 3.5" dia beams and legs	4-seat full-bucket arch-swing, 7' H crossbar, minimum 3.5" dia beams and legs	
Tod/Pre-School	4-seat arch-swing, 7' H crossbar, minimum 3.5" dia beams and legs - **4** full-bucket seats	2 sets of 2- seat arch-swings, 7' H crossbar, minimum 3.5" dia beams and legs - 2 full-bucket, 2 belt seats	2 sets of 4-seat arch-swings, 7' H crossbar, minimum 3.5" dia beams and legs - **4** full-bucket, 4 belt seats	
Pre-K/Kinder	4-seat arch-swing, 7' H crossbar, minimum 3.5" dia beams and legs - 4 belt seats	4-seat arch-swing, 7' H crossbar, minimum 3.5" dia beams and legs - total 4 belt seats	2 seat and 4-seat arch-swing, 7' H crossbar, minimum 3.5" dia beams and legs - total 6 belt seats	
		TRIKE PATHS		
All	5' trike path req'd; resilient play surfacing in the center of trike paths for play structures	5' trike path req'd; resilient play surfacing in the center of trike paths for play structures	5' trike path req'd; resilient play surfacing in the center of trike paths for play structures	
Infant/Pre-Tod	1 building façade (gas station, cottage, drive thru, store, fruit stand, ice cream parlor, club house, etc.) and 2 different type signs (yield, stop, 5 mph, school zone, crossing, traffic light, etc.)	1 building façade and 3 different type signs	2 different building facades and 3 different type signs	
Tod/Pre-School	2 different building facades and 3 different type signs	3 different building facades and 3 different type of signs	4 different building facades and 4 different type of signs	
Pre-K/Kinder	4 different building facades and 3 different type signs	4 different building facades and 4 different type signs	5 different building facades and 4 different type of signs (assuming 2 different trike paths)	

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Child Development Centers
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Playgrounds	Small CDC Facility	Medium CDC Facility	Large CDC Facility	Additional Notes
		SHADE STRUCTURE (water proof)		
Infant/Pre-Tod	Minimum 20' x 20'; must cover infant fun center, and tot tree	Minimum 20' x 20'; must cover infant fun center, and tot tree	Minimum 20' x 20'; must cover infant fun center, and tot tree	
Tod/Pre-School	15' x 15' x 8'	20' x 20' x 8'	20' x 20' x 8'	
Pre-K/Kinder	15' x 15' x 8'	20' x 20' x 8'	20' x 20' x 8'	
		SHADE STRUCTURE 2 (shade only)		
Infant/Pre-Tod	Must cover Crawler 2	Must cover Crawler 3	Must cover Crawler 3	
Tod/Pre-School	Must cover Play Structure only (not creative play element)	Must cover Play Structure only (not creative play element)	Must cover Play Structure only (not creative play element)	
Pre-K/Kinder	Must cover Play Structure only (not creative play element)	Must cover Play Structure only (not creative play element)	Must cover Play Structures only (not creative play element)	
		MISCELLANEOUS		
Infant/Pre-Tod	Light color resilient surfacing only Minimum 50' depth of playground (from face of building)	Light color resilient surfacing only Minimum 50' depth of playground (from face of building)	Light color resilient surfacing only Minimum 50' depth of playground (from face of building)	
Tod/Pre-School				
Pre-K/Kinder	water feature (yard hydrant or stream bed, etc.)	water feature (yard hydrant or stream bed, etc.)	water feature (yard hydrant or stream bed, etc.)	

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

35. SPACE: Site/Building Exterior

- The layout of the parking lot and traffic circulation must consider the safety of the children when entering and departing the facility. Parking lots shall be designed such that children are not required to walk behind parked vehicles as they walk from the parking lot to the building. In other words, sidewalks shall be provided immediately in front of, or beside the, parked car. These sidewalks must be sufficient width to accommodate the overhang of the vehicle and still provide ADA width, and shall be of adequate width to accommodate patrons with strollers and little children. This will eliminate the possibility of a child being required to walk behind a parked car to gain access to the building. If curbside or parallel parking is provided, parking should be restricted to the right side so children will not exit the vehicle on the street side of the vehicle. If the parking lot design requires crosswalks, as a minimum, these must be painted and identifiable with signage in appropriate locations to ensure the safety of the patrons.

- ~~An entrance canopy must be provided. The canopy shall be permanent construction, and shall enhance the architectural theme of the facility. The minimum area of this canopy shall be 100 square feet, with a minimum dimension of 8'. Per Army criteria, this area counts as half-scope to the total square footage of the facility. Larger canopies are acceptable.~~

- All sidewalks and exit pathways must be ADA compliant. The sidewalk around the perimeter of the building shall be 6' wide. The sidewalk around the perimeter of the building must be directly adjacent to the building, with no grass or landscaping between the sidewalk and the building.

- Required fire exits (which includes exterior exits from all activity rooms) from the building will lead to a public way or to a clear safe area which is a minimum distance of 50 feet from the building. If this is located in a fenced area, they shall terminate at a gate in the playground fence.

- Hose bibs, 18" above finished grade, are required in each age group play space and must be of the frost/freeze protective type with removable cut off handles with integral vacuum breakers. As a minimum, hose bibs shall be located as follow:

    - ~~1 by the kitchen door in all size facilities~~
    - 1 in each of the ~~3~~ playgrounds ~~in the small and medium facilities~~
    - ~~1 in the Infant/Pre-Tod playground, 2 in the Toddler/Pre-School playground, and 2 in the Pre-K/Kindergarten playgrounds in the large facilities~~

- ~~Hose bibs, 18" above finished grade, are required in each age group play space and must be of the frost/freeze protective type with removable cut off handles with integral vacuum breakers.~~

- Provide appropriate tamper-proof exterior electrical outlets near each set of exterior storage room doors. Mount the outlets at 54" A.F.F.

- Locate exterior mechanical and electrical equipment as far from the main entrance as possible. It is recommended that the mechanical yard be located at the side of the facility. Screening is required that is architecturally compatible with the facility.

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

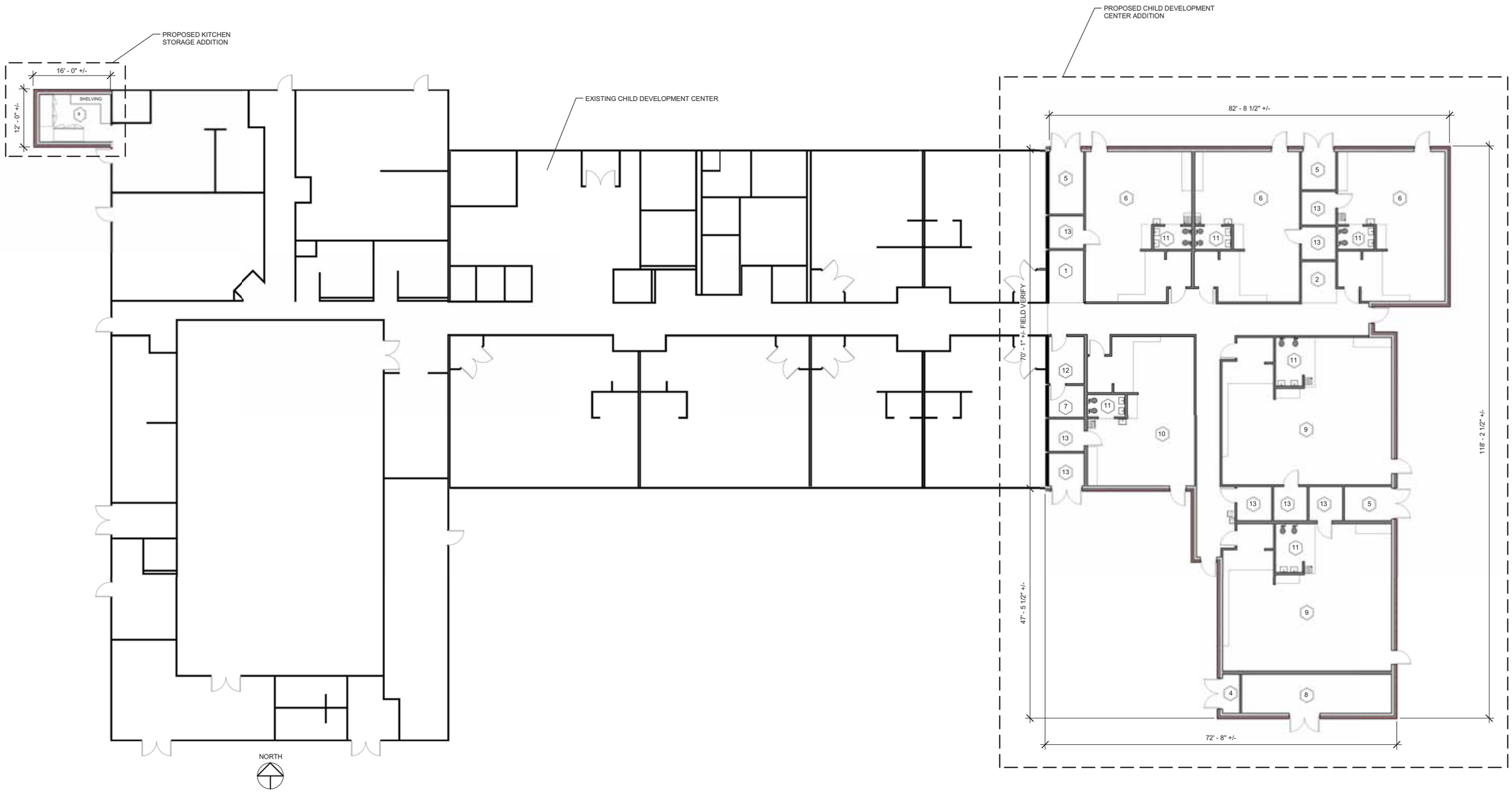
- ~~Fire alarm audio and visual devices shall be provided by the main entrance.~~

- The following rendering of a CDC 0-5 Small is provided for information only. The intent of the rendering is only to provide a general 3D perspective of the building and site.

Standard Design Criteria
Child Development Centers
(For Children 6 Weeks – 5 Years)

Attachment F

Conceptual Floor Plans



Area Schedule (Gross Building)				
Number	Name	Area	Area Type	Gross Area + 1/2 Exterior Area
1	CLASSROOM ADDITION	7314 SF	Gross Building Area	7314 SF
2	PORCH	27 SF	Exterior Area	13 SF
3	KITCHEN STOR ADD.	197 SF	Gross Building Area	197 SF
Grand total: 3				7524 SF

Room Legend

1 BUGGY STORAGE
2 CAR SEAT STORAGE
3 DRY STORAGE ADDITION (KIT.)
4 ELECTRIC
5 EXTERIOR STORAGE
6 INFANT / PRE-TODD / PRE-K
7 JANITOR'S CLOSET
8 MECHANICAL
9 PRE-K / PRE-SCHOOL
10 PRE-TODD / TODDLER
11 RR
12 STAFF WC
13 STOR.

1 SCHEMATIC FLOOR PLAN - BASE BID
3/32" = 1'-0"

US Army Corps of Engineers
Owner

SYMBOL	DESCRIPTION	DATE	BY

DESIGNED BY: DR & WC
DWN BY: SJL
CKD BY: DR
SUBMITTED BY: BWSC
DATE: Issue Date
SOLICITATION NO.: P2 #353254
CONTRACT NO.:
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SIZE: ANSI D
PLOT SCALE: 3/32" = 1'-0"

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE DISTRICT

BWSC Blayne Workenhese Stanker & Daniels, Inc.

BUILD ADDITION
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

BUILDING 273
SCHEMATIC FLOOR PLAN
BASE BID

PLATE REFERENCE NUMBER
A101
SHEET OF xxx

7/12/2011 10:08:44 AM

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SUBMITTAL TYPE - DATE

1 SCHEMATIC FLOOR PLAN - BASE BID
1/8" = 1'-0"

US Army Corps of Engineers
Owner

SYMBOL	DESCRIPTION	DATE	BY

DATE: Issue Date
SOLICITATION NO.: P2 #353254
CONTRACT NO.: -
CATEGORY CODE:
PLOT DATE: 7/12/2011 10:09:06 AM

DESIGNED BY: PR & WC
DWN BY: SJL
CKD BY: DR
SUBMITTED BY: BWSC
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PLOT SCALE: 1/8" = 1'-0"
SIZE: ANSI D

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE DISTRICT

BWSC Blanton Wasserman Schanker & Cannon, Inc.

BUILD ADDITION
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

BUILDING 273
ENLARGED DIMENSIONED FLOOR PLAN - BASE BID

PLATE REFERENCE NUMBER
A102
SHEET OF xxx

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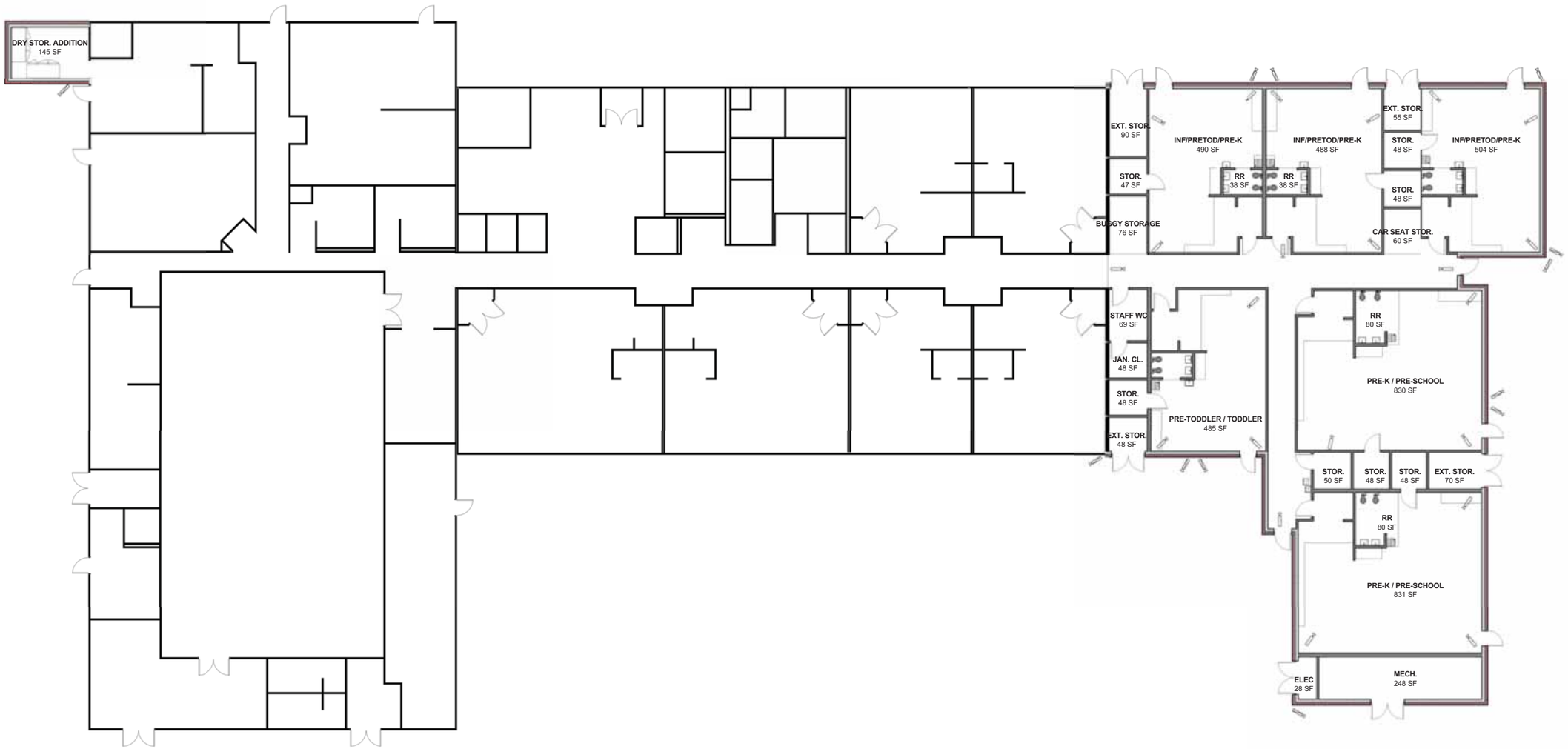
SUBMITTAL TYPE - DATE

LEGEND

- INTERIOR FIXED CAMERA W/ ID NO.
- EXTERIOR FIXED CAMERA W/ ID NO.

GENERAL NOTES

1. REFER TO THE ROOM-BY-ROOM DESCRIPTIONS FOR ADDITIONAL SECURITY AND MONITORING REQUIREMENTS.
2. ASSUMPTIONS (FOR CAMERA PLACEMENT ON DRAWINGS):
   - ALL CEILINGS ARE (8) FEET SUSPENDED TILES UNLESS OTHERWISE NOTED.
   - ALL FURNITURE AND LANDSCAPE PLACEMENT WILL NOT BLOCK CAMERA VIEWS.
   - BUILDINGS WILL HAVE "OVERHANGS / SOFFITS" TO ACCOMMODATE EXTERIOR CAMERAS.
   - EXTERIOR CAMERAS ARE PLACED BASED ON EXPECTED LOCATION OF PLAYGROUNDS.
3. ALL INTERIOR CAMERAS SHALL HAVE A LENS SIZE OF 2.9-8.2 mm UNLESS OTHERWISE NOTED.
4. ALL EXTERIOR CAMERAS SHALL HAVE A LENS SIZE OF 2.9-8.2 mm UNLESS OTHERWISE NOTED.
5. RELOCATE EXISTING CAMERAS AS REQUIRED TO ACCOMODATE NEW CONSTRUCTION.



1 CAMERA PLACEMENT PLAN - BASE BID
3/32" = 1'-0"

US Army Corps of Engineers
Owner

SYMBOL	DESCRIPTION	DATE	BY

DESIGNED BY: DR & WC
DWN BY: SJL
CKD BY: DR
SUBMITTED BY: BWSC
DATE: Issue Date
SOLICITATION NO.: P2 #353254
CONTRACT NO.: -
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PLOT SCALE: As Indicated

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE DISTRICT

BWSC Beatrice Wachtmeister Slunecka & Daniels, Inc.

BUILD ADDITION
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

BUILDING 273
CAMERA PLACEMENT PLAN
BASE BID

PLATE REFERENCE NUMBER
A103
SHEET OF xxx

SUBMITTAL TYPE - DATE

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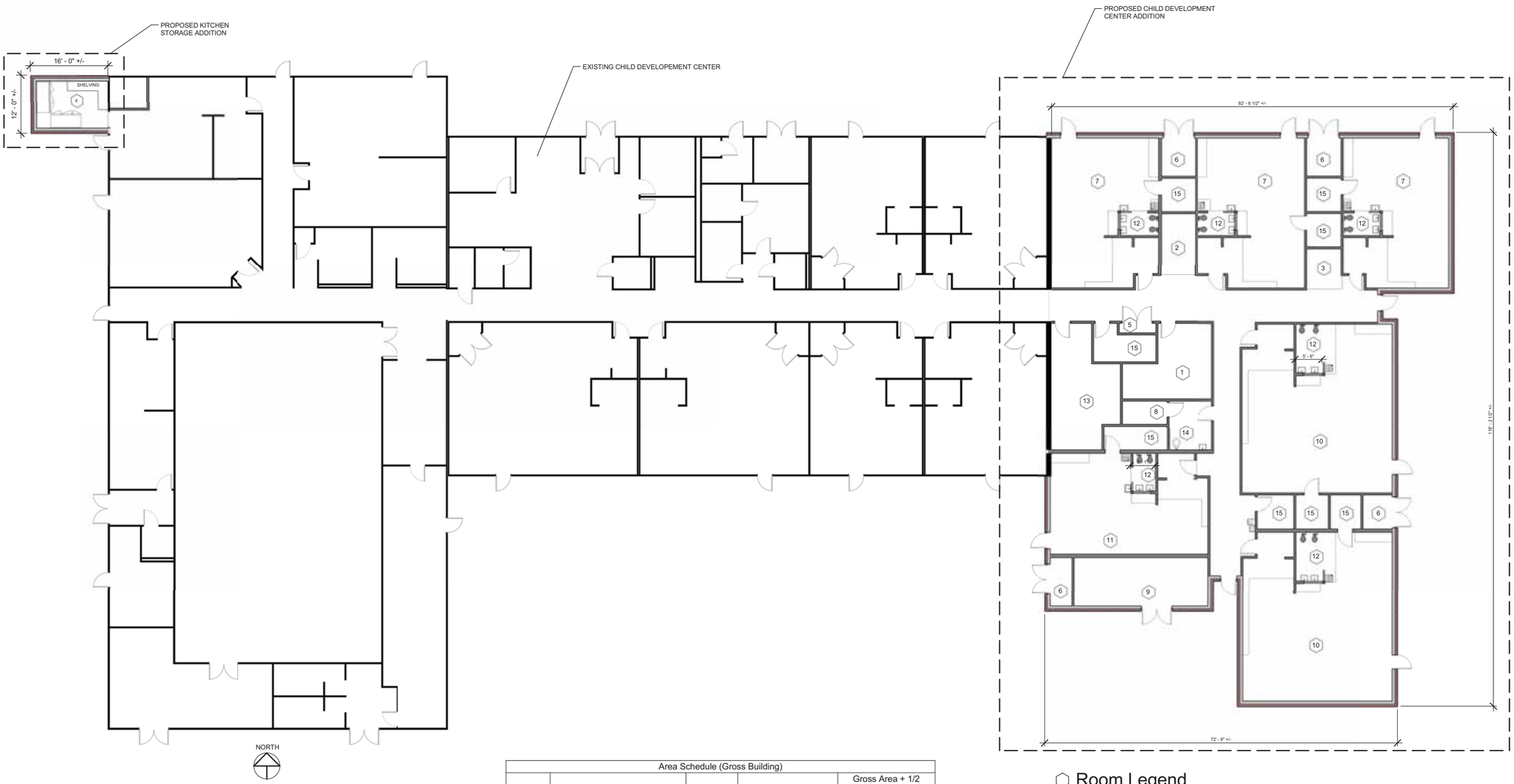

Area Schedule (Gross Building)				
Number	Name	Area	Area Type	Gross Area + 1/2 Exterior Area
1	CLASSROOM ADDITION	8121 SF	Gross Building Area	8121 SF
3	PORCH	32 SF	Exterior Area	16 SF
4	PORCH	16 SF	Exterior Area	8 SF
5	KIT. STOR. ADDITION	197 SF	Gross Building Area	197 SF
Grand total: 4				8341 SF

Room Legend

1	ADMIN	9	MECHANICAL
2	BUGGY STORAGE	10	PRE-K / PRE-SCHOOL
3	CAR SEAT STORAGE	11	PRE-TODD / TODDLER
4	DRY STORAGE ADDITION (KIT.)	12	RR
5	ELECTRIC	13	STAFF LOUNGE
6	EXTERIOR STORAGE	14	STAFF WC
7	INFANT / PRE-TODD / PRE-K	15	STOR.
8	JANITOR'S CLOSET		

1 SCHEMATIC FLOOR PLAN - OPTION
3/32" = 1'-0"

US Army Corps of Engineers
Louisville District

SYMBOL	DESCRIPTION	DATE	BY

DESIGNED BY: DR & WC
DWN BY: SJL
CKD BY: DR
SUBMITTED BY: BWSC
DATE: 16 JUNE 2011
SOLICITATION NO.: P2 #353254
CONTRACT NO.: -
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PLOT SCALE: 3/32" = 1'-0"

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE DISTRICT

BWSC Beakes Wachtmeister Slusher & Daniels, Inc.

BUILD ADDITION
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

BUILDING 273
SCHEMATIC FLOOR PLAN OPTION

PLATE REFERENCE NUMBER
A104
SHEET OF xxx

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SUBMITTAL TYPE - DATE

Room Legend

- ADMIN.
- BUGGY STORAGE
- CAR SEAT STOR.
- DRY STOR. ADDITION
- ELEC.
- EXT. STOR.
- INF/PRETOD/PRE-K
- JAN. CL.
- MECH.
- PRE-K / PRE-SCHOOL
- PRE-TODDLER / TODDLER
- RR
- STAFF LOUNGE
- STAFF WC
- STOR.

1 SCHEMATIC FLOOR PLAN - OPTION
1/8" = 1'-0"

US Army Corps of Engineers
Louisville District

SYMBOL	DESCRIPTION	DATE	BY

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SOLICITATION NO.: P2 #353254
CONTRACT NO.: -
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PLOT SCALE: 1/8" = 1'-0"
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DWN BY: SJL
CKD BY: DR
SUBMITTED BY: BWSC
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U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE DISTRICT

BAKER, WATTHOFER BURKHER & CANNON, INC.
BWSC

BUILD ADDITION
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

BUILDING 273
ENLARGED DIMENSIONED FLOOR PLAN - OPTION

PLATE REFERENCE NUMBER
A105
SHEET OF xxx

SUBMITTAL TYPE - DATE

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LEGEND

- INTERIOR FIXED CAMERA W/ ID NO.
- EXTERIOR FIXED CAMERA W/ ID NO.

GENERAL NOTES

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4. ALL EXTERIOR CAMERAS SHALL HAVE A LENS SIZE OF 2.9-8.2 mm UNLESS OTHERWISE NOTED.
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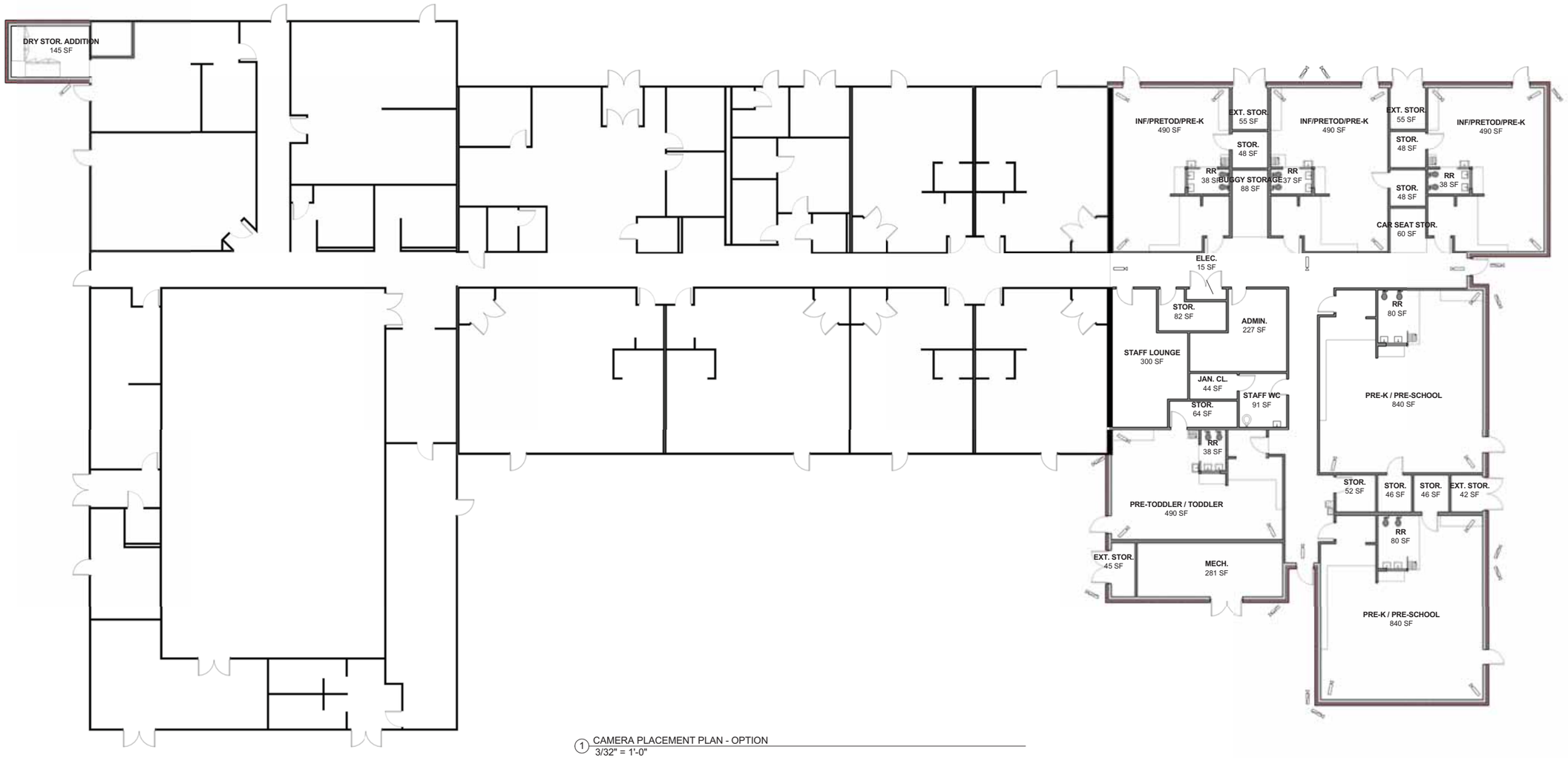

1 CAMERA PLACEMENT PLAN - OPTION
3/32" = 1'-0"

US Army Corps of Engineers
Louisville District

SYMBOL	DESCRIPTION	DATE	BY

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DWN BY: SJL
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CONTRACT NO.: -
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SIZE: ANSI D

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE DISTRICT

BWSC Blanton Wolfenbarger Sloanker & Cannon, Inc.

BUILD ADDITION
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

BUILDING 273
CAMERA PLACEMENT PLAN OPTION

PLATE REFERENCE NUMBER
A106
SHEET OF xxx

SUBMITTAL TYPE - DATE

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Attachment I

Army Child Development Center Primary Color Scheme

NEW PRIMARY FINISHES FOR 0-10 CDCS

JOHNSONITE
844 WINTER LAKE
0R MANNINGTON
250 SAPPHIRE

868 CARDINAL
228 NEW GERANIUM

901 CREAM PUFF
213 BANANA CREAM

886 BELUGA
161 STEEL WHITE

SHERWIN WILLIAMS
SW 6961

SW 2865

SW 7101

SW 6422

SW 6654

846 LIME CILANTRO
245 TARRAGON

CORIAN RAINCLOUD

LIVINGSTONE FLAX

MANNINGTON MOTIVATION ION 3311

JOHNSONITE WALL BASE IN 37 FOG

LAMINATE- WILSONART FUSION MAPLE

JOHNSONITE OPTIMA SHEET VINYL IN BELUGA 886

PRIMARY COLOR SCHEME
ARMY CHILD DEVELOPMENT CENTERS

NOTE: All manufacturers listed below are provided as examples. Other manufacturers may be used as long as the colors, patterns, and durability are very similar. Substitutions will require Government approval.

FLOORING:

VCT:

0-5: Hallways, Admin, ~~Entry/Waiting,~~ Staff Lounge, ~~Training~~

6-10: Hallways, ~~Arts and Science Activity Room and Activity/ Eating Room~~

Mannington VCT	***or***	***Johnsonite VCT***
#250 Sapphire		**#844 Winter Lake**
#228 New Geranium		**#868 Cardinal**
#213 Banana Cream		**#901 Cream Puff**
#245 Tarragon		**#846 Lime Cilantro**
#161 Steel White		**#886 Beluga**

Sheet Vinyl:

0-5: Infant/Pre-Tod/Toddler Rooms, Pre-school/Pre-K/Kindergarten Rooms, ~~Transitional Care Room, Active Play Room, Isolation Room~~

~~6-10: All Other Activity Rooms~~

Johnsonite-Tarkett Optima Sheet Vinyl
#886 Beluga

Cove Base:

Johnsonite
#37 Fog

~~Carpet (Anti-Static):~~

~~6-10: Computer Lab/Homework Center~~

~~Mannington, Enhanced Texture Loop~~
~~Pattern- Motivation; Color-Ion 3311~~

Quarry Tile:

0-5: ~~Kitchen, Laundry~~, Janitor

~~6-10: Kitchen~~

American Olean "Naturals"
N46 Shadow Gray (Abrasive Grain)
-or-
Dal-Tile
OT03 Ashen Gray

Grout for Quarry Tile:

Custom Building Products – "The Naturals" – 100% Solid Epoxy
#19 Pewter

Ceramic Tile:

Toilet areas

Natura Floor Tile – "Liberty" (slip resistant)
#8613 Pewter
-or-
Dal-Tile
DC05 Ice Gray

WALLS:

~~Ceramic Tile:~~

~~Kitchen~~

~~Laufen International~~
~~LWBG 301-4 White Bright Glaze~~
~~-or-~~
~~Dal-Tile~~
~~0190 Arctic White~~

Restrooms and Toilet Areas

Laufen International
LWBG 301-4 White Bright Glaze
-or-
Dal-Tile
0190 Arctic White

SOLID SURFACE:

Corian
Raincloud
-or-
Livingstone
Flax

LAMINATE:

Wilsonart
Fusion Maple

PAINT CHOICES:

Sherwin Williams
#SW 6961
#SW 2865
#SW 7101
#SW 6422
#SW 6654

May 18. 2010

Attachment J

Existing Building Code Analysis

Preliminary Code Review and Life Safety Analysis

1.0 FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

1.1 Project Name: Build Addition – B273 Child Development Center (CDC) Addition
Detroit Arsenal, Warren, Michigan
Project Number PN: 33447

1.2 Applicable Codes and Standards

A. UFC 1-200-01 General Building Requirements (2010)
B. UFC 3-600-01, Design: Fire Protection Engineering for Facilities (July 2009)
C. UFC 4-021-01 Design and O&M: Mass Notification Systems (2008)
D. International Building Code (2009) for fire resistance requirements, allowable floor area, building height and building separation distance requirements except as modified be UFC 3-600-01
E. ABA – Accessibility Standards for Department of Defense Facilities as adopted by the Deputy Secretary of Defense memorandum Oct. 31, 2008 & ADA - ADA Standards for Accessible Design (2010)
F. NFPA 101 Life Safety Code (2009) for building egress and life safety and applicable criteria in UFC 3-600-101
G. NFPA 13 Installation of Sprinkler Systems (2009)
H. NFPA 10 Standard for Portable Fire Extinguishers (20009)
I. NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection
J. NFPA 90A Standard Installation of Air Conditioning & Ventilation Systems (2009)
K. NFPA 70 National Electrical Code

1.3 Occupancy Classification: IBC Chapters 3 and 4:

Existing Child Care Use Groups include E, I-4 and A-3.
Accessory occupancies include offices, storage, a laundry and kitchen; as well as toilet rooms and janitor closets. Incidental Occupancies include mechanical, electrical rooms. The Proposed Child Care Addition will be classified similarly.

1.3.1 NFPA Occupancy Classification

Per NFPA 101 the facility will be classified as a Multiple Mixed Use Non-separated Occupancy that includes Education, Daycare, and Assembly. Assembly is the most restrictive use.

1.4 Construction Type: IBC Chapter 6 and Table 503

Existing construction is classified as VB
The Proposed Addition classified as VB

1.5 Area Limitations: IBC Chapter 5 and Table 503

The building will be classified as Mixed Use Non-Separated, and includes A-3, E, and I-4 Use Groups. A-3 is the most restrictive existing use.

1.6 Allowable Floor Areas: IBC 503 – General Building Height and Area, Table 503

The allowable floor area is based on the most restrictive use. The permitted floor area without permitted area increase is 6,000 SF.

1.7 Allowable Area Increase; IBC Section 506 & 507 (506.1 – Frontage Increase, 506.3 Automatic Sprinkler Increase, Height Increase 504.2, & 507 – Unlimited Area Buildings)

The permitted area based on open perimeter exception is 4,500 SF (Area increase = (F/P – 0.25) W/30).

The permitted area increase based on sprinkler increase is 18,000 (TA x 300% for a single story building).

Permitted height increase based on permitted sprinkler increase is 1 story and 20 FT.

1.8 Building Height and Area Limitations Summary - Test for Allowable Height and Area: based on Mixed Use Non-Separated per IBC 508 based on existing Type VB Construction and equipped throughout WITH and automatic sprinkler system. Use Groups include existing A-3 Assembly and E – Education; and proposed I-4 Day Care; and, existing and proposed Incidental and Accessory Occupancies. The existing A-3 Assembly Use is the most restrictive:

Tabular Height & Area A-3 Use	1Story / 55 FT	6,000 SF / Flr
Sprinkler Increase (506.3)	NA / NA FT	18,000 SF / Flr (300% x TA)
Frontage Increase (506.2)	0 Story / 0 FT	4,500 SF / Flr Open 3 sides
Allowable Height & Area	1 Story/55 FT	28,500 SF / Flr

Floor Area:
= 18,078 SF Existing + 8,341 Proposed = 26,419 SF $\leq$ 28,500 SF OK

Actual Building Height = 1 Story / 20 FT $\leq$ 1 Story / 55 FT OK

1.9 Incidental Accessory Occupancies including Mechanical and Electrical Rooms: Existing Incidental Areas are separated by a Smoke Partition and sprinklers per 508.2.5. Doors are self closing.

1.10 Fire Resistive Requirements - Existing: IBC Tables 601 & 602

A. Exterior Nonbearing Walls & Partitions (Tb'l 602) – 0 Hour when X $\geq$ 30 Feet
B. Interior Nonbearing Walls and Partitions (Comply with NFPA 101 Table A8.2.1.2) – 0 Hour Rating
C. Primary Structural Frame – 0 Hour Rating
D. Exterior Bearing Walls – 0 Hour Rating
E. Interior Bearing Walls – 0 Hour Rating
F. Floor Construction / Ceiling & Secondary Members – 0 Hour Rating
G. Roof Construction / Roof Ceiling & Secondary Members – 0 Hour Rating.

1.11 Fire Separation Ratings:

A. Fire Partitions (Existing Corridor Walls): 0 Hour and Sprinklers. Partitions run to the bottom of a drywall sheeted truss.
B. Existing Smoke Partitions – 0 Hour Rating Required

1.12 An Automatic Sprinkler and Fire Alarm System is provided in the existing structure.

1.13 Portable Fire Extinguishers are provided in the existing structure.

1.14 Enclosure Protection and Penetration Requirements – Opening Protective and Through Penetrations.

A. 1 Hour Fire Barrier (Occupancy Separations & Incidental Occupancy Separations) - 45 minute protection (3/4 HR)
B. Exterior walls are nonrated – with doors commensurate with wall rating
C. All doors are self closing.

1.15 Existing Finishes:

A. Exit Corridors: Walls are painted gypsum board and ceilings are suspended acoustic panels. Bottom cords include a layer of gypsum board.
B. Existing Corridor Floors: VCT
C. Existing Rooms and Enclosed Spaces: Walls are painted gypsum board and ceramic tile in toilet room areas. Floors are VCT.

1.16 Means of Egress: Existing exits are remotely located

1.17 Occupant Load: The existing facility was designed for an occupant load of 233 children and 38 adults.

1.18 Number of Means of Egress: There are 5 primary existing exits in addition to the exits from the child care rooms.

1.19 Illumination of Means of Egress: All existing exits are marked and provide with emergency illumination.

1.20 Accessibility Requirements: The Existing facility is accessible.

1.21 Door Hardware for Means of Egress: All existing exits swing in the direction of travel.

4.0 APPLICABLE CRITERIA

Unless a specific document version or date is indicated, use criteria from the most current references, including any applicable addenda, unless otherwise stated in the contract or task order, as of the date of the Contractor's latest accepted proposal or date of issue of the contract or task order solicitation, whichever is later. In the event of conflict between References and/or Applicable Military Criteria, apply the most stringent requirement, unless otherwise specifically noted in the contract or task order.

4.1. INDUSTRY CRITERIA

Applicable design and construction criteria references are listed in Table 1 below. This list is not intended to include all criteria that may apply or to restrict design and construction to only those references listed. See also Paragraph 3 for additional facility-specific applicable criteria.

Table 1: Industry Criteria

Air Conditioning and Refrigeration Institute (ARI)	
ARI 310/380	Packaged Terminal Air-Conditioners and Heat Pumps
ARI 440	Room Fan-Coil and Unit Ventilator
ANSI/ARI 430-99	Central Station Air Handling Units
ARI 445	Room Air-Induction Units
ARI 880	Air Terminals
Air Movement and Control Association (AMCA)	
AMCA 210	Laboratory Methods of Testing Fans for Rating
American Architectural Manufacturers Association (AAMA)	
AAMA 605	Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
AAMA 607.1	Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
AAMA 1503	Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections
American Association of State Highway and Transportation Officials (AASHTO)	
	Roadside Design Guide [guardrails, roadside safety devices]
	Standard Specifications for Transportation Materials and Methods of

	Sampling and Testing [Road Construction Materials]
	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
	Guide for Design of Pavement Structures, Volumes 1 and 2 [pavement design guide]
	A Policy of Geometric Design of Highways and Streets
American Bearing Manufacturers Association (AFBMA)	
AFBMA Std. 9	Load Ratings and Fatigue Life for Ball Bearings
AFBMA Std. 11	Load Ratings and Fatigue Life for Roller Bearings
American Boiler Manufacturers Association (ABMA)	
ABMA ISEI	Industry Standards and Engineering Information
American Concrete Institute	
ACI 302.2R	Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials
ACI 318	Building Code Requirements for Structural Concrete
ACI SP-66	ACI Detailing Manual
ACI 530	Building Code Requirements for Masonry Structures
ADA Standards for Accessible Design	
See US Access Board	ADA and ABA Accessibility Guidelines for Buildings and Facilities, Chapters 3-10.
American Institute of Steel Construction (AISC)	
	Manual of Steel Construction – 13th Edition (or latest version)
American Iron and Steel Institute	
AISI S100	North American Specification for the Design of Cold-Formed Steel Structural Members
American National Standards Institute 11 (ANSI)	

ANSI Z21.10.1	Gas Water Heaters Vol. 1, Storage water Heaters with Input Ratings of 75,000 Btu per Hour or less
ANSI Z124.3	American National Standard for Plastic Lavatories
ANSI Z124.6	Plastic Sinks
ANSI Z21.45	Flexible Connectors of Other Than All-Metal Construction for Gas Appliances
ANSI/IEEE C2-2007	National Electrical Safety Code
ANSI/AF&PA NDS-2001	National Design Specification for Wood Construction
American Society of Civil Engineers (ASCE)	
ASCE 7	Minimum Design Loads for Buildings and Other Structures
ASCE 37	Design and Construction of Sanitary and Storm Sewers, Manuals and Reports on Engineering Practice [sanitary sewer and storm drain design criteria]
ASCE/SEI 31-03	Seismic Evaluation of Existing Buildings [Existing Building Alteration/Renovation]
ASCE/SEI 41-06	Seismic Rehabilitation of Existing Buildings [Existing Building Alteration/Renovation]
American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)	
ASHRAE 90.1	ANSI/ASHRAE/IESNA 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE Guideline 0	The Commissioning Process
ASHRAE Guideline 1.1	The HVAC Commissioning Process
ASHRAE Handbooks	Fundamentals, HVAC Applications, Systems and Equipment, Refrigeration (Applicable, except as otherwise specified)
ASHRAE Standard 15	Safety Standard for Refrigeration Systems
ASHRAE Standard 62.1	Ventilation for Acceptable Indoor Air Quality
ASHRAE Standard 55	Thermal Environmental Conditions for Human Occupancy (Design portion is applicable, except where precluded by other project requirements.)

ASHRAE Standard 189.1	Standard for the Design of High-Performance Green Buildings (ANSI Approved; USGBC and IES Co-sponsored), - (APPLICABLE TO THE EXTENT SPECIFICALLY CALLED OUT IN THE CONTRACT)
American Society of Mechanical Engineers International (ASME)	
ASME BPVC SEC VII	Boiler and Pressure Vessel Code: Section VII Recommended Guidelines for the Care of Power Boilers
ASME A17.1	Safety Code for Elevators and Escalators
ASME B 31 (Series)	Piping Codes
American Water Works Association (AWWA)	
	Standards [standards for water line materials and construction]
American Welding Society	
	Welding Handbook
	Welding Codes and Specifications (as applicable to application, see International Building Code for example)
Architectural Woodwork Institute (AWI)	
Latest Version	AWI Quality Standards
Associated Air Balance Council (AABC)	
AABC MN-1	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems
	AABC Associated Air Balance Council Testing and Balance Procedures
ASTM International	
ASTM C1060-90(1997)	Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
ASTM E 779 (2003)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E1827-96(2002)	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door

Builders Hardware Manufacturers Association (BHMA)	
ANSI/BHMA	The Various BHMA American National Standards
Building Industry Consulting Service International	
	Telecommunications Distribution Methods Manual (TDMM)
	Customer-Owned Outside Plant Design Manual (CO-OSP)
Code of Federal Regulations (CFR)	
49 CFR 192	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
10 CFR 430	Energy Conservation Program for Consumer Products
Consumer Electronics Association	
CEA 709.1B	Control Network Protocol Specification
CEA 709.3	Free-Topology Twisted-Pair Channel Specification
CEA 852	Tunneling Component Network Protocols Over Internet Protocol Channels
Electronic Industries Association (EIA)	
ANSI/EIA/TIA 568	Structured Cabling Series
ANSI/EIA/TIA 569	Commercial Building Standard for Telecommunications Pathways and Spaces (includes ADDENDA)
ANSI/TIA/EIA-606	Administrative Standard for the Telecommunications Infrastructure of Commercial Buildings
J-STD EIA/TIA 607	Commercial Building Grounding and Bonding Requirements for Telecommunications
Federal Highway Administration (FHWA)	
	Manual on Uniform Traffic Control Devices for Streets and Highways [signage and pavement markings for streets and highways]
FHWA-NHI-01-021	Hydraulic Engineering Circular No. 22, Second Edition, URBAN DRAINAGE DESIGN MANUAL

Illuminating Engineering Society of North America (IESNA)	
IESNA RP-1	Office Lighting
IESNA RP-8	Roadway Lighting
IESNA Lighting Handbook	Reference and Application
Institute of Electrical and Electronics Engineers Inc. (IEEE)	
	Standard for Use of the International System of Units (SI): the Modern Metric System
Standard 1100	Recommended Practice for Powering and Grounding Sensitive Electronic Equipment
International Code Council (ICC)	
IBC	International Building Code Note: All references in the International Building Code to the International Electrical Code shall be considered to be references to NFPA 70. All references in the International Building Code to the International Fuel Gas Code shall be considered to be references to NFPA 54 and NFPA 58. All references in the International Building Code to the International Fire Code and Chapter 9 shall be considered to be references to Unified Facilities Criteria (UFC) 3-600-01.
IMC	International Mechanical Code – Note: For all references to “HEATING AND COOLING LOAD CALCULATIONS”, follow ASHRAE 90.1 Note: For all references to “VENTILATION”, follow ASHRAE 62.1
IRC	International Residential Code
IPC	International Plumbing Code
IEC	Energy Conservation Code (IEC) –Applicable only to the extent specifically referenced herein. Refer to Paragraph 5, ENERGY CONSERVATION requirements.
IGC	International Gas Code - not applicable. Follow NFPA 54, National Fuel Gas Code and NFPA 58, Liquified Petroleum Gas Code.

International Organization for Standardization (ISO)	
ISO 6781:1983	Qualitative detection of thermal irregularities in building envelopes – infrared method
LonMark International (LonMark)	
LonMark Interoperability Guidelines	(available at www.lonmark.org), including: Application Layer Guidelines, Layer 1-6 Guidelines, and External Interface File (XIF) Reference Guide
LonMark Resource Files	(available at www.lonmark.org), including Standard Network Variable Type (SNVT) definitions
Metal Building Manufacturers Association (MBMA)	
	Metal Building Systems Manual
Midwest Insulation Contractors Association (MICA)	
	National Commercial and Industrial Insulation Standards Manual
National Association of Corrosion Engineers International (NACE)	
NACE RP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0185	Extruded, Polyolefin Resin Coating Systems with Adhesives for Underground or Submerged Pipe
NACE RP0285	Corrosion Control of Underground Storage Tank Systems by Cathodic Protection
NACE RP0286	Electrical Isolation of Cathodically Protected Pipelines
National Electrical Manufacturers Association (NEMA)	
National Environmental Balancing Bureau (NEBB)	
	Procedural Standards Procedural Standards for Testing Adjusting Balancing of Environmental Systems
National Fire Protection Association (NFPA)	
NFPA 10	Standard for Portable Fire Extinguishers
NFPA 13	Installation of Sprinkler Systems

NFPA 13R	Residential Occupancies up to and Including Four Stories in Height Sprinkler Systems
NFPA 14	Standard for the Installation of Standpipes and Hose Systems
NFPA 20	Installation of Centrifugal Fire Pumps
NFPA 24 NFPA 25	Standard for the Installation of Private Fire Service Mains and Their Appurtenances [underground fire protection system design] Inspection, Testing And Maintenance Of Water-Based Fire Protection Systems
NFPA 30	Flammable and Combustible Liquids Code
NFPA 30A	Motor Fuel Dispensing Facilities and Repair Garages
NFPA 31	Installation of Oil Burning Equipment
NFPA 54	National Fuel Gas Code
NFPA 58	Liquefied Petroleum Gas Code
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 76	Fire Protection of Telecommunications Facilities
NFPA 80	Standard for Fire Doors and Fire Windows
NFPA 90a	Installation of Air Conditioning and Ventilating Systems
NFPA 96	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
NFPA 101	Life Safety Code
NFPA 780	Standard for the Installation of Lightning Protection Systems
National Roofing Contractor's Association (NRCA)	
	Roofing and Waterproofing Manual
National Sanitation Foundation, International	

NSF/ANSI Std. 2, 3, 4, 5, 6, 7, 8, 12, 13, 18, 20, 21, 25, 29, 35, 36, 37, 51, 52, 59, 169	Food Equipment Standards
ANSI/UL Std. 73, 197, 471, 621, 763	Food Equipment Standards
CSA Std. C22.2 No. 109, 120, 195	Food Equipment Standards
Occupational Safety and Health Administration (OSHA)	
Title 29, Part 1926	OSHA Construction Industry Standards, Title 29, Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction
Plumbing and Drainage Institute (PDI)	
PDI G 101	Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data
PDI WH201	Water Hammer Arrestors
Precast Concrete Institute	
PCI Design Handbook	Precast and Prestressed Concrete
Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)	
SMACNA HVAC Duct Construction Standards	HVAC Duct Construction Standards - Metal and Flexible
SMACNA Architectural Manual	Architectural Sheet Metal Manual
SMACNA HVAC TAB	HVAC Systems - Testing, Adjusting and Balancing
State/Local Regulations	
	State Department of Transportation Standard Specifications for Highway and Bridge Construction
	Sedimentation and Erosion Control Design Requirements
	Environmental Control Requirements
	Storm Water Management Requirements

Steel Door Institute (SDI)	
ANSI A250.8/SDI 100	Standard Steel Doors and Frames
Steel Deck Institute	
	SDI Diaphragm Design Manual
Steel Joist Institute	
	Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders
Underwriters Laboratories (UL)	
UL 96A	Installation Requirements for Lightning Protection Systems
UL 300	Standard for Safety for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas
UNITED STATES ACCESS BOARD: U.S. ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD	
ADA and ABA Accessibility Guidelines for Buildings and Facilities	ABA Accessibility Standard for DoD Facilities Derived from the ADA and ABA Accessibility Guidelines: Specifically includes: ABA Chapters 1 and 2 and Chapters 3 through 10. Use this reference in lieu of IBC Chapter 11. Excluded are: (a) Facilities, or portions of facilities, on a military installation that are designed and constructed for use exclusively by able-bodied military personnel (See Paragraph 3 for any reference to this exclusion). (b) Reserve and National Guard facilities, or portions of such facilities, owned by or under the control of the Department of Defense, that are designed and constructed for use exclusively by able-bodied military personnel. (See paragraph 3 for any reference to this exclusion).
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES	
	FDA National Food Code
U.S. GREEN BUILDING COUNCIL (USGBC)	
LEED-NC	Green Building Rating System for New Construction & Major Renovations
	Application Guide for Multiple Buildings and On-Campus Building

	Projects

4.2. MILITARY CRITERIA

The project shall conform to the following criteria. Certain design impacts and features due to these criteria are noted for the benefit of the offeror. However, all requirements of the referenced criteria will be applicable, whether noted or not, unless otherwise specified herein.

4.2.1. Energy Policy Act of 2005 (Public Law 109-58) (applies only to the extent specifically implemented in the contract, which may or may not directly cite or reference EPACT)

4.2.2. Executive Order 12770: Metric Usage In Federal Government

(a) Metric design and construction is required except when it increases construction cost. Offeror to determine most cost efficient system of measurement to be used for the project.

4.2.3. TB MED 530: Occupational and Environmental Health Food Sanitation

4.2.4. Unified Facilities Criteria (UFC) 3-410-01FA: Heating, Ventilating, and Air Conditioning - applicable only to the extent specified in paragraph 5, herein.

4.2.5. Deleted.

4.2.6. UFC 3-600-01 Design: Fire Protection Engineering for Facilities. Use the latest edition of the IBC in coordination with this UFC. Use Chapters 3, 6, 7, 33 and UFC 3-600-01. If any conflict occurs between these Chapters and UFC 3-600-01, the requirements of UFC 3-600-01 take precedence. Use UFC 3-600-01 in lieu of IBC Chapters 4, 8,9,10.

4.2.7. UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings

4.2.8. UFC 4-023-03 Design of Buildings to Resist Progressive Collapse (Use most recent version, regardless of references thereto in other publications)

(a) Note the option to use tie force method or alternate path design for Occupancy Category II.

4.2.9. UFC 4-021-01 Design and O&M: Mass Notification Systems

4.2.10. Technical Criteria for Installation Information Infrastructure Architecture (I3A)

(a) Email: DetrickISECI3Aguide@conus.army.mil

4.2.11. U.S. Army Information Systems Engineering Command (USAISEC) SECRET Internet Protocol (IP) Router Network (SIPRNET) Technical Implementation Criteria (STIC).. See Paragraph 3 for applicability to specific facility type. May not apply to every facility. This is mandatory criteria for those facilities with SIPRNET.

4.2.11.1. Draft Guide Specification for Section 27 05 28 PROTECTIVE DISTRIBUTION SYSTEM (PDS) FOR SIPRNET COMMUNICATIONS SYSTEMS, found at http://mrsi.usace.army.mil/rfp/Shared%20Documents/SECTION_270528-v3.pdf

5.0 GENERAL TECHNICAL REQUIREMENTS

This paragraph contains technical requirements with general applicability to Army facilities. See also Paragraph 3 for facility type-specific operational, functional and technical requirements. Residential or similar grade finishes and materials are not acceptable for inclusion in these buildings, unless otherwise specifically allowed.

5.1. SITE PLANNING AND DESIGN

5.1.1. STANDARDS AND CODES: The site planning and design shall conform to APPLICABLE CRITERIA and to paragraph 6, PROJECT SPECIFIC REQUIREMENTS.

5.1.2. SITE PLANNING OBJECTIVES: Group buildings in configurations that create a sense of community and promote pedestrian use. See paragraph 3 for additional site planning requirements relating to building functions.

5.1.2.1. Provide enclosures and or visual screening devices for Outdoor Utility such as dumpsters, emergency generators, transformers, heating, ventilation, and air conditioning units from streetscape and courtyard views to limit visual impact. Enclosures shall be compatible with the building they serve and accessible by vehicle. The location of dumpsters can have a significant visual impact and should be addressed as part of an overall building design and incorporated in site planning.

5.1.2.2. Where included in the project, dumpster pads shall be concrete (minimum of 8 inches thick on 4 inch base course, unless site conditions dictate more conservative requirements) and directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Provide space at dumpster areas for recycling receptacles. Coordinate with Installation on recycling receptacle types, sizes and access requirements and provide space at dumpster areas to accommodate them.

5.1.2.3. Vehicular Circulation. Apply design vehicle templates provided by the American Association of State Highway and Transportation Officials (AASHTO) to the site design. The passenger car class includes passenger cars and light trucks, such as vans and pick-ups. The passenger car template is equivalent to the non-organizational – privately owned vehicle (POV). The truck class template includes single-unit trucks, recreation vehicles, buses, truck tractor-semi-trailer combinations, and trucks or truck tractors with semi-trailers in combination with full trailers. Provide vehicle clearances required to meet traffic safety for emergency vehicles, service vehicles, and moving vans. Provide required traffic control signage Site entrances and site drive aisles shall maximize spacing between drives, incorporate right-angle turns, and limit points of conflict between traffic. Design Services Drives to restrict access to unauthorized vehicles by removable bollards, gates, or other barriers to meet Anti-Terrorism/Force Protection (ATFP) requirements. Orient service drives to building entrances other than the primary pedestrian entry at the front of the building.

5.1.2.4. Provide Emergency Vehicle Access around the facility and shall be in accordance with AT/FP requirements. Maintain a 33-foot clear zone buffer for emergency vehicles, designed to prevent other vehicles from entering the AT/FP standoff to the building.

5.1.2.5. Clear and grub all trees and vegetation necessary for construction; but, save as many trees as possible. Protect trees to be saved during the construction process from equipment.

5.1.2.6. Stormwater Management. Employ design and construction strategies (Best Management Practices) that reduce stormwater runoff, reduce discharges of polluted water offsite and maintain or restore predevelopment hydrology with respect to temperature, rate, volume and duration of flow to the maximum extent practicable. See paragraph 6, PROJECT SPECIFIC requirements for additional information.

5.1.3. EXTERIOR SIGNAGE: Provide exterior signage in accordance with Appendix H, Exterior Signage. Provide exterior NO SMOKING signage that conveys building and grounds smoking policy.

5.1.4. EXISTING UTILITIES: Base utilities maps and capacities for this site are included as part of this RFP. See paragraph 6 for more detailed information.

5.2. SITE ENGINEERING

5.2.1. STANDARDS AND CODES: The site engineering shall conform to APPLICABLE CRITERIA.

5.2.2. SOILS:

5.2.2.1. A report has been prepared to characterize the subsurface conditions at the project site and is **appended to these specifications.** The report provides a general overview of the soil and geologic conditions with detailed descriptions at discrete boring locations. The Contractor's team shall include a licensed geotechnical engineer to interpret the report and develop earthwork and foundation recommendations and design parameters in which to base the contractor's design. If any additional subsurface investigation or laboratory analysis is required to better characterize the site or develop the final design, the Contractor shall perform it under the direction of a licensed geotechnical engineer. There will be no separate payment for the cost of additional tests. If differences between the Contractor's additional subsurface investigation and the government provided soils report or the reasonably expected conditions require material revisions in the design, an equitable adjustment may be made, in accordance with the provisions of the Differing Site Conditions clause. The basis for the adjustment would be the design and construction appropriate for the conditions described in the Government furnished report or the reasonably expected conditions, in comparison with any changes required by material differences in the actual conditions encountered, in accordance with the terms of contract clause Differing Site Conditions.

5.2.2.2. The contractor's licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal, as described in Section 01 33 16, *Design After Award*.

5.2.3. VEHICLE PAVEMENTS: (as applicable to the project)

5.2.3.1. Design procedures and materials shall conform to one of the following: 1) the USACE Pavement Transportation Computer Assisted Structural Engineering (PCASE) program, 2) American Association of State Highway and Transportation Officials (AASHTO) or, 3) the applicable state Department of Transportation standards in which the project is located. See paragraph 5.2.2.2 and Section 01 33 16 for required information for the Contractor's geotechnical evaluation report. The minimum flexible pavement section shall consist of 2 inches of asphalt and 6 inches of base or as required by the pavement design, whichever is greater, unless specifically identified by the Government to be a gravel road. Design roads and parking areas for a life expectance of 25 years with normal maintenance. Parking area for tactical vehicles (as applicable to the project) shall be Portland Cement Concrete (PCC) rigid pavement design. For concrete pavements, submit joint layout plan for review and concurrence. Design pavements for military tracked vehicles (as applicable to the project) IAW USACE PCASE. Traffic estimates for each roadway area will be as shown on the drawings or listed in Section 01 10 00 Paragraph 6.4.4. Pavement markings and traffic signage shall comply with the Installation requirements and with the Manual on Uniform Traffic Control Devices.

5.2.3.2. Parking Requirements.

(a) All handicap POV parking lots (where applicable in the facility specific requirements) shall meet the ADA and ABA Accessibility Guidelines for accessible parking spaces.

(b) Design POV parking spaces for the type of vehicles anticipated, but shall be a minimum of 9 ft by 18 ft for POVs, except for two wheel vehicles.

5.2.3.3. Sidewalks. Design the network of walks throughout the complex (where applicable) to facilitate pedestrian traffic among facilities, and minimize the need to use vehicles. Incorporate sidewalks to enhance the appearance of the site development, while creating a sense of entry at the primary patron entrances to the buildings. Minimum sidewalk requirements are in Paragraph 3, where applicable and/or paragraph 6 and/or site plans, where applicable..

5.2.4. CATHODIC PROTECTION: Provide cathodic protection systems for all underground metallic systems and metallic fittings/portions of non-metallic, underground systems, both inside and outside the building 5 foot line that are subject to corrosion. Coordinate final solutions with the installation to insure an approach that is consistent with installation cathodic protection programs.

5.2.5. UTILITIES: See paragraph 6.4.6 for specific information on ownership of utilities and utility requirements. Meter all utilities (gas, water, and electric, as applicable) to each facility. For Government owned utilities, install meters that are wireless data transmission capable as well as have a continuous manual reading option. All meters will be capable of at least hourly data logging and transmission and provide consumption data for gas, water, and

electricity. Gas and electric meters will also provide demand readings based on consumption over a maximum of any 15 minute period. Configure all meters to transmit at least daily even if no receiver for the data is currently available at the time of project acceptance. For privatized utilities, coordinate with the privatization utility(ies) for the proper meter base and meter installation.

5.2.6. PERMITS: The CONTRACTOR shall be responsible for obtaining all permits (local, state and federal) required for design and construction of all site features and utilities.

5.2.7. IRRIGATION. Landscape irrigation systems, if provided, shall comply with the following:

5.2.7.1. Irrigation Potable Water Use Reduction. Reduce irrigation potable water use by 100 percent using LEED credit WE1.1 baseline (no potable water used for irrigation), except where precluded by other project requirements.

5.2.8. EPA WATERSENSE PRODUCTS AND CONTRACTORS. Except where precluded by other project requirements, use EPA WaterSense labeled products and irrigation contractors that are certified through a WaterSense labeled program where available.

5.3. ARCHITECTURE AND INTERIOR DESIGN:

This element will be evaluated per APPLICABLE CRITERIA under the quality focus.

5.3.1. STANDARDS AND CODES: The architecture and interior design shall conform to APPLICABLE CRITERIA.

5.3.2. GENERAL: Overall architectural goal is to provide a functional, quality, visually appealing facility that is a source of pride for the installation and delivered within the available budget and schedule.

5.3.3. COMPUTATION OF AREAS: See APPENDIX Q for how to compute gross and net areas of the facility(ies).

5.3.4. BUILDING EXTERIOR: Design buildings to enhance or compliment the visual environment of the Installation. Where appropriate, reflect a human scale to the facility. Building entrance should be architecturally defined and easily seen. When practical, exterior materials, roof forms, and detailing shall be compatible with the surrounding development and adjacent buildings on the Installation and follow locally established architectural themes. Use durable materials that are easy to maintain. Exterior colors shall conform to the Installation requirements. See paragraph 6.

5.3.4.1. Building Numbers: Permanently attach exterior signage on two faces of each building indicating the assigned building number or address. Building number signage details and locations shall conform to Appendix H, Exterior Signage.

5.3.5. BUILDING INTERIOR

5.3.5.1. Space Configuration: Arrange spaces in an efficient and functional manner in accordance with area adjacency matrices.

5.3.5.2. Surfaces: Appearance retention is the top priority for building and furniture related finishes. Provide low maintenance, easily cleaned room finishes that are commercially standard for the facility occupancy specified, unless noted otherwise.

5.3.5.3. Color: The color, texture and pattern selections for the finishes of the building shall provide an aesthetically pleasing, comfortable, easily maintainable and functional environment for the occupants. Coordinate the building colors and finishes for a cohesive design. Select colors appropriate for the building type. Use color, texture and pattern to path or way find through the building. Trendy colors that will become dated shall be limited to non-permanent finishes such as carpet and paint. Select finisheswith regards to aesthetics, maintenance, durability, life safety and image. Limit the number of similar colors for each material. Use medium range colors for ceramic and porcelain tile groutto help hide soiling. Plastic laminate and solid surface materials shall have patterns that are mottled, flecked or speckled. Coordinate finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items with the building interior. Match color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) the ceiling color.

5.3.5.4. Circulation: Circulation schemes must support easy way finding within the building.

5.3.5.5. Signage: Provide interior signage for overall way finding and life safety requirements. A comprehensive interior plan shall be from one manufacturer. Include the following sign types: (1) Lobby Directory, (2) Directional Signs; (3) Room Identification Signs; (4) Building Service Signs; (5) Regulatory Signs; (6) Official and Unofficial Signs (7) Visual Communication Boards (8) NO SMOKING signage that conveys building smoking policy. Use of emblems or logos may also be incorporated into the signage plan.

5.3.5.6. Window Treatment: Provide interior window treatments with adjustable control in all exterior window locations for control of day light coming in windows or privacy at night. Maintain uniformity of treatment color and material to the maximum extent possible within a building.

5.3.5.7. Casework: Unless, otherwise specified, all casework for Cabinetry and cases shall be “custom grade”, as described in the AWI Quality Standards.

5.3.6. COMPREHENSIVE INTERIOR DESIGN

5.3.6.1. Comprehensive Interior Design includes the integration of a Structural Interior Design (SID) and a Furniture, Fixtures and Equipment (FF&E) design and package. SID requires the design, selection and coordination of interior finish materials that are integral to or attached to the building structure. Completion of a SID involves the selection and specification of applied finishes for the building’s interior features including, but not limited to, walls, floors, ceilings, trims, doors, windows, window treatments, built-in furnishings and installed equipment, lighting, and signage. The SID package includes finish schedules, finish samples and any supporting interior elevations, details or plans necessary to communicate the building finish design and build out. The SID also provides basic space planning for the anticipated FF&E requirements in conjunction with the functional layout of the building and design issues such as life safety, privacy, acoustics, lighting, ventilation, and accessibility. See Section 01 33 16 for SID design procedures.

5.3.6.2. The FF&E design and package includes the design, selection, color coordination and of the required furnishing items necessary to meet the functional, operational, sustainability, and aesthetic needs of the facility coordinated with the interior finish materials in the SID. The FF&E package includes the specification, procurement documentation, placement plans, ordering and finish information on all freestanding furnishings and accessories, and a cost estimate. Coordinate the selection of furniture style, function and configuration with the defined requirements. Examples of FF&E items include, but are not limited to workstations, seating, files, tables, beds, wardrobes, draperies and accessories as well as marker boards, tack boards, and presentation screens. Criteria for furniture selection include function and ergonomics, maintenance, durability, sustainability, comfort and cost. See Section 01 33 16 for FFE design procedures.

5.4. STRUCTURAL DESIGN

5.4.1. STANDARDS AND CODES: The structural design shall conform to APPLICABLE CRITERIA.

5.4.2. GENERAL: The structural system must be compatible with the intended functions and components that allows for future flexibility and reconfigurations of the interior space. Do not locate columns, for instance, in rooms requiring visibility, circulation or open space, including, but not limited to entries, hallways, common areas, classrooms, etc. Select an economical structural system based upon facility size, projected load requirements and local availability of materials and labor. Base the structural design on accurate, site specific geotechnical information and anticipated loads for the building types and geographical location. Consider climate conditions, high humidity, industrial atmosphere, saltwater exposure, or other adverse conditions when selecting the type of cement and admixtures used in concrete, the concrete cover on reinforcing steel, the coatings on structural members, expansion joints, the level of corrosion protection, and the structural systems. Analyze, design and detail each building as a complete structural system. Design structural elements to preclude damage to finishes, partitions and other frangible, non-structural elements to prevent impaired operability of moveable components; and to prevent cladding leakage and roof ponding. Limit deflections of structural members to the allowable of the applicable material standard, e.g., ACI, AISC, Brick Industry Association, etc. When modular units or other pre-fabricated construction is used or combined with stick-built construction, fully coordinate and integrate the overall structural design between the two different or interfacing construction types. If the state that the project is located in requires separate, specific licensing for structural engineers (for instance, such as in Florida, California and others), then the structural engineer designer of record must be registered in that state.

5.4.3. LOADS: See paragraph 3 for facility specific (if applicable) and paragraph 6 for site and project specific structural loading criteria. Unless otherwise specified in paragraph 6, use Exposure Category C for wind. If not specified, use Category C unless the Designer of Record can satisfactorily justify another Exposure Category in its design analysis based on the facility Master Plan. Submit such exceptions for approval as early as possible and prior to the Interim Design Submittal in Section “Design After Award”. Design the ancillary building items, e.g. doors, window jambs and connections, overhead architectural features, systems and equipment bracing, ducting, piping, etc. for gravity, seismic, lateral loads and for the requirements of UFC 4-010-01, DOD Minimum Antiterrorism Standards for Buildings. Ensure and document that the design of glazed items includes, but is not limited to, the following items under the design loads prescribed in UFC 4-010-01:

(a) Supporting members of glazed elements, e.g. window jamb, sill, header

(b) Connections of glazed element to supporting members, e.g. window to header

(c) Connections of supporting members to each other, e.g. header to jamb

(d) Connections of supporting members to structural system, e.g. jamb to foundation.

5.4.4. TERMITE TREATMENT: (Except Alaska) Provide termite prevention treatment in accordance with Installation and local building code requirements, using licensed chemicals and licensed applicator firm.

5.5. THERMAL PERFORMANCE

5.5.1. STANDARDS AND CODES: Building construction and thermal insulation for mechanical systems shall conform to APPLICABLE CRITERIA.

5.5.2. BUILDING ENVELOPE SEALING PERFORMANCE REQUIREMENT. Design and construct the building envelope for office buildings, office portions of mixed office and open space (e.g., company operations facilities), dining, barracks and instructional/training facilities with a continuous air barrier to control air leakage into, or out of, the conditioned space. Clearly identify all air barrier components of each envelope assembly on construction documents and detail the joints, interconnections and penetrations of the air barrier components. Clearly identify the boundary limits of the building air barriers, and of the zone or zones to be tested for building air tightness on the drawings. The use of painted interior walls is not an acceptable air barrier method.

5.5.2.1. Trace a continuous plane of air-tightness throughout the building envelope and make flexible and seal all moving joints.

5.5.2.2. The air barrier material(s) must have an air permeance not to exceed 0.004 cfm / sf at 0.3” wg (0.02 L/s.m2 @ 75 Pa) when tested in accordance with ASTM E 2178

5.5.2.3. Join and seal the air barrier material of each assembly in a flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of these assemblies and components.

5.5.2.4. Support the air barrier so as to withstand the maximum positive and negative air pressure to be placed on the building without displacement, or damage, and transfer the load to the structure.

5.5.2.5. Seal all penetrations of the air barrier. If any unavoidable penetrations of the air barrier by electrical boxes, plumbing fixture boxes, and other assemblies are not airtight, make them airtight by sealing the assembly and the interface between the assembly and the air barrier or by extending the air barrier over the assembly.

5.5.2.6. The air barrier must be durable to last the anticipated service life of the assembly.

5.5.2.7. Do not install lighting fixtures with ventilation holes through the air barrier

5.5.2.8. Provide a motorized damper in the closed position and connected to the fire alarm system to open on call and fail in the open position for any fixed open louvers at elevator shafts. Coordinate the motorized elevator hoistway vent damper(s) with the Fire Protection System design in paragraph 5.10. Ensure that the damper(s) is accessible to facilitate regular inspection and maintenance.

5.5.2.9. Damper and control to close all ventilation or make-up air intakes and exhausts, , etc., when leakage can occur during inactive periods. Atrium smoke exhaust and intakes shall only open when activated per IBC and other applicable Fire Code requirements.

5.5.2.10. Compartmentalize garages under buildings by providing air-tight vestibules at building access points.

5.5.2.11. Compartmentalize spaces under negative pressure such as boiler rooms and provide make-up air for combustion.

5.5.2.12. Performance Criteria and Substantiation: Submit the qualifications and experience of the testing entity for approval. Demonstrate performance of the continuous air barrier for the opaque building envelope by the following tests:

(a) Develop an Air Barrier Quality Control plan to assure that a competent air barrier inspector/specialist inspects the critical components prior to them being concealed. At a minimum, three onsite inspections are required during construction to assure the completeness of the construction and design.

(b) Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed 0.25cfm/ft2 at a pressure differential of 0.3” w.g.(75 Pa) in accordance with ASTM’s E 779 (2003) or E-1827-96 (2002). Accomplish tests using both pressurization and depressurization.. Divide the volume of air leakage in cfm @ 0.3” w.g. (L/s @ 75 Pa) by the area of the pressure boundary of the building, including roof or ceiling, walls and floor to produce the air leakage rate in cfm/ft2 @ 0.3” w.g. (L/s.m2 @ 75 Pa). Do not test the building until verifying that the continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.

(c) Test the completed building using Infrared Thermography testing. Use infrared cameras with a resolution of 0.1deg C or better. Perform testing on the building envelope in accordance with ISO 6781:1983 and ASTM C1060-90(1997). Determine air leakage pathways using ASTM E 1186-03 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems, and perform corrective work as necessary to achieve the whole building air leakage rate specified in (a) above.

(d) Notify the Government at least three working days prior to the tests to provide the Government the opportunity to witness the tests. Provide the Government written test results confirming the results of all tests.

5.6. PLUMBING

5.6.1. STANDARDS AND CODES: The plumbing system shall conform to APPLICABLE CRITERIA.

5.6.2. PRECAUTIONS FOR EXPANSIVE SOILS: Where expansive soils are present, include design features for underslab piping systems and underground piping serving chillers, cooling towers, etc, to control forces resulting from soil heave. Some possible solutions include, but are not necessarily limited to, features such as flexible expansion joints, slip joints, horizontal offsets with ball joints, or multiple bell and spigot gasketed fittings. For structurally supported slabs, suspend piping from the structure with adequate space provided below the pipe for the anticipated soil movement.

5.6.3. HOT WATER SYSTEMS: For Hot Water heating and supply, provide a minimum temp of 140 Deg F in the storage tank and a maximum of 110 Deg F at the fixture, unless specific appliances or equipment specifically require higher temperature water supply.

5.6.4. SIZING HOT WATER SYSTEMS: Unless otherwise specified or directed in paragraph 3, design in accordance with ASHRAE Handbook Series (appropriate Chapters), ASHRAE Standard 90.1, and the energy conservation requirements of the contract. Size and place equipment so that it is easily accessible and removable for repair or replacement.

5.6.5. JANITOR CLOSETS: In janitor spaces/room/closets, provide at minimum, a service sink with heavy duty shelf and wall hung mop and broom rack(s).

5.6.6. FLOOR DRAINS: As a minimum, provide floor drains in mechanical rooms and areas, janitor spaces/rooms/closets and any other area that requires drainage from fixtures or equipment, drain downs, condensate, as necessary.

5.6.7. URINALS: Urinals shall be non-water type or water-type, conforming to ASHRAE Standard 189.1 (0.5 gpf/1.9 lpf). Non-Water type shall include sealed replaceable cartridge or integral liquid seal trap. Either non-water type urinal shall use a biodegradable liquid to provide the seal and maintain a sanitary and odor-free environment. Install, test and maintain in accordance with manufacturer's recommendations. Slope the sanitary sewer branch line for non-water use urinals a minimum of 1/4 inch per foot. Do not use copper tube or pipe for drain lines that connect to the urinal. Manufacturer shall provide an operating manual and on-site training to installation operations personnel for the proper care and maintenance of the urinal.

5.6.8. BUILDING WATER USE REDUCTION. Reduce building potable water use in each building 30 percent from the Baseline ,using the Manufacturing Performance Requirements for .Plumbing Fixtures from the Energy Policy Act of 1992 (Public Law 102-486). See Appendix S.

5.6.9. Do not use engineered vent or Sovent® type drainage systems.

5.6.10. Where the seasonal design temperature of the cold water entering a building is below the seasonal design dew point of the indoor ambient air, and where condensate drip will cause damage or create a hazard, insulate plumbing piping with a vapor barrier type of insulation to prevent condensation. Do not locate water or drainage piping over electrical wiring or equipment unless adequate protection against water (including condensation) damage is provided. Insulation alone is not adequate protection against condensation. Follow ASHRAE Fundamentals Chapter 23, Insulation for Mechanical Systems, IMC paragraph 1107 and International Energy Conservation Code for pipe insulation requirements.

5.6.11. Cover all drain, waste and vent piping to prevent mortar or other debris from being flushed down and blocking pipes during such construction activities.

5.7. ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

5.7.1. STANDARDS AND CODES: The electrical systems for all facilities shall conform to APPLICABLE CRITERIA.

5.7.2. MATERIALS AND EQUIPMENT: Materials, equipment and devices shall, as a minimum, meet the requirements of Underwriters Laboratories (UL) where UL standards are established for those items. Wiring for branch circuits shall be copper. Motors larger than one-half horsepower shall be three phase. All electrical systems shall be pre-wired and fully operational unless otherwise indicated. Wall mounted electrical devices (power receptacles, communication outlets and CATV outlets) shall have matching colors, mounting heights and faceplates.

5.7.3. POWER SERVICE: Primary service from the base electrical distribution system to the pad-mounted transformer and secondary service from the transformer to the building service electrical equipment room shall be underground. See paragraph 6 for additional site electrical requirements.

5.7.3.1. Spare Capacity: Provide 10% space for future circuit breakers in all panelboards serving residential areas of buildings and 15% spaces in all other panelboards.

5.7.4. TELECOMMUNICATION SERVICE: Connect the project's facilities to the Installation telecommunications (voice and data) system through the outside plant (OSP) telecommunications underground infrastructure cabling system per the I3A Criteria. Connect to the OSP cabling system from each facility main cross connect located in the telecommunications room.

5.7.5. LIGHTING: Comply with the recommendations of the Illumination Engineering Society of North America (IESNA), the National Energy Policy Act and Energy Star requirements for lighting products..

5.7.5.1. Interior Lighting:

(a) Reflective Surfaces: Coordinate interior architectural space surfaces and colors with the lighting systems to provide the most energy-efficient workable combinations.

(b) High Efficiency Fluorescent Lighting: Utilize NEMA premium electronic ballasts and energy efficient fluorescent lamps with a Correlated Color Temperature (CCT) of 4100K. Linear fluorescent and compact fluorescent fixtures shall have a Color Rendering Index of (CRI) of 87 or higher. Fluorescent lamps shall be the low mercury type qualifying as non-hazardous waste upon disposal. Do not use surface mounted fixtures on acoustical tile ceilings. Provide an un-switched fixture with emergency ballast shall be provided at each entrance to the building.

(c) Solid State Lighting: Fixtures shall provide lighting with a minimum Correlated Color Temperature (CCT) of 4100K and shall have a Color Rendering Index of (CRI) of 75 or higher. Verify performance of the light producing solid state components by a test report in compliance with the requirements of IESNA LM 80. Verify performance of the solid state light fixtures by a test report in compliance with the requirements of IESNA LM 79. Provide lab results by a NVLAP certified laboratory. The light producing solid state components and drivers shall have a life expectancy of 50,000 operating hours while maintaining at least 70% of original illumination level. Provide a complete five year warranty for fixtures.

(d) Metal Halide Lighting (where applicable): Metal Halide lamp fixtures in the range of 150-500 Watts shall be pulse start type and have a minimum efficiency rating of 88%.

(e) Lighting Controls: ANSI/ASHRAE/IESNA 90.1 has specific lighting controls requirements. Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces (classrooms, conference rooms) to promote the productivity, comfort and well being of the building occupants. In office spaces, the preferred lighting should be a 30 FC ambient lighting level with occupancy sensor controlled task lighting in the work spaces to provide a composite lighting level of 50 FC on the working surfaces. Consider incorporating daylighting techniques for the benefit of reducing lighting energy requirements while improving the quality of the indoor spaces. If daylight strategies are used, additional coordination is required with the architect and mechanical engineer. Additionally, incorporate electric lighting controls to take advantage of the potential energy savings.

(f) Exterior Lighting: See paragraph 6.9 for site specific information, if any, on exterior lighting systems. Minimize light pollution and light trespass by not over lighting and use cut-off type exterior luminaries.

5.7.6. TELECOMMUNICATION SYSTEM: Building telecommunications cabling systems (BCS) and OSP telecommunications cabling system shall conform to APPLICABLE CRITERIA, including but not limited to I3A Technical Criteria. An acceptable BCS encompasses, but is not limited to, copper and fiber optic (FO) entrance cable, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, workstation outlets, racks, cable management, patch panels, cable tray, cable ladder, conduits, grounding, and labeling.. Items included under OSP infrastructure encompass, but are not limited to, manhole and duct infrastructure, copper cable, fiber optic cable, cross connects, terminations, cable vaults, and copper and FO entrance cable.

5.7.6.1. Design, install, label and test all telecommunications systems in accordance with the I3A Criteria and ANSI/TIA/EIA 568, 569, and 606 standards. A Building Industry Consulting Services International (BICSI) Registered Communications Distribution Designer (RCDD) with at least 2 yrs related experience shall develop and stamp telecommunications design, and prepare the test plan. See paragraph 5.8.2.5 for design of environmental systems for Telecommunications Rooms.

5.7.6.2. The installers assigned to the installation of the telecommunications system or any of its components shall be regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. Key personnel; i.e., supervisors and lead installers assigned to the installation of this system or any of its components shall be BICSI Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel. In lieu of BICSI certification, supervisors and installers shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products.

5.7.6.3. Perform a comprehensive end to end test of all circuits to include all copper and fiber optic cables upon completion of the BCS and prior to acceptance of the facility. Provide adequate advanced notification to the COR to allow COR and Installation personnel attendance The BCS circuits include but are not limited to all copper and fiber optic(FO) entrance cables, termination equipment, copper and fiber backbone cable, copper and fiber horizontal distribution cable, and workstation outlets. Test in accordance with ANSI/EIA/TIA 568 standards. Use test instrumentation that meets or exceeds the standard. Submit the official test report to include test procedures, parameters tested, values, discrepancies and corrective actions in electronic format. Test and accomplish all

necessary corrective actions to ensure that the government receives a fully operational, standards based, code compliant telecommunications system.

5.7.7. LIGHTNING PROTECTION SYSTEM: Provide a lightning protection system where recommended by the Lightning Risk Assessment of NFPA 780, Annex L.

5.8. HEATING, VENTILATING, AND AIR CONDITIONING

5.8.1. STANDARDS AND CODES: The HVAC system shall conform to APPLICABLE CRITERIA.

5.8.2. DESIGN CONDITIONS.

5.8.2.1. Outdoor and indoor design conditions shall be in accordance with UFC 3-410-01FA. Outdoor air and exhaust ventilation requirements for indoor air quality shall be in accordance with ASHRAE 62.1. All Buildings with minimum LEED Silver requirement (or better) will earn LEED Credit EQ 7.1, Thermal Comfort-Design., except where precluded by other project requirements. Where the contract specifies indoor design temperature , airflow, humidity conditions, etc., use those parameters.

5.8.2.2. High Humidity Areas: Design HVAC systems in geographical areas meeting the definition for high humidity in UFC 3-410-01FA to comply with the special criteria therein for humid areas.

5.8.2.3. Cooling equipment may be oversized by up to 15 percent to account for recovery from night setforward. Heating equipment may be oversized by up to 30 percent to account for recovery from night setback. Design single zone systems and multi-zone systems to maintain an indoor design condition of 50% relative humidity for cooling only. For heating only where the indoor relative humidity is expected to fall below 20% for extended periods, add humidification to increase the indoor relative humidity to 30%. Provide ventilation air from a separate dedicated air handling unit (DOAU) for facilities using multiple single zone fan-coil type HVAC systems. Do not condition outside air through fan coil units. Avoid the use of direct expansion cooling coils in air handling units with constant running fans that handle outside air.

5.8.2.4. Locate all equipment so that service, adjustment and replacement of controls or internal components are readily accessible for easy maintenance.

5.8.2.5. Environmental Requirements for Telecommunications Rooms and Telecommunications Equipment Rooms, (including SIPRNET ROOMS, where applicable for specific facility type). Comply with ANSI/EIA/TIA 569 (including applicable Addenda**)**. Maintain environmental conditions at the Class 1 and 2 Recommended Operating Environment. Before being introduced into the room, filter and pre-condition outside air to remove particles with the minimum MERV filtration quality shown in the ASHRAE HVAC Applications, Chapter 17. Maintain rooms under positive pressure relative to surrounding spaces. Design computer room air conditioning units specifically for telecommunications room applications. Build and test units in accordance with the requirements of ANSI/ASHRAE Standard 127. A complete air handling system shall provide ventilation, air filtration, cooling and dehumidification, humidification (as determined during the design phase), and heating. The system shall be independent of other facility HVAC systems and shall be required year round.

5.8.2.6. Fire dampers: dynamic type with a dynamic rating suitable for the maximum air velocity and pressure differential to which the damper is subjected. Test each fire damper with the air handling and distribution system running.

5.8.3. BUILDING AUTOMATION SYSTEM. Provide a Building Automation System consisting of a building control network , and integrate the building control network into the UMCS as specified.

The building control network shall be a single complete non-proprietary Direct Digital Control (DDC) system for control of the heating, ventilating and air conditioning (HVAC) systems as specified herein. The building control network shall be an Open implementation of LONWORKS® technology using ANSI/EIA 709.1B as the only communications protocol and use only LonMark Standard Network Variable Types (SNVTs), as defined in the LonMark® Resource Files, for communication between DDC Hardware devices to allow multi-vendor interoperability.

5.8.3.1. The building automation system shall be open in that it is designed and installed such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without further dependence on the original Contractor. This includes, but is not limited to the following:

(a) Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.

(b) Necessary documentation (including rights to documentation and data), configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the Government such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor.

5.8.3.2. All DDC Hardware shall:

(a) Be connected to a TP/FT-10 ANSI/EIA 709.3 control network.

(b) Communicate over the control network via ANSI/EIA 709.1B exclusively.

(c) Communicate with other DDC hardware using only SNVTs

(d) Conform to the LonMark® Interoperability Guidelines.

(e) Be locally powered; link power (over the control network) is not acceptable.

(f) Be fully configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself to support the application. All settings and parameters used by the application shall be configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (*nci*), or hardware settings on the controller itself

(g) Provide input and output SNVTs required to support monitoring and control (including but not limited to scheduling, alarming, trending and overrides) of the application. Required SNVTs include but are not limited to: SNVT outputs for all hardware I/O, SNVT outputs for all setpoints and SNVT inputs for override of setpoints.

(h) To the greatest extent practical, not rely on the control network to perform the application.

(i) Provide on board nonvolatile memory for devices accumulating energy consumption.

5.8.3.3. Controllers shall be Application Specific Controllers whenever an ASC suitable for the application exists. When an ASC suitable for the application does not exist use programmable controllers or multiple application specific controllers.

5.8.3.4. Application Specific Controllers shall be LonMark Certified whenever a LonMark Certified ASC suitable for the application exists. For example, VAV controllers must be LonMark certified.

5.8.3.5. Application Specific Controllers (ASCs) shall be configurable via an LNS plug-in whenever t an ASC with an LNS plug-in suitable for the application exists.

5.8.3.6. Each scheduled system shall accept a network variable of type SNVT_occupancy and shall use this network variable to determine the occupancy mode. If the system has not received a value to this network variable for more than 60 minutes it shall default to a configured occupancy schedule.

5.8.3.7. Gateways may be used provided that each gateway communicates with and performs protocol translation for control hardware controlling one and only one package unit.

5.8.3.8. Not Used

5.8.3.9. Perform all necessary actions needed to fully integrate the building control system. These actions include but are not limited to:

- Configure M&C Software functionality including: graphical pages for System Graphic Displays including overrides, alarm handling, scheduling, trends for critical values needing long-term or permanent monitoring via trends, and demand limiting.
- Install IP routers or ANSI/CEA-852 routers as needed to connect the building control network to the UMCS IP network. Routers shall be capable of configuration via DHCP and use of an ANSI/CEA-852 configuration server

but shall not rely on these services for configuration. All communication between the UMCS and building networks shall be via the ANSI/CEA-709.1B protocol over the IP network in accordance with ANSI/CEA-852.

5.8.3.10. Provide the following to the Government for review prior to acceptance of the system:

- The latest version of all software and user manuals required to program, configure and operate the system.
- Points Schedule drawing that shows every DDC Hardware device. The Points Schedule shall contain the following information as a minimum:
  - Device address and NodeID.
  - Input and Output SNVTs including SNVT Name, Type and Description.
  - Hardware I/O, including Type (AI, AO, BI, BO) and Description.
  - Alarm information including alarm limits and SNVT information.
  - Supervisory control information including SNVTs for trending and overrides.
  - Configuration parameters (for devices without LNS plug-ins) Example Points Schedules are available at https://eko.usace.army.mil/fa/besc/
- Riser diagram of the network showing all network cabling and hardware. Label hardware with ANSI.CEA-709.1 addresses, IP addresses, and network names.
- Control System Schematic diagram and Sequence of Operation for each HVAC system.
- Operation and Maintenance Instructions including procedures for system start-up, operation and shut-down, a routine maintenance checklist, and a qualified service organization list.
- LONWORKS® Network Services (LNS®) database for the completed system.
- Quality Control (QC) checklist (below) completed by the Contractor's Chief Quality Control (QC) Representative

Table 5-1: QC Checklist

Instructions: Initial each item, sign and date verifying that the requirements have been met.		
#	Description	Initials
1	All DDC Hardware is installed on a TP/FT-10 local control bus.	
2	Communication between DDC Hardware is only via EIA 709.1B using SNVTs. Other protocols and network variables other than SNVTs have not been used.	
3	All sequences are performed using DDC Hardware.	
4	LNS Database is up-to-date and accurately represents the final installed system	
5	All software has been licensed to the Government	
6	M&C software monitoring displays have been created for all building systems, including all override and display points indicated on Points Schedule drawings.	
7	Final As-built Drawings accurately represent the final installed system.	
8	O&M Instructions have been completed and submitted.	
9	Connections between the UMCS IP network and ANSI/CEA-709.1B building networks are through ANSI/CEA-852 Routers.	
By signing below I verify that all requirements of the contract, including but not limited to the above, been met.		
Signature:_____ Date:_____		

5.8.3.11. Perform a Performance Verification Test (PVT) under Government supervision prior to system acceptance. During the PVT demonstrate that the system performs as specified, including but not limited to demonstrating that the system is Open and correctly performs the Sequences of Operation.

5.8.3.12. Provide a 1 year unconditional warranty on the installed system and on all service call work. The warranty shall include labor and material necessary to restore the equipment involved in the initial service call to a fully operable condition.

5.8.3.13. Provide training at the project site on the installed building system Upon completion of this training each student, using appropriate documentation, should be able to start the system, operate the system, recover the

system after a failure, perform routine maintenance and describe the specific hardware, architecture and operation of the system.

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5.8.4. TESTING, ADJUSTING AND BALANCING. Test and balance air and hydronic systems, using a firm certified for testing and balancing by the Associated Air Balance Council (AABC), National Environmental Balancing Bureau (NEBB), or the Testing Adjusting, and Balancing Bureau (TABB). The prime contractor shall hire the TAB firm directly, not through a subcontractor. Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, i.e., AABC MN-1, NEBB TABES, or SMACNA HVACTAB unless otherwise specified herein. All recommendations and suggested practices contained in the TAB Standard shall be considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practicable to satisfy the Contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB Firm and Specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations. All quality assurance provisions of the TAB Standard such as performance guarantees shall be part of this contract. For systems or system components not covered in the TAB Standard, the TAB Specialist shall develop TAB procedures. Where new procedures, requirements, etc., applicable to the Contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are mandatory.

5.8.5. COMMISSIONING: Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for LEED Enhanced commissioning, in accordance with ASHRAE Guideline 1.1, ASHRAE Guideline 0 and LEED. Do not use the sampling techniques discussed in ASHRAE Guideline 1.1 and in ASHRAE Guideline 0. Commission 100% of the HVAC controls and equipment. Hire the Commissioning Authority (CxA), certified as a CxA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CxA will be an independent subcontractor and not an employee of the Contractor nor an employee or subcontractor of any other subcontractor on this project, including the design professionals (i.e., the DOR or their firm(s)). The CxA will communicate and report directly to the Government in execution of commissioning activities. The Contracting Officer’s Representative will act as the Owner’s representative in performance of duties spelled out under OWNER in Annex F of ASHRAE Guideline 0. Because required CxA contractual relationship may not be acceptable to GBCI for LEED certification, the project cannot earn LEED Credit EA3 Enhanced Commissioning. However, still complete, maintain and provide copies of all necessary LEED documentation for Credit EA 3. This LEED Credit cannot be included to meet the required LEED rating for this project. Contractor may attempt this as an additional credit for GBCI certification but the Government will not accept it until GBCI accepts it.

5.9. ENERGY CONSERVATION

5.9.1. The building including the building envelope, HVAC systems, service water heating, power, and lighting systems shall meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.2. Design all building systems and elements to meet the minimum requirements of ANSI/ASHRAE/IESNA 90.1. Design the buildings, including the building envelope, HVAC systems, service water heating, power, and lighting systems to achieve an energy consumption that is at least 40% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1. Energy calculation methodologies and substantiation requirements are defined in Section 01 33 16, Design After Award.

5.9.3. Purchase Energy Star products, except use FEMP designated products where FEMP is applicable to the type product. The term “Energy Star product” means a product that is rated for energy efficiency under an Energy Star program. The term “FEMP designated product” means a product that is designated under the Federal Energy Management Program of the Department of Energy as being among the highest 25 percent of equivalent products for energy efficiency. When selecting integral sized electric motors, choose NEMA PREMIUM type motors that conform to NEMA MG 1, minimum Class F insulation system. Motors with efficiencies lower than the NEMA PREMIUM standard may only be used in unique applications that require a high constant torque speed ratio (e.g., inverter duty or vector duty type motors that conform to NEMA MG 1, Part 30 or Part 31).

5.9.4. Solar Hot Water Heating. Provide at least 30% of the domestic hot water requirements through solar heating methodologies, unless the results of a Life Cycle Cost Analysis (LCCA) developed utilizing the Building Life

Cycle Cost Program (BLCC) which demonstrates that the solar hot water system is not life cycle cost effective in comparison with other hot water heating systems. The type of system will be established during the contract or task order competition and award phase, including submission of an LCCA for government evaluation to justify non-selection of solar hot water heating. The LCCA uses a study period of 25 years and the Appendix K utility cost information. The LCCA shall include life cycle cost comparisons to a baseline system to provide domestic hot water without solar components, analyzing at least two different methodologies for providing solar hot water to compare against the baseline system.

5.9.5. Process Water Conservation. When potable water is used to improve a building's energy efficiency, employ lifecycle cost effective water conservation measures, except where precluded by other project requirements.

5.9.6. Renewable Energy Features. The Government's goal is to implement on-site renewable energy generation for Government use when lifecycle cost effective. See Paragraph 6, PROJECT SPECIFIC REQUIREMENTS for renewable energy requirements for this project.

5.10. FIRE PROTECTION

5.10.1. STANDARDS AND CODES Provide the fire protection system conforming to APPLICABLE CRITERIA.

5.10.2. Inspect and test all fire suppression equipment and systems, fire pumps, fire alarm and detection systems and mass notification systems in accordance with the applicable NFPA standards. The fire protection engineer of record shall witness final tests. The fire protection engineer of record shall certify that the equipment and systems are fully operational and meet the contract requirements. Two weeks prior to each final test, the contractor shall notify, in writing, the installation fire department and the installation public work representative of the test and invite them to witness the test.

5.10.3. Fire Extinguisher Cabinets: Provide fire extinguisher cabinets and locations for hanging portable fire extinguishers in accordance with NFPA 10 Standard for Portable Fire Extinguishers. The Government will furnish and install portable fire extinguishers, which are personal property, not real property installed equipment.

5.10.4. Fire alarm and detection system: Required fire alarm and detection systems shall be the addressable type. Fire alarm initiating devices, such as smoke detectors, heat detectors and manual pull stations shall be addressable. When the system is in alarm condition, the system shall annunciate the type and location of each alarm initiating device. Sprinkler water flow alarms shall be zoned by building and by floor. Supervisory alarm initiating devices, such as valve supervisory switches, fire pump running alarm, low-air pressure on dry sprinkler system, etc. shall be zoned by type and by room location.

5.10.5. Roof Access: Paragraph 2-9 of UFC 3-600-01 Fire Protection for Facilities will be modified in the next update to that UFC. Pending revision, comply with roof access and stairway requirements in accordance with the International Building Code. Where roof access is required by the IBC or other criteria, comply with UFC 4-010-01, Anti-Terrorist Force Protection, Standard 14. "Roof Access".

5.10.6. Fire Protection Engineer Qualifications: In accordance with UFC 3-600-01, FIRE PROTECTION ENGINEERING FOR FACILITIES**,** the fire protection engineer of record shall be a registered professional engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES), or a registered P.E. in a related engineering discipline with a minimum of 5 years experience, dedicated to fire protection engineering that can be verified with documentation.

5.11. SUSTAINABLE DESIGN

5.11.1. STANDARDS AND CODES: Sustainable design shall conform to APPLICABLE CRITERIA. See paragraph 6, PROJECT-SPECIFIC REQUIREMENTS for which version of LEED applies to this project. The LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) applies to all projects. Averaging may be used for LEED compliance as permitted by the AGMBC but is restricted to only those buildings included in this project. Each building must individually comply with the requirements of paragraphs ENERGY CONSERVATION and BUILDING WATER USE REDUCTION.

5.11.2. LEED RATING, REGISTRATION, VALIDATION AND CERTIFICATION: See Paragraph PROJECT-SPECIFIC REQUIREMENTS for project minimum LEED rating/achievement level, for facilities that are exempt from

the minimum LEED rating, for LEED registration and LEED certification requirements and for other project-specific information and requirements.

5.11.2.1. Innovation and Design Credits. LEED Innovation and Design (ID) credits are acceptable only if they are supported by formal written approval by GBCI (either published in USGBC Innovation and Design Credit Catalog or accompanied by a formal ruling from GBCI). LEED ID credits that require any Owner actions or commitments are acceptable only when Owner commitment is indicated in paragraph PROJECT-SPECIFIC REQUIREMENTS or Appendix LEED Project Credit Guidance

5.11.3. OPTIMIZE ENERGY PERFORMANCE. : Project must earn, as a minimum, the points associated with compliance with paragraph ENERGY CONSERVATION. LEED documentation differs from documentation requirements for paragraph ENERGY CONSERVATION and both must be provided. For LEED-NC v2.2 projects you may substitute ASHRAE 90.1 2007 Appendix G in its entirety for ASHRAE 90.1 2004 in accordance with USGBC Credit Interpretation Ruling dated 4/23/2008.

5.11.4. COMMISSIONING. See paragraph 5.8.5 COMMISSIONING for commissioning requirements. USACE templates for the required Basis of Design document and Commissioning Plan documents are available at http://en.sas.usace.army.mil (click on Engineering Criteria) and may be used at Contractor's option.

5.11.5. DAYLIGHTING. Except where precluded by other project requirements, do the following in at least 75 percent of all spaces occupied for critical visual tasks: achieve a 2 percent glazing factor (calculated in accordance with LEED credit EQ8.1) OR earn LEED Daylighting credit, provide appropriate glare control and provide either automatic dimming controls or occupant-accessible manual lighting controls.

5.11.6. LOW-EMITTING MATERIALS. Except where precluded by other project requirements, use materials with low pollutant emissions, including but not limited to composite wood products, adhesives, sealants, interior paints and finishes, carpet systems and furnishings,

5.11.7. CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT. Except where precluded by other project requirements, earn LEED credit EQ 3.1 Construction IAQ Management Plan, During Construction and credit EQ 3.2 Construction IAQ Management Plan, Before Occupancy.

5.11.8. RECYCLED CONTENT. In addition to complying with section RECYCLED/RECOVERED MATERIALS, earn LEED credit MR4.1, Recycled Content, 10 percent except where precluded by other project requirements.

5.11.9. BIOBASED AND ENVIRONMENTALLY PREFERABLE PRODUCTS. Except where precluded by other project requirements, use materials with biobased content, materials with rapidly renewable content, FSC certified wood products and products that have a lesser or reduced effect on human health and the environment over their lifecycle to the maximum extent practicable.

5.11.10. FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM (FB4P). The Farm Security and Rural Investment Act (FSRIA) of 2002 required the U.S. Department of Agriculture (USDA) to create procurement preferences for biobased products that are applicable to all federal procurement (to designate products for biobased content). For all designated products that are used in this project, meet USDA biobased content rules for them except use of a designated product with USDA biobased content is not required if the biobased product (a) is not available within a reasonable time, (b) fails to meet performance standard or (c) is available only at an unreasonable price. For biobased content product designations, see http://www.biopreferred.gov/ProposedAndFinalItemDesignations.aspx.

5.12. CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT: Achievement of 50% diversion, by weight, of all non-hazardous C&D waste debris is required. Reuse of excess soils, recycling of vegetation, alternative daily cover, and wood to energy are not considered diversion in this context, however the Contractor must tracked and report it. A waste management plan and waste diversion reports are required, as detailed in Section 01 57 20.00 10, ENVIRONMENTAL PROTECTION.

5.13. SECURITY (ANTI-TERRORISM STANDARDS): Unless otherwise specified in Project Specific Requirements, only the minimum protective measures as specified by the current Department of Defense Minimum Antiterrorism Standards for Buildings, UFC 4-010-01, are required for this project. The element of those standards that has the most significant impact on project planning is providing protection against explosives effects. That

protection can either be achieved using conventional construction (including specific window requirements) in conjunction with establishing relatively large standoff distances to parking, roadways, and installation perimeters or through building hardening, which will allow lesser standoff distances. Even with the latter, the minimum standoff distances cannot be encroached upon. These setbacks will establish the maximum buildable area. All standards in Appendix B of UFC 4-010-01 must be followed and as many of the recommendations in Appendix C that can reasonably be accommodated should be included. The facility requirements listed in these specifications assume that the minimum standoff distances can be met, permitting conventional construction. Lesser standoff distances (with specific minimums) are not desired, however can be provided, but will require structural hardening for the building. See Project Specific Requirements for project specific siting constraints. The following list highlights the major points but the detailed requirements as presented in Appendix B of UFC 4-010-01 must be followed.

(a) Standoff distance from roads, parking and installation perimeter; and/or structural blast mitigation

(b) Blast resistant windows and skylights, including glazing, frames, anchors, and supports

(c) Progressive collapse resistance for all facilities 3 stories or higher. Unless determined otherwise by the Installation and noted in paragraphs 3 or 6, the building shall be considered to have areas of uncontrolled public access when designing for progressive collapse.

(d) Mass notification system (shall also conform to UFC 4-021-01, Mass Notification Systems)

(e) For facilities with mailrooms (see paragraph 3 for applicability) – mailrooms have separate HVAC systems and are sealed from rest of building

6.0 PROJECT SPECIFIC REQUIREMENTS

6.1. GENERAL

The requirements of this paragraph augment the requirements indicated in Paragraphs 3 through 5.

6.2. APPROVED DEVIATIONS

The following are approved deviations from the requirements stated in Paragraphs 3 through 5 that only apply to this project.

(a) In accordance with ECB 2010-14 and ECB 2011-1, all references to energy consumption reduction shall be considered against ASHRAE 90.1-2007. Compliance with the minimum requirements of ASHRAE 90.1-2010 is required.

(b) Change the first paragraph of section 2.4 to read as follows:

The Contractor is not responsible for selecting or purchasing furniture. Coordinate with the user to define requirements for furniture systems, movable furniture, storage systems, equipment and any existing items to be reused, etc. Early coordination of furniture design is required for a complete and usable facility.

(c) Omit paragraph 5.3.6 in its entirety. See paragraph 3 for CID requirements.

(d) Add sub-paragraph (a) to paragraph 5.8.2.1 as follows:

- Cooling system design shall utilize the 99.6% dry bulb and mean coincident wet bulb condition

- Heating system design shall utilize the 0.4% dry bulb and mean coincident wet bulb condition

- Outside air system design shall utilize the 99.6% wet bulb and mean coincident dry bulb condition

(e) Modify paragraph 5.8.5 to read as follows:

Amdt. #003

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5.8.5. COMMISSIONING: All HVAC systems and equipment including controls, lighting including controls, domestic hot water, and renewable energy systems shall be commissioned in accordance with LEED EA credit 3 Enhanced Commissioning and EA prerequisite 1 Fundamental Commissioning of Building Energy Systems. The Commissioning Authority (CxA) will be provided by the Government. The CxA will develop the commissioning plan, review design documents, develop installation and functional performance test checklists, review submittals, perform inspections, lead functional performance testing, review the systems manual, and prepare a commissioning report.

The Contractor shall be responsible for the following:

- The Contractor shall provide a single point of contact for coordination of all commissioning activities. The point of contact shall coordinate all of the Contractor and sub-contractor involvement in the commissioning activities.

- The Contractor and the DOR shall meet with the CxA and USACE prior to the 65% design submittal to discuss commissioning requirements and processes, roles and responsibilities, schedules, lines of communication, and logistics related to the commissioning process. The Owner's Project Requirements document shall be reviewed during this meeting.

- Review the commissioning plan, 1 plan review per design submittal, and provide comments within 2 weeks of receipt.

- Develop the project commissioning specifications. Incorporate the requirements of the commissioning plan into the project commissioning specifications and attach a copy of the plan to the specifications.

- Attach inspection checklists, functional performance test checklists, Owner's Project Requirements document, Basis of Design document, and Training Tracking Template to the project commissioning specifications.

- Evaluate CxA design review comments for each design submittal concurrent with evaluation of USACE review comments.

- The Contractor shall meet with the CxA and USACE prior to beginning construction to discuss commissioning requirements and processes, roles and responsibilities, lines of communication, inspection and test procedures, incorporation of commissioning activities into the construction schedule, and logistics.

- Respond to deficiencies, problems, or other issues when identified by the CxA.

- Provide all testing/calibration equipment required to perform inspections and testing of equipment and systems undergoing commissioning.

- All sub-contractors associated with systems to be inspected shall complete inspection and document the inspection by completing the inspection checklists provided by the CxA.

- The Contractor's Quality Control Representative shall accompany the CxA during CxA inspections. 100% of equipment in commissioned systems shall be inspected.

- All sub-contractors associated with systems to be tested participate and facilitate functional performance testing in accordance with the commissioning plan. The CxA will lead the tests. Testing will be documented using the functional performance test checklists. 100% of HVAC, lighting control, domestic hot water, and renewable energy systems will be tested to include all capacities, sequences of operation, safeties, interlocks, and sensor calibration. Systems that fail initial testing shall be corrected and re-tested until they pass. Re-testing shall not occur until all deficiencies are corrected.

- The Contractor's Quality Control Representative shall accompany the CxA during functional performance testing.

- Functional performance testing that can not be completed due to weather conditions shall be performed when weather conditions permit. Schedule these tests in coordination with USACE and the CxA.

- Develop a systems manual compliant with LEED EA credit 3 Enhanced Commissioning requirements. System manual shall include at a minimum: single line diagrams, as-built sequences of operation, control drawings, original setpoints, recommended schedule of maintenance if not covered by O&M manuals, and recommended schedule for sensor and actuator calibration. The Contractor shall correct deficiencies found in the system manual by the CxA or USACE.

- Track completion of training by completing the training tracking template. Provide updated template to USACE and the CxA after each training session.

- The Contractor's Quality Control Representative shall accompany the CxA during the post-occupancy building operation review required by LEED EA credit 3 Enhanced Commissioning. The Contractor shall make necessary corrections, modifications and complete all work required by the Corrective Action Plan developed including ensuring that manufacturer warranty actions are completed.

- The Contractor shall update the Systems Manual based on corrective actions taken after the post-occupancy building operation review work is completed.

~~5.8.5. COMMISSIONING: Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for LEED Enhanced commissioning, in accordance with ASHRAE Guideline 1.1, ASHRAE Guideline 0 and LEED. Earn LEED credit EAc3 Enhanced Commissioning. Do not use the sampling techniques discussed in ASH RAE Guideline 1.1 and in ASHRAE Guideline 0. Commission 100% of the HVAC controls and equipment. Hire the Commissioning Authority (CxA), certified as a CxA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CxA will be an independent subcontractor and not an employee of the Contractor nor an employee or subcontractor of any other subcontractor on this project, including the design professionals (i.e., the DOR or their firm(s)). The CxA will communicate and report directly to the Government in execution of commissioning activities. The Contracting Officer's Representative will act as the Owner's representative in performance of duties spelled out under OWNER in Annex F of ASH RAE Guideline 0. Because required CxA contractual relationship may not be acceptable to GBCI for LEED certification, the project cannot earn LEED Credit EA3 Enhanced Commissioning. However, still complete, maintain and provide copies of all necessary LEED documentation for Credit EA 3. This LEED Credit cannot be included to meet the required LEED rating for this project. Contractor may attempt this as an additional credit for GBCI certification but the Government will not accept it until GBCI accepts it.~~

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(f) Documentation

All drawings, specifications and design analyses prepared by the Contractor and issued as part of this project shall include the DTA "DPW Work Order # IMA325181J" and "ERC # 11-023". Drawings shall include this information in the lower right hand. Specification, design analyses and similar documents shall include the information on the cover in a prominent location.

6.3. SITE PLANNING AND DESIGN

6.3.1. General:

The existing Child Development Center (CDC), Building 273 is located within the confines of Detroit Arsenal (DTA) in Macomb County, Warren, Michigan. The site is located at the southwest corner of the intersection of Bradley Drive and Macarthur Drive. Existing parking lots W-9 and W-8 are to the south of the existing CDC. Parking lot “R” is located to its west. The existing CDC parking lot E-1, and the child drop off areas are located to the north and west of the existing facility respectively.

The new building addition will be located to the east of the existing facility. Additional POV parking stalls will be provided as part of this project as shown in Appendix J Drawings.

Site utilities: stormwater and stormwater management structures, water, sanitary sewers, natural gas, power and communication will be provided to the new building addition.

6.3.1.1. The site and utility information provided for this project are developed to a 65% design level and are prescriptive. Refer to drawings in Appendix J for Government approved site and utility plans. Appendix J depicts existing conditions/demolition and proposed prescriptive layout based on an evaluation of the site and the project program. The Design Build Contractor shall complete the engineering design as a logical extension of these concept documents and in compliance with the other requirements within this RFP.

6.3.1.2. Anti-Terrorism/Force Protection: In accordance with DoD Antiterrorism Standards the CDC building and the building addition at this site are classified as a “Primary Gathering” Building located within a controlled perimeter.

6.3.2. Site Structures and Amenities

Refer to Appendix J Drawings for additional information on site structures and amenities.

6.3.2.1 POV Parking. The parking lot shall be designed to accommodate additional POV parking. POV parking shall be provided as shown on drawings in Appendix J.

6.3.2.2 Enclosures and Utility Pads

(a) Dumpster Enclosures. The existing dumpster pad and enclosure located to the west of the existing CDC facility will service the new building addition. No additional dumpster pads or enclosures are required for the building addition. The existing CDC facility will be operational during construction. Provide uninterrupted access to the existing CDC dumpster pad during all phases of the construction.

(b) Equipment Enclosures. The finish floor shall be a minimum of 6 inch above finished grade. Screen wall construction shall be similar to that of the new building with materials to match. Provide screen wall on three sides with an open front with lockable access gates for access. A minimum of 4 feet clearance or the distance required by the equipment's manufacturer (whichever is greater) shall be provided between the equipment and the inside face of the screen wall. Screen wall shall be constructed to a minimum of 1'0" above the height as the tallest section of the equipment being screened. A top cover/screen enclosure shall be supplied if required by AT/FP requirements.

(c) Access opening in the mechanical screen wall shall be by way of ornamental gates. Gates shall be jamb mounted within the opening with hinges mounted to imbed plates. One leaf of the double gate opening shall be provided with a door lever and locking mechanism designed for all weather conditions. The second leaf is to be provided with a flush bolt extended down into a concrete encased strike. Gate material shall be aluminum for minimum maintenance. Locks shall be keyed to the Installation standard system. The Design-Build Contractor shall coordinate current key type and standard with the Contracting Officer's Representative.

(d) Utility Pads. Install all concrete utility pads located outside the building exterior for any mechanical or utility device needed for the building operation and function. Include all necessary piping wiring, or utility extensions for the device to function as designed. Locate mechanical equipment next to existing or proposed sidewalks, pathways, or parking areas to eliminate the need to construct additional hard surfaces.

6.3.3. Site Functional Requirements:

6.3.3.1. Stormwater Management (SWM) Systems.

The storm water management shall meet the water quality standards and channel protection criteria standards of Macomb County Public Work Office (MCPWO) as outlined in the "Procedures and Design Standards for Stormwater Management" manual, latest edition. The standards set in this manual are the minimum requirements of the MCPWO and should not be construed as all-inclusive.

MCWPO POC is Lara Sucharski, 586-469-5327, e-mail lara.sucharski@macombcountymi.gov, Macomb County web site is: HYPERLINK "www.macombcountymi.gov/publicworks/index.htm"www.macombcountymi.gov/publicworks/index.htm

(a) Energy Independence and Security Act of 2007 (EISA)

The project shall attempt to meet Section 438 requirements of the Energy Independence and Security Act of 2007 (EISA). The design build contractor shall use site planning, design, construction, and maintenance strategies for the site to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the site with regard to temperature, rate, volume and duration of flow. The geotechnical report in Appendix A, includes infiltration rates of the existing soils for this purpose.

(b) Storm Sewer System

Storm sewer systems on this Installation are Government owned. The new CDC Building addition site will be located to the east of the existing building. The existing building downspouts located on the east side of the existing facility will have to be removed. All roof downspouts will be connected to a collection piping system. None of the roof drains or the collection piping shall have direct connections to the storm sewer system. All roof drains shall daylight to the rain garden prior to discharging to the storm sewer system. A conceptual storm sewer system is shown on the drawings in Appendix J.

The site storm drainage system shall be designed for a 10-year return storm frequency. No ponding shall occur for the 10-year event. Storm drainage system design shall be checked for a 100-year return event to insure no flooding or adverse impacts occur downstream. Storm drainage design shall be in accordance with UFC 3-230-17FA, Michigan Department of Transportation Design Manual, and other requirements of the RFP whichever is more stringent.

The storm drain collection system may consist of grassed swales, concrete inlet drop or curb inlets, concrete headwall and pipe systems. The proposed system shall tie to the existing grassed ditches or pipe systems. Minimum pipe velocities shall be 2 feet per second and the maximum shall be 5 feet per second. Outlet erosion protection shall be provided as required. The minimum pipe size for an open pipe system shall be 18 inches and 15 inches for a closed system.

Concrete inlets/catch basins and manholes shall comply with Michigan Department of Transportation Design Manual with these additional requirements. Catch basins shall have 3 inch weep holes cast into the walls. The exterior of the weep holes shall receive a 1/4 inch wire mesh with a 12 inch width belt of crushed rock. Precast manhole or inlet rings shall connect with industry standard gaskets. Storm drain pipes shall be grouted into the concrete structures to provide a watertight connection. Information on Michigan Department of Transportation (MDOT) standards can be obtained by contacting MDOT. For information on how to contact MDOT visit HYPERLINK "www.michigan.gov/mdot/"www.michigan.gov/mdot/. The Design-Build Contractor shall make an effort to place catch basins within the installation's cleaning truck hose length.

Frames, covers, and grates shall be cast iron and shall comply with the Detroit Arsenal Design Guide. All catch basins in or within 25 feet of any paved surface shall be provided with bicycle safe grates. All manhole covers shall have "storm" or other wording cast into them to indicate the use of the manhole. Integrally cast manhole steps shall be provided for all manholes greater than 3 feet in depth.

Catch basins and manholes for all storm sewers larger than 24-inch shall be bolted down to prevent entry using the "Stabiloc" system or approved equal. Manufacturer information is as follows: STABILOC LLC, 7065 East 8 Mile Road, Warren, Michigan USA, 48091, telephone 877-782-2456, visit HYPERLINK "www.stabiloc.com"www.stabiloc.com.

(c) Sump Pit

The design build contractor shall be responsible to discharge the effluent form the sump pit draining the new building addition foundations in a manner which meets local and state criteria.

6.3.3.2. Erosion and Sediment Control

The construction of the new building addition and parking lot extensions will disturb more than one acre and an NPDES, NOI and NOT permits will be required. Design the Erosion and Sediment Controls to comply with the local, state and federal requirements. Coordinate the lay down spaces, haul roads, and fabrication areas with the Installation's Storm Water Pollution Prevention Plan (SWPPP).

6.3.3.2.1 County Soil Erosion and Sediment Control (SESC) Permit

Contractor shall prepare the SESC plan & all relevant drawings which describes all the measures they will take to control the soil. (See County requirements available on line or direct from County.) Contractor shall maintain the SESC controls until permit is terminated. Contractor shall provide state certified construction storm water inspector who performs required inspections. Contractor shall obtain permit, but Garrison must first approve and sign as land owner. Drawings must also show how the designer will mitigate for any increase in stormwater such as rain gardens, bioswales etc. Contractor is responsible for all fees.

6.3.3.2.2 Michigan DNRE Construction Site NPDES Permit

Contractor must first obtain County SESC permit, then apply for State construction NDPES. Contractor fills out required paperwork and permit form. Contractor provides POC info and stormwater operator info on permit form. Garrison approves permit package and signs as landowner. Contractor submits package to state and obtains permit. Contractor is responsible for all fees.

6.3.3.2.3 City of Warren Review

The City of Warren must review the drawings pertinent to the stormwater measures and footprint. The City shall also be provided a copy of the County SESC permit. Construction cannot begin until the County permit has been obtained; the State NPDES permit has been submitted; and the City has seen the plans. Contractor is responsible

for all fees. If the contractor begins without all the required permits, the work must be stopped at contractor's expense until the permits are obtained.

6.3.3.3. Vehicular Circulation.

Vehicular circulation shall promote safe, efficient movement of vehicles and pedestrians within the site. The existing CDC facility will be operational during construction. Provide uninterrupted access to the existing CDC drop off area, existing POV parking and dumpster pad during all phases of the construction.

(a) Emergency Vehicle Access. The ground access surface shall accommodate emergency and fire vehicle access.

(b) The CDC building shall have a minimum of one fire truck access point wherein the Detroit Arsenal Fire Department shall be able to set up their heaviest piece of equipment within 33-feet of the building. These access points shall be a minimum of 20-feet wide to accommodate the outriggers of the equipment. The pavement design in these areas shall be able to support the fire truck loading requirements. Installation emergency vehicle information is provided in Appendix DD of this RFP package.

Prior to final design, the Design-Build Contractor shall confirm the emergency vehicles list with the Detroit Arsenal Fire Department, in the event newly acquired equipment would require a change in the pavement design or other access requirements. In the event of new emergency vehicles, the Design-Build Contractor shall provide optional changes to the design for review.

(c) Fire Lane Markings: Delineate Emergency access drives and Fire Lanes with 6-inch wide red striping and words "FIRE LANE NO PARKING" in 4-inch high letters within the stripes.

6.4. SITE ENGINEERING

6.4.1. Existing Topographical Conditions

The existing information shown on the drawings in Appendix J includes survey information prepared by Barge Waggoner Sumner & Cannon, Inc.

The Design-Build Contractor shall be responsible for providing any additional survey information that may be required for the design of the project.

The design-build contractor is responsible to perform their own survey and bring any discrepancies which are found in the Government furnished survey to the immediate attention of the Government for clarification. The survey provides control points based on state plane coordinates and identifies horizontal and vertical datums. All surface features and underground utilities on the site shall be identified by this topographic survey. Refer to Appendix J Drawings for existing site conditions.

6.4.2. Existing Geotechnical conditions: See Appendix A for a preliminary geotechnical report.

6.4.2.1 Geotechnical Borings

Any additional borings shall be sampled with a splitspoon sampler in accordance with ASTM D-1586, with samples visually classified at 1.5 foot intervals in accordance with the Unified Soil Classification System (ASTM D 2487). The depth to water shall be recorded. Standard Penetration Blow counts shall be recorded. A dated drilling log shall be provided for each boring drilled. Soils information obtained from field logs, laboratory tests and geologist's logs shall be presented on the contract drawings in the form of boring plan, final boring logs and explanatory notes.

The Contractor is required to obtain a dig permit from Detroit Arsenal. See Appendix FF for a copy of the dig permit application.

6.4.2.2 Geophysical Survey

Locations, depth and status of all underground infrastructure(s) shall be identified as part of this construction site survey prior to final design. In addition to the topographic survey, the Government has provided a Geophysical

survey to better identify underground features. Refer to Appendix EE for the results of the subsurface EM-61 test report.

6.4.3. Fire Flow Tests See Appendix D for results of fire flow tests to use for basis of design for fire flow and domestic water supply requirements.

Water flow test information was obtained during the preparation of the RFP to provide information for estimating purposes only. Locations of existing fire hydrants which were tested are shown in the drawings in Appendix D. After award, the design build contractor is responsible to perform new hydrant flow tests to use as basis of design.

6.4.4. Pavement Engineering and Traffic Estimates:

Design pavement to support applicable traffic loads, seasonal frost conditions and the parameters established in the final Geotechnical Report. Design the parking lot extensions for POV parking and the occasional traffic loading of an emergency or fire vehicle. The pavement buildup shall match, at a minimum, the existing pavement buildup. The drop-off pavement also serves as the access drive for fire and dumpster trucks. Any pavement cuts for utility work and subsequent repair shall take into account the vehicle traffic described in this paragraph.

6.4.4.1 Parking

Minimum POV parking stall size shall be 9-ft by 18-ft. Parking shall be provided as shown in Appendix J Drawings.

6.4.4.2 Access Drives and Sidewalks

Provide for pedestrian circulation from the expanded lots “R” and E-1 to the CDC facility. Provide pedestrian circulation improvements within the project boundary. Provide walkway connections to existing sidewalks where appropriate and orient pedestrian traffic to safe, convenient roadway crossings. Design walkways for the project site to provide access to the building entrance, service area, and outdoor site activity areas for convenience and maintenance access. Refer to Appendix J for proposed locations of sidewalks. Separate pedestrian and vehicular circulation. The existing CDC facility will be operational during construction. Provide uninterrupted access to the existing CDC drop off area, existing POV parking and dumpster pad during all phases of the construction.

Sidewalks shall be a minimum of 6-feet wide. Sidewalks designed to support emergency vehicle traffic shall be a minimum of 20-feet wide. Sidewalks designed to support service vehicles shall be a minimum of 10-ft wide. Construct non-vehicular sidewalks with a minimum thickness of 4-inches and design joint patterns uniformly so as not to exceed the length to width ratio of 1.25. Slope sidewalks to meet ABA requirements. For the width of sidewalks around the perimeter of the CDC addition, match existing.

Sidewalks crossing or located within 4 feet of vehicular pavement shall be designed to sustain the same loads as the pavement unless the sidewalks are protected by curbs, bollards, or other obstructions to vehicular traffic. Design and appearance of bollards and other obstructions shall be subject to acceptance by the Government and shall meet the Installation Design guide requirements.

The Design Build Contractor shall provide removable bollards, where necessary, to provide for access for snow plowing vehicles. Sidewalks that serve as fire department access points to buildings shall be designed to the same pavement strength as the roadway serving the site. The Design-Build Contractor shall design the new sidewalk widths to provide an acceptable pedestrian level of service.

Prior to final design, the Design-Build Contractor shall update the fire vehicles list with the Detroit Arsenal Fire Department, in the event newly acquired equipment would require a change in the pavement design or other access requirements. The Design-Build Contractor shall provide optional changes to the design for review.

6.4.5. Traffic Signage and Pavement Markings

Traffic signage and pavement marking shall meet the installation design guide (IDG) and the Manual on Uniform Traffic Control Devices (MOUTCD), latest edition and as shown in Appendix J Drawings.

Pavement markings shall be white.

6.4.6. Base Utility Information

The Design-Build Contractor may contact the Installation Public Work Directorate, for additional utility information and drawings for utilities owned by the Government within the Installation. POC for additinoal information is Mr. Don Hudgens, Tel: (586) 282-8469. The design of water, sewer, natural gas, power lines, and communication lines are included in this RFP package Appendix J Drawings. The existing CDC facility will be operational during construction. The design build contractor shall make the new utility connections with minimum interruptions to existing CDC facility operations. Coordinate with the installation, through the contracting officer, to ensure appropriate implementation of this requirement.

6.4.6.1 Utility Interruptions

All utility connections shall be coordinated through and require the prior approval of the Contracting Officer. Requests for utility tie-ins (not requiring shutdown) shall be made in writing at least two (2) weeks prior to the expected date of tie-in. Requests for utility shutdowns shall be made in writing at least four (4) weeks prior to the expected date of shutdown. As soon as the shutdown date is known, the Design-Build Contractor shall notify the Contracting Officer in writing at least fourteen (14) calendar days prior to the requested shutdown. The Design-Builder's progress schedule shall include preliminary listing of all proposed shutdown dates. Every effort shall be made to make all shutdowns as brief as possible, and limited in extent as possible. Shutoff of utilities that cause an interruption of the using agency work operations, as determined by the Contracting Officer, shall be accomplished during the using agency non-work hours or non-work days without additional cost to the government.

For Government owned utilities, install “smart” meters that are compatible and read & write programmable with the Tridium JACE Utility Monitoring and Control System (UMCS).

6.4.6.2. Design-Build Contractor’s Responsibility

It is the Design-Build Contractor’s responsibility to confirm the specific locations of the existing utilities and to coordinate with the utility owners to provide water supply, including fire protection requirements, sanitary sewer, power, communications and natural gas for the new building addition. The storm, water, gas, and sewer systems shall be designed and constructed in accordance with the criteria contained herein and their standards.

6.4.6.3 Marking of Utility Lines

Utility lines shall be marked with plastic marking tape. Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6 inch wide with minimum thickness of 0.01 mm. Tape shall have a minimum strength of 12.5 MPa lengthwise and 10.5 MPa crosswise. The tape shall be of a type specifically manufactured for marking and locating underground utilities.

Warning tapes shall be installed directly above all buried pipes or wires, at a depth of 18 inches below finished grade. Tape color shall be as specified below and shall bear a continuous printed inscription to describe the specific utility.

Tape Color:
Red: Electric
Orange: Telephone, Telegraph, Television, Police, and Fire Communications
Blue: Water Systems
Green: Sewer Systems
Yellow: Gas, Dangerous Materials

In addition to the plastic marking tape, tracer wire shall also be provided for all new underground utilities. Tracer wire shall be provided for all pipelines, including force mains but excluding storm drain and sanitary sewer lines. Tracer wire shall be provided for all electrical and communication conduits, direct buried cables, and other utilities as indicated. Tracer wire shall be installed on the bottom of the trench just to one side of where the pipe, conduit, or cable contacts the trench bottom. The wire shall run continuously between and terminate at valve boxes on water and gas lines, regulator stub-ups on gas lines, sprinkler heads and valve boxes on sprinkler system lines, panel boxes on electrical lines, and other such aboveground appurtenances. Each end of the wire shall have an additional length of at least 2 feet coiled up in the appurtenance. Tracer wire shall be insulated No. 12 AWG solid copper and of a type specifically manufactured for locating underground utilities. Aluminum wire shall not be

permitted. Insulation shall be solid yellow in color. Provide field testing prior to project completion to ensure that trace wire is detectable.

6.4.6.4 Site Base Electrical Utility

See paragraph 6.9.

6.4.6.5 Site Base Water Utility

Water Distribution and Service within the limits of this Installation are Government owned. Water lines outside the Installation are public and are owned by the City of Warren, Michigan. All water system design shall comply with the City of Warren; MI. Potable water shall meet the requirements of the Michigan State Plumbing code. Asbestos cement water mains shall not be allowed.

An existing water main is located to the west of the existing CDC facility. A new water lateral shall connect to this main as shown in the concept drawings included in Appendix J. The new domestic lateral will enter the new building addition at the mechanical room located on the south side. A new fire connection, PIV valve and a backflow preventer, inside the mechanical room, will be required for the new building addition. The existing fire lines inside the building will be extended for this purpose. Because of the new building addition, the single fire hydrant located on the east side of the existing facility will not provide adequate fire protection. A second fire hydrant shall be added to the east of the new building addition for this purpose.

All water service and distribution piping shall be pressure tested and flushed and disinfected in accordance with AWWA Manual C651.

Water system design shall provide a minimum residual pressure of 20 psi at each fire hydrant at design flow rates. See Fire Protection for additional information.

All exterior water distribution and service lines shall meet local frost depth requirements.
Water main and service lines shall be separate from parallel sanitary and storm sewers by 10-feet, center to center. If water lines and sewer lines cross, sewer pipe shall be concrete-encased 10-feet on each side of crossing with the joints staggered.

No lines shall run under buildings or structures. The drawings in this RFP include the water main design.
The water service lines shall be of sufficient size to furnish water to the building addition in the quantities and at the pressure required by International Plumbing Codes. The new Building addition shall be provided with separate interior service main cut-off valve readily accessible but not exposed in the public area. The Design-Build Contractor shall provide a hose bib above the main cutoff to allow for draining the system if necessary.

The new Building addition shall be provided with a separate service and main shut-off valve readily accessible to maintenance and emergency personnel. Separate metering shall be provided for the building addition. “Smart” meters shall be used. Meters shall be compatible with and read & write programmable with the Tridium System UMCS.

Valve boxes shall be cast iron. Boxes shall be extension-type with slide-type adjustment and with flared base. The word "water” shall be cast in the cover. The boxes shall be of such length as will be adopted without full extension to the depth of cover required over the pipe at the valve location. Valve boxes shall be suitable for vehicle traffic to accommodate the loading of an AASHTO WB-40 vehicle and shall be bonded with the ferrous valve and be cathodically protected, if required. The valve box shall have a protective coating applied using a coal tar epoxy.

The geotechnical report addresses cathodic protection. Should cathodic protection be needed, cathodic protection shall be provided for all fire hydrants and materials subject to corrosion and shall comply with the provisions of the National Association of Corrosion Engineers (NACE) criteria and standards. All ferrous underground material shall receive a protective catalog with a coating efficiency of 90 percent after 15 years. The Design-Build Contractor shall design and locate sacrificial anode.

All proposed fire hydrants shall be dry barrel type, weep holes will not be allowed, and have two national standard 2 ½ -inch outlets and one national standard 4 ½” thread fire department connection. The 4 ½” outlet shall be faced toward the hard surfaced area immediately adjacent to the hydrant, and open with a counter clockwise turn, and be equipped with a “Stortz” adapter with blind end cap. No existing fire hydrant, valve or other appurtenance

associated with an existing fire hydran shall be reused.
Fire hydrants shall not be closer than 40 feet to any building.

If backflow preventers are installed, a test connection must be provided outside the building downstream of all backflow prevention valves for flow tests.

6.4.6.6 Site Base Sewer Utility

Sanitary Sewer mains and services within the limits of the Installation are Government owned. Sanitary sewers outside the installation are owned by the City of Warren, Michigan. The facility shall be designed in accordance with the Detroit Arsenal Installation Guide and the City of Warren, MI, requirements, Ten State Standards and Michigan Plumbing code, whichever is more stringent.

Two existing sanitary sewer laterals located at the north of the existing CDC facility connect together to discharge into an existing sanitary sewer manhole located at the northwest corner of the site. The new sanitary sewer lateral form the new building addition shall not connect to the existing laterals or the existing described manhole. The lateral shall be routed, as shown on the drawings included in Appendix J, to connect to an existing lift station located at the northwest corner of the site. The existing lift station has adequate capacity to support the loads from the new building addition. The existing CDC will be operational during construction. The design build contractor shall coordinate his or her work when crossing the existing CDC drop off area in order to minimize impact to existing operations.

The Design-Build Contractor shall provide integrally cast manhole steps for manhole depths greater than 3 feet. The word “Sanitary Sewer” shall be cast in manhole covers. Frames, covers, and grates shall be cast iron and shall comply with the Detroit Arsenal Design Guide.

Allowable materials and installation methods shall be in accordance with Specification section 33 30 00, Sanitary Sewers. The minimum diameter of any sanitary sewer shall be 8-inches.

The utility drawings included in Appendix J of this RFP show the design of the sanitary sewer system.

6.4.6.7 Site Base Gas Utility

Gas Distribution and Service on this Installation belong to Consumers Energy.

Installation of gas piping shall be in accordance with ANSI B31.8, Gas Transmission and Distribution Piping Systems. UFGS Section 33 51 03.00 10 GAS DISTRIBUTION SYSTEM shall be the basis for the gas distribution system specifications.

An existing natural gas line is located to the south of the new building addition. Natural gas point of connection is shown on the drawings in Appendix J.

The gas distribution system shall comply with the requirements of NFPA 54, National Fuel Gas Code. The new building addition will need gas service. The Design-Build Contractor shall provide isolation valves at for the building addition. The isolation valves shall be located at a safe distance from the buildings.
The routing of the new gas line is shown on the drawings included in this RFP.

Consumer’s Energy will make the connection, install the service line, provide and install the gas meters and regulators. The Design/Build Contractor will connect the building lines to the meters and regulators and install piping in the buildings.

The Design/Build Contractor is also required to pay a connection fee for the building addition to The Consumer’s Energy Company. The Contractor shall coordinate with Consumer's Energy for the connection application process and applicable fees. The Contractor is responsible for all fees.

Shutoff valves shall be polyethylene (Rockwell or approved equal) and shall be provided in a valve box on the exterior of the building.

Gas regulators and required associated vents shall be located at or near the building but a minimum of 15 feet from any air conditioning system equipment.

The building service entrance shall be installed at a height sufficient to allow for installation of the gas meter.

Valves shall be installed so that interruptions to service can be confined to any specific building.
Lines shall not be placed under any buildings. Lines shall be placed with a minimum of 2 feet of earth cover.
Protective casings shall be provided to protect lines from superimposed street or heavy traffic loads.

6.4.6.8 Site Base Cable TV Utility

See paragraph 6.9.

6.4.7. Cut and Fill

Maintain existing topography and slopes while recognizing standard minimum and maximum gradients. Balance the quantity of cut and fill to create a smooth transition of graded areas into the existing natural terrain. Minimize the disturbance of land and utilize natural drainage paths where possible. The difference in grade between the Finished Floor elevation (FFE) and the ground surface immediately adjacent to the building shall be a minimum of 6-inches, except at doors. The ground outside the building, except at play areas, shall have a minimum of 5% slope away from all exterior walls for the first 10-ft and positive drainage thereafter. Play areas shall be graded to drain away from the building at a maximum grade of 2%. Earth cut and fill slopes shall not be steeper than 3 horizontal to 1 vertical.

The Contractor is required to obtain a dig permit from Detroit Arsenal. See Appendix FF for a copy of the dig permit application.

6.4.7.1 Cut

All disturbed soils are to be hauled off-site of the Installation. Contractor shall be responsible for all costs associated with disposal, including testing costs.

See Appendix E Environmental for additional information and requirements including Record of Environmental Consideration (REC) and USAG-DTA Environmental Protection Specifications.

6.4.7.2 Fill

There are no fill or borrow pits located on the installation. If fill material is required the Contractor shall provide appropriate material from an off-site location. All fill brought onto the installation is required to be lab tested or certified to be clean and free of harmful compounds and materials.

See Appendix GG Environmental System Management Goals for goals and requirements established by the Detroit Arsenal that are applicable to this project.

6.4.7.3 Soil Compaction

The contractor's project Geotechnical Engineer shall approve soil compaction equipment. Moistened or aerated material as necessary to provide the moisture content necessary to obtain the compaction specified with the equipment used. Each loose layer of fill placement shall be no greater than 8-inches thick.

Compact each layer to not less than the percent of maximum density specified in the Table below, determined in accordance with ASTM D-1557.

Table

Type	Compaction
Soil Compaction Foundations	95%

Concrete Work and Pavements	90%
Landscaping	85%
Retaining Wall Backfill	85 – 90%

The requirements shall be verified or modifications recommended by the Contractor's consulting professional geotechnical engineer in the report whenever engineering, soils or climatic factors indicate the necessity. Any modifications to the stated compaction requirements shall require approval from the COR. Subgrade suitability (by proof rolling operations), fill placement and compaction operations shall be observed and tested on a full time basis by a qualified independent testing agency as directed by the Contractor's project geotechnical engineer. Field in-place density shall be determined and check in accordance with the appropriate ASTM methodologies. The rate of in-place density testing shall be specified in the earthwork specifications. Representative Optimum Moisture and Laboratory Maximum Density Tests shall be made for each type of material or source of material. Upon completion of all earthwork, the contractor's geotechnical engineer shall certify in writing that the fill was placed in accordance with the requirements and provide the backup data including but not limited to: Proctor curves (moisture/density relationship), moisture contents, Atterberg limits, field density checks, sieve analysis, etc... Testing locations and elevations for all results shall be documented so that their position can be substantiated and relocated if necessary. The Contractor's QC plan shall detail these testing requirements and outline his plan to report the testing results. During construction, all foundation excavations shall be inspected and approved by the Contractor's project professional geotechnical engineer prior to placing concrete.

6.4.8. Borrow Material

There are no on-site borrow sources within the installation limits. Certified “clean” borrow material shall be used to minimize possible impacts and future liability as a result of uncertain borrow sources. Sources shall be approved by the Contracting Officer, in consultation with the Government Environmental Coordinator.

There are no on-site locations within the installation limits where excess material may be placed. Contractor shall be responsible for all costs associated with disposal, including testing costs.

6.4.9. Haul Routes and Staging Areas

Construction haul routes shall be through the Main Gate on 11 Mile Road as shown in Appendix J Drawings. Site access shall be coordinated with DPW, COR and Base Security.

The Design-Build Contractor shall use the Contractor’s access drive and yard as shown in Appendix J Drawings.

6.4.10. Clearing and Grubbing:

Clear and grub all trees and vegetation necessary for construction; but, save as many trees as possible. Protect trees and other vegetation to be saved during construction process from equipment.

6.4.11. Landscaping:

Landscaping requirements for the site shall comply with the Installation Design Guide requirements and AT/FP requirements.

Trees or shrubs demolished by construction activity, including utility and temporary parking construction shall be replaced in same quantities at locations inside the instillation. Locations to be determined by the contracting officer.

Irrigation of landscape beds and yards are not required on this project.

Roll type polypropylene weed control fabric shall be provided in all landscape beds. Fabric shall be woven and needle punched to allow water infiltration. Weed fabric shall be 99% opaque with a minimum weight of 5 ounces per square yard and minimum thickness of 20 mils.

Plant materials shall be native to Michigan and not require supplemental irrigation. Plant selection shall also take into consideration salt tolerance.

Mulch within the rain garden shall be 1” – 3” rounded river stone at a minimum depth of 3”.

The Contractor shall be responsible for proper maintenance of plant materials from the beginning of construction continuing until final acceptance by the Government. Maintenance activities shall include, but not be limited to watering, mowing, pruning, weeding, fertilizing, etc. for all shrubs, trees, ground cover, wildflower/grass and turf areas. Thorny vegetation, poisonous vegetation, and vegetation with berries or fruit shall not be permitted.

(a) Measures shall be taken to protect existing trees and plants as well as yard areas that are to remain. Plantings damaged as a result of construction operations and lawns shall be replaced and or repaired at construction completion. Trees or shrubs demolished by construction activity, including utility and temporary parking construction shall be replaced in same quantities at locations inside the instillation. Locations to be determined by the contracting officer.

6.4.12. Turf:

Turf preparation shall include eradication of unwanted vegetation and the use of a pre-emergent granular herbicide. Provide for a soil test that includes pH, potassium, phosphorus, calcium, magnesium, nematode count and soil amendment recommendations (N-P-K). Fertilizer and other soil amendments shall be applied as recommended in the soil test to provide healthy turf. The area within the limits of construction shall present a neat and finished appearance. All turf areas within the play area fence shall be sodded.

6.5. ARCHITECTURE

6.5.1. General: To the maximum extent possible within the contract cost limitation, the buildings shall conform to the look and feel of the architectural style and shall use the same colors as adjacent facilities as expressed herein . The Government will evaluate the extent to which the proposal is compatible with the architectural theme expressed in the RFP during the contract or task order competition. The first priority in order of importance is that the design provides comparable building mass, size, height, and configuration compared to the architectural theme expressed herein. The second priority is that design is providing compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching nearby and installation material/color pallets, as described herein.

6.5.2. **Design**

6.5.2.1. Appendix F is provided “For Information Only”, to establish the desired site and architectural themes for the area. Appendix F identifies the desired project look and feel based on Detroit Arsenal**’s** Installation Architectural Theme from existing and proposed adjacent building forms; i.e. building exterior skin, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, exterior color schemes, and organizational layout.

6.5.2.2. The design should address Detroit Arsenal’s identified preferences. Implement these preferences considering the following:

(a) Achievable within the Construction Contract Cost Limitation (CCL)

(b) Meets Milestones within Maximum Performance Duration.

(c) Achieves Full Scope indentified in this Solicitation

(d) Best Life-Cycle Cost Design

(e) Meets the Specified Sustainable Design and LEED requirements

(f) Complies with Energy Conservation Requirements Specified in this RFP.

6.5.2.3. Priority #1. Visual Compatibility: Facility Massing (Size, Height, Spacing, Architectural Theme, etc.) Exterior Aesthetic Considerations: The buildings massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are sympathetic to the style and context of the Installation. The Installation’s intent for this area is:

The color, texture and pattern selections for the building shall be in accordance with the indicated standards and shall be coordinated with existing work.

Exterior materials including roof forms and detailing, etc. shall match existing work. Doors, windows, hardware and related items are to match existing facility components while meeting current standards for CDC facilities.

6.5.2.4. Priority #2. Architectural Compatibility: Exterior Design Elements (Materials, Style, Construction Details, etc.) Roofs, Exterior Skin, and Windows & Door Fenestrations should promote a visually appealing compatibility with the desired character while not sacrificing the integrity and technical competency of building systems.

6.5.2.5. See Appendix F for exterior colors that apply to Architectural character at Detroit Arsenal. The manufacturers and materials referenced are intended to establish color only, and are not intended to limit manufacturers and material selections.

6.5.2.6. Additional architectural requirements:

(a) Install fall protection anchor points on all roofs with a slope greater than 2:12

(a) Modular or "stick built" construction is acceptable.

(b) The finish floor elevation of the addition shall match that of the existing CDC.

(c) The existing roof shall be framed to meet the new roof in a continuous plane. The Contractor shall maintain any warranties while performing work on the existing CDC. Provide appropriate expansion joints between the new and existing work including the roof.

(d) Crawl spaces, if provided, shall be provided with a minimum of 1 access opening of not less than 18 inches by 24 inches. The ground surface in the crawl space shall be provided with a Class I vapor retarder and gravel. Ground levels in crawl spaces shall not be located below the bottom of the footing. An approved drainage system shall be provided at crawl spaces (both interior and exterior) and foundation walls shall be water proofed, as applicable.

6.5.3. Programmable Electronic Key Card Access Systems:

Not Required.

6.5.4. INTERIOR DESIGN

It is the intent that finish materials that are integral or attached to the building structure shall be coordinated with the interior of the existing CDC structure while conforming to current standards for CDC's. This includes the selection and specification of applied finishes for the building's interior features including, but not limited to, walls, floors, ceilings, trims, doors windows, window treatments, built-in furnishings and installed equipment, lighting, and signage. Furnishings, fixtures and equipment selected (for example, tables, beds/cribs, seating, storage cabinets or bins, window treatments, marker boards, tack boards) shall be coordinated with furnishing items in the existing CDC facility while conforming to current CDC standards.

Finish colors of fire extinguisher cabinets, ceiling devices and equipment (speakers, smoke detectors, grills, diffusers, etc.), receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items shall match and be coordinated with existing work.

Interior building signage requirements:

- All Room Identification signage shall be from one manufacturer.

- Room identification signs shall be by room number only.

- All room numbers shall be permanent.

- The Contractor shall work with the Base CDC Director to determine the room numbering system and plan. The numbers shall be in chronological order and flow logically through the facility.

- Multiple window inserts for room identification and caregivers names to accommodate the flexibility for personnel or room functions change.

- Activity Rooms shall have inserts to provide photo of each caregiver.

- Building Service signs for all permanent spaces such as mechanical, electrical, communication and janitorial rooms shall have permanent room numbers and permanent corresponding room name messages. Other rooms which require permanent room numbers and names are: toilet rooms, storage closets, staff lounge and adminstrative areas.

- Secondary Directional signs shall list room numbers with corresponding directional arrows.

- Where possible, use international symbols in addition to messages.

- Each corridor shall have emergency/fire evacuation plan signs located at key areas to insure life safety.

- All signs shall meet ABA requirements.

- Direction Signs shall be located at the entrances into all connecting corridors.

- Each door throughout the facility, with the exception of store front doors shall receive a room sign with a permanent room number.

- Glass mounted signs shall be installed with a backer sheet that matches the front of the sign so no attachment method is visible.

- Identify doors to receive a permanent room name and/or a window insert at final design submittal of the interior signage schedule.

- Provide exit door tactile signage as required by NFPA 101.

6.6. STRUCTURAL DESIGN

Construction Documents (drawings and specifications) shall be sealed and signed by a Registered Professional Engineer. All structural calculations shall be checked and initialed as such by a registered Professional Engineer other than the original design engineer.

Building addition shall be structurally isolated from the existing building as required by UFC 4-010-01. The existing building shall be evaluated and modified as required to resist additional loads created by drifting and sliding snow.

The floor live loads, roof live loads, seismic loads, snow loads, and wind loads shall be designed using Occupancy Category III (IBC 2009, Table 1604.5 and ASCE 7, Table 1-1).

At a minimum, design loads shall be based on the following:

Roof Live Load:	20 PSF
Ground Snow Load:	25 PSF
Basic Wind Speed:	90 MPH
Seismic Criteria:	SS=0.12 g
	S1=0.04 g

All concrete shall be a minimum of 3,000 PSI and shall be reinforced. Place floor mounted mechanical and electrical equipment on a 4” minimum concrete housekeeping pad.

6.6.1 Seismic Design

Design and support new construction, and new mechanical and electrical equipment, to resist seismic forces following the IBC.

Site Classification D unless otherwise specified by the project specific geotechnical investigation.

6.6.2 Radon Mitigation

The Contractor shall evaluate available on-site data against Table 1 in UFC 3-490-04A Design; Indoor Radon Prevention and Mitigation - 15 May 2003 and include the appropriate mitigation identified in the design. If no data is available utilize the EPA radon maps located on the US EPA radon web site. Note that UFC 3-490-04A is inactive and is only applicable to the extent specifically stated in this paragraph. The Contactor shall incorporate the most stringent mitigation requirements of UFC 3-490-04A as identified above and EPA's "Radon Prevention in the Design and Construction of Schools and Other Large Buildings" Third Printing with Addendum, June 1994 or most current version.

6.7. THERMAL PERFORMANCE

See other sections of the RFP for requirements.

6.8. PLUMBING

Provide new plumbing systems to serve the Child Development Center addition including but not limited to the following: Domestic cold, hot and hot water return system and service, Domestic water heater system, Sanitary and vent piping system, and Natural gas system. As a minimum the plumbing systems shall be provided to meet the requirements listed in paragraph 4, Applicable Criteria and the requirements set forth by the utility providers.

6.8.1 Domestic Water Heater

The domestic water heating systems shall have a heating capacity and auxiliary storage adequate for the building occupancy and shall be sized based on the methods described in the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) 2007 Applications Handbook chapter 49 Table 8, (School building). Domestic water heater shall be designed to maintain hot water within a maximum of 20 ft from any fixture requiring it. Domestic hot water shall be stored at 140F. Water circulation through the building shall not exceed 120 deg F. Tempered water shall be supplied to appropriate fixture in accordance with the Plumbing Code and other requirements of this RFP.

Natural gas is the required fuel source for all heating systems.

All fuel burning equipment shall include low NOx burners.

6.8.2 The following are site specific plumbing items that are required for this project:

- Reduced pressure zone type back flow preventers shall be provided on all incoming water supply for containment

- Janitor closets shall be located as indicated on the included floor plan. Provide wrist blade handles on janitor sink faucets

- Provide Frost proof wall hydrants per the requirements of the Design standard

- If a crawl space is provided, Contractor shall provide submersible sump pump and connect to interior and exterior footer drains. Sump pump shall have a sealed and vented receiver. Discharge the sump pump in an acceptable manner

- Water piping shall be ASTM B88 copper

- Drain, waste and vent piping shall be service weight cast iron bell and spigot below grade, and hubless above grade. Vent piping may be galvanized above grade

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.9.1 Site Electrical

The existing facility is fed from a pad-mounted, 750 kVA, 4.8 kV - 208Y/120 VAC transformer. The existing primary conductors, transformer and secondary conductors have sufficient capacity to feed the existing facility and the new addition and shall remain.

An emergency generator is not required for the new building addition.

Should cathodic protection be needed, cathodic protection shall be provided to materials subject to corrosion and shall design by a certified and registered Cathodic Engineer to comply with the provisions of the National Association of Corrosion Engineers (NACE) criteria and standards. All ferrous underground material shall receive a protective catalog with a coating efficiency of 90 percent after 15 years. The Design-Build Contractor shall design and locate sacrificial anode.

6.9.2 Site Telecommunications

The existing building contains sufficient resources for site connectivity. No additional work is required for site connectivity.

POC for base communications is Chris Arndt, 586-282-6741, e-mail: chris.arndt@us.army.mil

6.9.2.1 Cable TV

A 4” conduit shall be run from the east side of MacArthur Drive into the new Electrical Room for future CATV service. Provide ¾” painted FRT plywood 8’ high backboard in the electrical room for CATV entrance equipment.

6.9.2.2 Grounding.

Grounding shall be in accordance with NFPA 70. Grounding systems for this facility shall include the electrical system service entrance ground, equipment grounding, and other auxiliary systems grounding such that all systems and components maintain low potential differences. Copper ground conductors from the main communications room backboard to the main electrical service ground shall also be provided. Facility grounding system shall have a resistance of 25 ohms or less to earth. All ground rods shall be 10 foot long, minimum copper clad steel. Ground Bus system shall be designed with a wall mounted 4-inch wide copper bus bar for connecting equipment items. It shall also contain a #4/0 copper ground conductor connected to the building counterpoise system. Provide a Ground Bus at the main electrical service, all electrical rooms and all telecommunication rooms. Provide a short circuit study to the Government.

A grounding counterpoise is not currently installed at the existing facility and is not required to be provided for the new addition. The new addition shall be bonded at each corner with a bare copper conductor from the building steel to a ground rod. All ground rods shall be copper clad steel, a minimum of 3/4-inch diameter by 10 feet long. All connections shall be exothermically welded.

Telecommunications systems grounding shall comply with the NEC and EIA/TIA-607, Grounding and Bonding Requirements for Telecommunications. All communication racks, cable trays, conduits, etc., shall be grounded with #6 AWG insulated (green) copper grounding conductor to main grounding bus bar. The racks shall be individually grounded to bus bar. Looping grounds shall not be permitted.

6.9.2.3 Exterior Lighting.

New parking lot lighting shall be provided as shown in Appendix J Drawings. New lighting fixtures, poles and bases shall be provided to match existing. Contractor shall verify that existing area lighting circuits have enough capacity to feed new light fixtures and shall extend existing circuits where possible to feed new light fixtures. Lighting levels shall conform to IES guidelines.

Building mounted exterior security and emergency egress lighting shall be provided. New lighting shall match existing.

New poles and light fixtures shall be designed to withstand a steady 100-mph wind with a 1.3 gust factor. Concrete foundations for exterior pole mounted lighting fixtures shall extend a minimum of 12 inches above finished grade when located in grass or landscaping and 36” above grade in parking lots.

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.10.1 Facility Electrical

Refer to other sections of the RFP.

6.10.2 Interior Communication

All IT infrastructures should be installed in accordance/consideration with the Department of Army Technical Guide for Installation Information Infrastructure Architecture (I3A, latest edition at time of contract award) and compatible with existing DTA system.

A complete cabling system including all j-hooks, raceway, cabling, terminations, jacks, patch panels, faceplates testing and warranty shall be provided. Design Build contractor shall route all cabling and make connections to voice/data jacks.

All communication wiring shall be performed by certified telecommunications contractors only. Certifications shall be provided to the Government before work can begin.

Voice and data cabling shall be Cat 6 UTP, and plenum rated. Voice cable shall be blue. Data cabling shall be yellow. Cable shall be terminated on Category 6 rated RJ-45 jacks at the workstation. Voice outlets shall be white. Data outlets shall be red. Conduit shall be routed from jack outlet to j-hooks located above accessible ceiling. Power poles are not desirable and will only be acceptable when feed cannot be made from an available wall or through available systems furniture. Route new voice and data cabling into the existing Communications Room. Provide new 2” conduits from above accessible ceiling through existing unused knockouts in the top of the existing Communications Cabinet Provide new 110-type block Category 6 compliant termination panels mounted within the existing Communication Cabinet for termination of new data cabling. Termination of all voice cabling shall be done on existing wall mounted 110 wall field within the existing Communications Room. All communication wiring shall be done in accordance with EIA/TIA 568B standards. All equipment cabinets shall be floor mounted. The contractor shall be responsible for all connections. All patch panels and associated racks, cabinets & pathways shall be grounded in accordance with J-STD EIA/TIA 607.

Provide one patch cable in the Communications Room and one at the workstation for each new connection. Patch cables shall match the EIA/TIA channel configuration of the cabling system. Patch cables in the Communications Room shall be 7’ in length and blue in color. Patch cables at the workstation shall be 12’ in length and blue in color.

There shall be a minimum of two outlet types utilized.

- Single voice – Outlet to consist of single voice jack and cable in 1-gang box, 54” MH. Minimum (40).

- Dual outlet – Outlet to consist of 1-voice and 1-data. Voice and data shall be in the same outlet, 1-RJ45 for voice and 1-RJ45 for data with a double faceplate, Outlet shall be mounted at 43” when mounted above teacher’s desk. Mounting height shall be 54” when located in the locations within classrooms. Administrative spaces shall have an 18” typical mounting height.

Design/Build contractor shall provide liquid-tight flexible connection between wall/floor outlet to furniture system for voice/data connection.

The communications infrastructure shall be labeled according to TIA/EIA 606 and I3A requirements. Labeling for each outlet, patch panel, and port shall match the existing standard. The use of handwritten labels is not acceptable.

The following areas should be understood to have the following outlets:

- Classroom Space – 1 dual at workstation, 1 dual within classroom.
- Mechanical Room – 1 single for wall mounted phone, 1 dual for DDC location.
- Electrical Closet – 1 single for wall phone.
- Staff Lounge – 1 single for wall phone, 2 dual within room, and 1 single for future CATV mounted at 84".
- Administrative Offices – 1-dual at each workstation location.
- Vending – 1-dual
- Copier/Fax – 4-dual
- Electrical – 1-wall phone

6.10.3 Intercom Communications

Provide an internal, hands-free intercom system that allows for individual room/area communication. The intent of such a system is for two way communication, rather than general announcements or music. A remote unit shall be placed at each child activity room, playgrounds, and offices. The remotes shall be mounted 54" above finish floor. Provide a variable volume control with a mean volume level 15dba above ambient noise level at 10ft. Provide controls that allow private conversation.

Provide the master unit at the existing main receptionist desk. Provide cabling as required for the selected system.

6.10.4 Lightning Protection

A lightning protection system is not installed in the existing facility. Contractor shall perform a Lightning Risk Assessment per NFPA 780. If deemed required by the assessment, the contractor shall provide a complete lightning protection system for both the existing building and the new addition. The lightning protection system shall be provided per NFPA 780 and UL96A and shall be provided with a UL Master Label. As a grounding counterpoise is not currently installed, lightning protection down conductors shall be connected directly to ground rods.

6.10.5 Security

Provisions (conduit, junction boxes, power, line voltage and low voltage wiring) for Video Surveillance shall be provided by the DB contractor.

The equipment for the security system shall be provided by the government (GFGI). The Design/Build contractor shall include the design and installation of the associated infrastructure for a full and operational system. Final CCTV Infrastructure design must be approved by SPAWAR before drawings are issued for construction.

CCTV infrastructure shall be provided in the Child Development Center. All interior CCTV camera locations are to be ceiling mounted. Drops serving cameras to be located on the exterior of the new addition are to be mounted at 9' above finished grade. Refer to drawings for quantities and locations. Detroit Arsenal will determine final locations with Design/Build contractor during design. The DB contractor shall provide for the removal or relocation of any existing cameras and CCTV infrastructure that interfere with new construction

Each CCTV camera drop shall consist of a RG59 cable and an 18AWG power cable. Route cabling through 1" conduit in areas without a ceiling, and in areas that contain a hard ceiling. Each drop to contain a 6' service loop to facilitate cameras repositioning. In areas with dropped ceilings, secure power and video cabling tied up at each location. In areas without dropped ceilings, provide one (1) single gang receptacle box, recess mounted no more than 12' above the fixed floor at each location. For exterior camera locations, install conduit (w/ video and power cabling) to the adjacent interior.

Provide new 4" conduits for routing CCTV video and power cabling from above the accessible ceiling into the existing Camera Room. Within the Camera Room, leave a 20' service loop of video cable for each feed. The

camera video cable shall be RG-59U type CCTV plenum coax. The color will be determined by the owner. Provide a 120VAC/30-AMP circuit to the location for the new CCTV surveillance equipment cabinet.

6.11. HEATING, VENTILATING, AND AIR CONDITIONING

6.11.1 General Requirements

Provide new heating ventilation and air-conditioning (HVAC) systems to serve the Child Development Center addition. The HVAC system shall be separate from those serving the existing building.

As a minimum the mechanical systems shall be provided to meet the requirements listed in paragraph 4, Applicable Criteria and the requirements set forth by the utility providers.

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Integrate the control system to the installation's existing UMCS. The BAS system shall be compatible with and read & write programmable with the Detroit Arsenal Wide JACE Tridium System. <u>All new panels and interface devices shall be located in a closet or the communication room for ease of access. Only unit controllers are allowed to be installed above the ceiling and only if it is unit mounted.</u>

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All site mechanical equipment shall be screened in accordance with the requirements of UFC 04-010-01 and the IDG.

6.11.2 System Selection

The HVAC systems shall be capable of controlling the dew point of the supply air for all load conditions. The designer must base system selection on the capability of the air-conditioning system to control the humidity in the conditioned space continuously under full load and part load conditions. Peak latent load outdoor design conditions (the design wet bulb temperature and the mean-coincident dry bulb temperature) or low sensible loads and high latent loads (relatively cool cloudy days) will, in some cases, cause inside relative humidity to be higher than desired.

Each child development room is required to have its own temperature control. Similar spaces and exposures shall be zoned together. Corner space shall be zoned independently.

Heating and Air Conditioning shall be provided by self contained units (i.e. factory built air handling equipment, boilers, chillers etc.). Provide self contained Natural gas units for heating (i.e. factory built natural gas boilers).

Natural gas is the required fuel source for all heating systems.

All fuel burning equipment shall include low NOx burners.

6.11.3 The following are site specific HVAC items that are required for this project:

- The Base Utility Monitoring and Control System is a Tridium JACE system

- All HVAC and Plumbing Equipment shall be monitored and controlled through a DDC system. The BAS system shall be compatible with and read & write programmable with the Detroit Arsenal Tridium JACE System

- Water, electric, natural gas and other energy sources if used shall be metered with smart meters to allow data collection into the DDC system

- Fully ducted return air system

6.11.4 The following may be acceptable in accordance with the requirements listed in other sections of thsi RFP but are not acceptable for new systems used on this project:

- Use of central steam heating source for the project
- Non-metallic material for rigid Ductwork
- Plastic piping systems inside the building footprint
- Lead based solder
- Internally lined sheet metal ductwork
- Electric heat

6.11.5 Internal Loads:

All internal loads shall be considered when calculating cooling loads for air conditioning and ventilation. The heat gain to the space shall be based on industry standard and it is the Design-Build contractor's responsibility to determine what is adequate. It is expected that a personal desktop computer will be required at each workstation. The heat gain should be based on a computer that is current state of the art and have at least a 19" CRT type monitor. It is also expected that a personal laptop computer will be required at each occupant in a class room or conference room. Other office equipment should also be considered.

6.11.6 Design Parameters

Outdoor Storage
40° F for freeze protection

6.11.7 Exhaust systems:

Provide exhaust grills over each diaper changing table. The total exhaust in each child development room shall be equal to the minimum outside air required for the child development room plus 10%. The exhaust shall be combined into a single exhaust fan.

If the dedicated outside air unit utilizes energy recovery, duct all exhaust air from the addition to the unit.

6.11.8 Crawl Space Requirements

A crawl space (if provided), shall be inside the building envelope and heated. The DOR shall conduct a Psychrometric analysis to determine if dehumidification is required to control mold growth in the crawl space.

Integrate the control system to the installation's existing UMCS. The existing UMCS is Tridium JACE

6.12. ENERGY CONSERVATION

6.12.1. General

In accordance with ECB 2010-14 and ECB 2011-1, all references to energy consumption reduction shall be comarpared using ASHRAE 90.1-2007. In addition, compliance with the minimum requirements of ASHRAE 90.1-2010 is required. A copy of ECB 2011-1 is include din Appendix BB for Reference.

All HVAC equipment efficiency ratings shall meet or exceed ASHRAE 189.1 requirements.

See Appendix GG Environmental System Management Goals for goals and requirements established by the Detroit Arsenal that are applicable to this project.

6.12.2. Inclusion of Renewable Energy Features. The following renewable energy features have been determined lifecycle cost effective, are included in the project budget and shall be provided:

None.

6.13. FIRE PROTECTION

No additional requirements.

6.14. SUSTAINABLE DESIGN

6.14.1. LEED Rating Tool Version. This project shall be executed using LEED-NC Version 3.

6.14.2. The minimum requirement for this project is to achieve LEED Silver level. Each non-exempt facility (building plus sitework) must achieve this level. In addition to any facilities indicated as exempt in paragraph 3, the following facilities are exempt from the minimum LEED achievement requirement: Existing Child Development Center.

6.14.3. Credit Validation: LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the Contractor. Administration/team management of the online project will be by the Contractor. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is required. The Contractor will obtain LEED certification prior to project closeout. Application, payment of certification of fees and all coordination with USGBC during the certification process will be by the Contractor. GBCI interim review of design phase data is not required by the Government but is recommended. Government validation during project execution does not relieve or modify in any way the Contractor's responsibility to satisfy all requirements for certification as defined by LEED and GBCI. Contractor is not responsible for design phase LEED documentation of any unaltered portion of the design that is accomplished by others. If the project includes unaltered complete design by others, during the certification process Contractor will coordinate all GBCI comments on LEED credits that fall outside Contractor's scope of responsibility with the Government for coordination with the Designer of Record, and Contractor will not be penalized if project fails to achieve certification at the minimum required level due to loss of credits that are the responsibility of others.

6.14.4. Commissioning: See Appendix M for Owner's Project Requirements document(s).

6.14.5. LEED Credits Coordination. The following information is provided relative to Sustainable Sites and other credits.

SS Credit 1 Site Selection:

Project site IS NOT considered prime farmland.

Delineation of 100-year flood elevation is shown on site drawings provided in this CONTRACT.

Delineation of threatened or endangered species habitat is shown on site drawings provided in this CONTRACT.

Delineation of water, wetlands and areas of special concern is shown on site drawings provided in this CONTRACT.

Project site WAS NOT previously used as public parkland.

SS Credit 2 Development Density & Community Connectivity.

Project site DOES NOT meets the criteria for this credit.

SS Credit 3 Brownfield Redevelopment.

Project site DOES NOT meets the criteria for this credit.

SS Credit 4.1 Public Transportation Access.

Project site DOES NOT meets the criteria for this credit.

EA Credit 6 Green Power.

35% of the project's electricity WILL NOT be provided through an Installation renewable energy contract. Do not purchase Renewable Energy Credits (REC's) to earn this credit.

MR Credit 2 Construction Waste Management.

The Installation does not have an on-post recycling facility available for Contractor's use.

Regional Priority Credits (Version 3 only)

The project zip code is 48397.

6.14.6. LEED Credit Preferences, Guidance and Resources. See Appendix L LEED Project Credit Guidance for supplemental information relating to individual credits.

6.14.7. Not Used

6.14.8. Additional Information

(a) Additional Requirements

The project design shall comply with Executive Order 13423, Executive Order 13514 and Engineering and Construction Bulletin (ECB) 2011-1 requirements. ECB 2011-1 is included in Appendix BB for Reference.

See Appendix GG Environmental System Management Goals for goals and requirements established by the Detroit Arsenal that are applicable to this project.

The following LEED credits are required to be achieved:

- EA 1 Optimize Energy: earn at least 15 points under this credit
- EA 3 Enhanced Commissioning
- EA 5 Measurement and Verification
- MR 2 Construction Waste Management
- MR 4 Recycled Content
- IEQ 3.1 Construction IAQ Management Plans
- IEQ 3.2 Construction IAQ Management Plans
- IEQ 7.1 Thermal Comfort Design

In addition, at least of 40% of the minimum points required for Silver level certification shall be earned in any combination of the following credits as applicable to the project scope and allowed by other RFP requirements (see Appendix O):

- SS 7.1 Heat Island Effect, Non-Roof
- SS 7.2 Heat Island Effect, Roof
- SS 8 Light Pollution Reduction
- WE 1.1 Water Efficient Landscaping - Reduce Potable Water Use by 50%

- WE 1.2 Water Efficient Landscaping - No Potable Use or No Irrigation
- WE 2 Innovative Wastewater Technologies
- WE 3 Water Use Reduction
- EA 1 Optimize Energy Performance
- EA 2 On-Site Renewable Energy
- EA 3 Enhanced Commissioning
- EA 5 Measurement & Verification
- EA 6 Green Power
- IEQ 1 Outside Air Delivery Monitoring
- IEQ 8.1 Daylight & Views - Daylight 75% of Spaces
- ID 1.1-1.5 Innovative Design, if achieved for energy and/or water savings
- RP 1.1-1.4 Regional Priorities, if achieved for energy and/or water savings

(b) Additional ECB 2011-1 Requirements

In accordance with ECB 2011-1, the following Energy and Sustainability Enhancements have been identified by the Government and shall be included in the project:

- All HVAC equipment efficiency ratings shall meet or exceed ASHRAE 189.1 requirements.

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(c) LEED 2009 Minimum Program Requirements

USGBC has granted the US Department of Defense a blanket exemption from the LEED 2009 Minimum Program Requirement (MPR) 6 (Must Commit to Sharing Whole-Building Energy and Water Usage Data). Coordinate completion of the exemption form and exemption process with the USACE Project Manager or their assigned designee. See Appendix HH LEED 2009 Minimum Program Requirement (MPR) 6 Exemption Process.

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6.15. ENVIRONMENTAL

All soil shall disturbed as part of the project shall be removed. Soils require special handling and will require disposal at a Class II landfill. Documentation and chain-of-custody documentation shall be provided to the COR for all soil removed from the site.

See Appendix E Environmental for additional information and requirements including Record of Environmental Consideration (REC) and USAG-DTA Environmental Protection Specifications.

See Appendix GG Environmental System Management Goals for goals and requirements established by the Detroit Arsenal that are applicable to this project.

6.16. PERMITS

The Design-Build Contractor shall be responsible to obtain all permits (Installation, local, state and federal) required for the design and construction. The Design Build Contractor is responsible for expediting all critical path permits so as not to impede the construction schedule. The Design-Build Contractor shall be responsible for the payment of all fees associated with permits. The Design-Build Contractor shall submit all permits to the COE, who in turn will submit to the appropriate DPW agencies for review and signature, if necessary. Required permits include, but are not limited to the following:

· Macomb County Soil Erosion Sedimentation Control Permit (SESC).

· State of Michigan Department of Environmental Quality (MDEQ) NPDES Construction Site Storm Water Permit.

· Storm Water review (Impact on storm water system) - City of Warren.

· Sanitary discharge volume increase permit-City of Warren.

· Installation Permit (air emission review to determine need for permit) - State of Michigan, Department of environmental Quality, Air Quality Division.

· Detroit Arsenal Installation Dig Permit from Detroit Arsenal (DPW).

· Construction Project Review from the City of Warren.

6.17. DEMOLITION

Demolish and remove existing construction only to the extent required by new construction. Use methods required to complete the work within limitations of governing regulations. Protect construction to remain against damage and soiling during selective demolition. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations.

The Design-Build Contractor shall be wholly responsible for the removal and proper disposal of all materials associated with any demolition to a site off the Installation in accordance with all federal, state, and local regulations.

Where existing utilities are to be demolished, they shall be removed and capped or closed, as appropriate, at the nearest manhole, junction box, or main as directed by the Contracting Officer’s Representative.

For water main abandonment, all valves, tees, blocking, and/or other appurtenances associated with the main being removed shall be removed and the connection replaced with suitable couplings and replacement pipe. No valves, tees, blocking, or other appurtenances will be permitted to remain at any main abandonment sites.

The Design-Build Contractor shall be responsible for furnishing an as-built drawing of the demolition site showing the location point where each utility shall be terminated. Locations where the abandoned existing utilities are not in conflict with the new construction can be cut and plugged and abandoned in place.

See Appendix E Environmental for additional information and requirements including Record of Environmental Consideration (REC) and USAG-DTA Environmental Protection Specifications.

(a) Asbestos Testing

The D/B contractor shall retain the services of an independent testing laboratory to perform a NESHAP inspection to identify the presence of asbestos prior to the start of demolition or renovation work. This includes all areas that will undergo renovation. The existing facility shall be thoroughly inspected for the presence of asbestos containing materials including Category I and Category II non-friable ACM. The inspection and testing shall be done by a laboratory that is certified to perform the types of inspections and tests required and shall be completely independent from the DB Contractor. The contractor and their personnel responsible for testing and inspection shall be properly trained and licensed by the State of Michigan. The DB Contractor shall provide USAG-DTA copies of licenses and certifications of companies and personnel retained to perform inspections and tests prior to

the start of work. Test results shall be provided to the USAG-DTA 10 days prior to start of demolition and renovation work.

See Appendix GG Environmental System Management Goals for goals and requirements established by the Detroit Arsenal that are applicable to this project.

6.18. ADDITIONAL FACILITIES

None.

End of Section 01 10 00.[Not Supplied - ProjectInfo : TONUM]

SECTION 01 32 01.00 10
PROJECT SCHEDULE

1.0 GENERAL

1.1. REFERENCES

1.2. QUALIFICATION

2.0 PRODUCTS (NOT APPLICABLE)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

3.2. BASIS FOR PAYMENT AND COST LOADING

3.3. PROJECT SCHEDULE DETAILED REQUIREMENTS

3.4. PROJECT SCHEDULE SUBMISSIONS

3.5. SUBMISSION REQUIREMENTS

3.6. PERIODIC SCHEDULE UPDATE MEETINGS

3.7. REQUESTS FOR TIME EXTENSIONS

3.8. DIRECTED CHANGES

3.9. WEEKLY PROGRESS MEETINGS

3.10. OWNERSHIP OF FLOAT

3.11. TRANSFER OF SCHEDULE DATA INTO RMS/QCS

1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

- U.S. ARMY CORPS OF ENGINEERS (USACE) ER 1-1-11 (1995) Progress, Schedules, and Network Analysis Systems http://www.usace.army.mil/publications/eng-regs/er1-1-11/entire.pdf

1.2. QUALIFICATIONS

Designate an authorized representative who shall be responsible for the preparation of the schedule and all required updating (statusing) and preparation of reports. The authorized representative shall be experienced in scheduling projects similar in nature to this project and shall be experienced in the use of the scheduling software that meets the requirements of this specification.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

3.1.1. Submit a project schedule as specified herein for approval showing the sequence in which the Contractor proposes to perform the work and dates on which the Contractor contemplates starting and completing all schedule activities. The scheduling of the entire project, including the design and construction sequences is required. Contractor management personnel shall actively participate in its development. Designers, subcontractors and suppliers working on the project shall also contribute in developing an accurate project schedule. The schedule must be a forward planning as well as a project monitoring tool. The approved project schedule shall be used to measure the progress of the work and to aid in evaluating requests for excusable time extensions. The schedule shall be cost loaded and activity coded as specified herein. The schedule will provide the basis for all progress payments. If the Contractor fails to submit any schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule

3.1.2. Status the schedule on at least a monthly basis, as specified herein. If in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained. See paragraph 3.7.4.

3.1.3. Failure of the Contractor to comply with the requirements of the Contracting Officer shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of the contract.

3.2. BASIS FOR PAYMENT AND COST LOADING

The schedule shall be the basis for determining contract earnings during each update period and therefore the amount of each progress payment. Lack of an approved schedule update or qualified scheduling personnel will result in an inability of the Contracting Officer to evaluate contract earned value for the purposes of payment. Failure of the Contractor to provide all information, as specified herein will result in the disapproval of the preliminary, initial and subsequent schedule updates. In the event schedule revisions are directed by the Contracting Officer and those revisions have not been included in subsequent revisions or updates, the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until such revisions to the project schedule have been made. Activity cost loading shall be reasonable as determined by the Contracting Officer. The aggregate value of all activities coded to a contract CLIN as specified herein shall equal the value of the CLIN on the Schedule.

3.3. PROJECT SCHEDULE DETAILED REQUIREMENTS

The computer software system utilized to produce and update the project schedule shall be capable of meeting all requirements of this specification. Failure of the Contractor to meet the requirements of this specification will result in the disapproval of the schedule. Scheduling software that meets the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER-1-1-11(1995) referenced herein are Primavera Project Planner (P3) by Primavera, and Open Plan by Deltek.

3.3.1. Use of the Critical Path Method

Use the Critical Path Method (CPM) of network calculation to generate the project schedule. Prepare the project schedule using the Precedence Diagram Method (PDM).

3.3.2. Level of Detail Required

Develop the project schedule to an appropriate level of detail. Failure to develop the project schedule to an appropriate level of detail, as determined by the Contracting Officer, will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2.1. Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities shall have Original Durations (OD) greater than 20 work days or 30 calendar days. Procurement activities are defined herein.

3.3.2.2. Design and Permit Activities

Include design and permit activities, including necessary conferences and follow-up actions and design package submission activities. Include the design schedule in the project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific contract period. This shall be at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. Include review and correction periods associated with each item.

3.3.2.3. Procurement Activities

Include activities associated with the submittal, approval, procurement, fabrication and delivery of long lead materials, equipment, fabricated assemblies and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days. A typical procurement sequence includes the string of activities: submit, approve/review, procure, fabricate, and deliver.

3.3.2.4. Mandatory Tasks

Include and properly schedule the following tasks (See also the Sample Preliminary Submittal Register Input Form):

(a) Submission, review and acceptance of design packages, including BIM

(b) Submission of mechanical/electrical/information systems layout drawings

(c) Submission and approval of O & M manuals

(d) Submission and approval of as-built drawings

(e) Submission and approval of 1354 data and installed equipment lists

(f) Submission and approval of testing and air balance (TAB)

(g) Submission of TAB specialist design review report

(h) Submission and approval of fire protection specialist

(i) Submission and approval of testing and balancing of HVAC plus commissioning plans and data. Develop the schedule logic associated with testing and commissioning of mechanical systems to a level of detail consistent with the contract commissioning requirements.

(j) Air and water balancing

(k) HVAC commissioning

(l) Controls testing plan submission

(m) Controls testing

(n) Performance Verification testing

(o) Other systems testing, if required

(p) Contractor's pre-final inspection

(q) Correction of punch list from Contractor's pre-final inspection

(r) Government's pre-final inspection

(s) Correction of punch list from Government's pre-final inspection

(t) Final Inspection

3.3.2.5. Government Activities. Show Government and other agency activities that could impact progress. These activities include but are not limited to: approvals, design reviews, review conferences, release for construction of design package(s), environmental permit approvals by State regulators, inspections, utility tie-ins, Government Furnished Property/Equipment (GFP) and Notice to Proceed for phasing requirements, if any.

3.3.2.6. Activity Responsibility Coding (RESP)

Assign Responsibility Code for all activities to the Prime Contractor, Subcontractor or Government agency responsible for performing the activity. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements. Code all activities not coded with a Government Responsibility Code to the Prime Contractor or Subcontractor responsible to perform the work. Activities shall not have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE). Unacceptable code values are abbreviations of the names of subcontractors.

3.3.2.7. Activity Work Area Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities shall not have more than one Work Area Code. Not all activities are required to be Work Area coded. A lack of Work Area coding will indicate the activity is not resource or space constrained.

3.3.2.8. Contract Changes/Requests for Equitable Adjustment (REA) Coding (MODF)

Assign Activity code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer, with a Contract Changes/REA Code. Key all Code values to the Government's modification numbering system. Any activity or sequence of activities added to the schedule as a result of alleged constructive changes made by the Government may be added to a copy of the current schedule, subject to the approval of the Contracting Officer. Assign Activity codes for these activities with a Contract Changes/REA Code. Key the code values to the Contractor's numbering system. Approval to add these activities does not necessarily mean the Government accepts responsibility and therefore liability for such activities and any associated impacts to the schedule, but rather the Government recognizes such activities are appropriately added to the schedule for the purposes of maintaining a realistic and meaningful schedule. Such activities shall not be Responsibility Coded to the Government unless approved. An activity shall not have more than one Contract Changes/REA Code

3.3.2.9. Contract Line Item (CLIN) Coding (BIDI)

Code all activities to the CLIN on the Contract Line Item Schedule to which the activity belongs. An activity shall not contain more than one CLIN Item Code. CLIN Item code all activities, even when an activity is not cost loaded.

3.3.2.10. Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities, based upon the phase of work in which the activity occurs. Code activities to either a Design Phase or a Construction Phase. Code fast track design and construction phases proposed by the Contractor to allow filtering and organizing the schedule by fast track design and construction packages. If the contract specifies construction phasing with separately defined performance periods, identify a Construction Phase Code to allow filtering and organizing the schedule accordingly. Each activity shall have only one Phase of Work code.

3.3.2.11. Category of Work Coding (CATW)

Assign Category of Work code to all Activities based upon the category of work which the activity belongs. Category of Work Code must include, but is not limited to: Design, Design Submittal, design reviews, review conferences, Construction Submittal, Approvals (if any), Acceptance, Procurement, Fabrication, Delivery, Weather Sensitive Installation, Non-Weather Sensitive Installation, Start Up, Test, and Turnover. Assign a Category of Work code to each activity. Each activity shall have only one Category of Work Code.

3.3.2.12. Definable Features of Work Coding (FOW1, FOW2, FOW3)

Assign a Definable Feature of Work Code to appropriate activities based on the definable feature of work to which the activity belongs. Definable Feature of Work is defined in Specification Section 01 45 04.00 10, Contractor Quality Control. An activity shall not have more than one Definable Feature of Work Code. Not all activities are required to be Definable Feature of Work Coded.

3.3.3. Scheduled Project Completion and Activity Calendars

The schedule interval shall extend from NTP date to the required contract completion date. The contract completion activity (End Project) shall finish based on the required contract duration, as adjusted for any approved contract time extensions. The first scheduled work period shall be the day after NTP is acknowledged by the Contractor. Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a 7 day calendar when the contract assigns calendar day durations for the activity such as a Government Acceptance activity. If the Contractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified including weekends and holidays. Assign the Category of Work Code - Weather Sensitive Installation to those activities that are weather sensitive. Original durations must account for anticipated normal adverse weather. The Government will interpret all work periods not identified as non-work periods on each calendar as meaning the Contractor intends to perform work during those periods.

3.3.3.1. Project Start Date

The schedule shall start no earlier than the date on which the NTP was acknowledged. Include as the first activity in the project schedule an activity called "Start Project" or “NTP”. The "Start Project" activity shall have an "ES" constraint date equal to the date that the NTP was acknowledged, with a zero day duration.

3.3.3.2. Schedule Constraints and Open Ended Logic

Constrain completion of the last activity in the schedule by the contract completion date. Schedule calculations shall result in negative float when the calculated early finish date of the last activity is later than the contract completion date. Include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have an "LF" constraint date equal to the contract completion date for the project, and with a zero day duration or by using the “project must finish by” date in the scheduling software. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as “zero fee float” or “zero total float” are typically prohibited. There shall only be 2 open ended activities: Start Project (or NTP) with no predecessor logic and End Project with no successor logic.

3.3.3.3. Early Project Completion

In the event the Preliminary or Initial project schedule calculates an early completion date of the last activity prior to the contract completion date, the Contractor shall identify those activities that it intends to accelerate and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. The last activity shall have a late finish constraint equal to the contract completion date and the schedule will calculate positive float. The Government will not approve an early completion schedule with zero float on the longest path. The Government is under no obligation to accelerate activities for which it is responsible to support a proposed early contract completion.

3.3.4. Interim Completion Dates

Constrain contractually specified interim completion dates to show negative float when the calculated early finish date of the last activity in that phase is later than the specified interim completion date.

3.3.4.1. Start Phase

Include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The “Start Phase X" activity shall have an "ES" constraint date equal to the date on which the NTP was acknowledged, and a zero day duration.

3.3.4.2. End Phase

Include as the last activity for a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have an "LF" constraint date equal to the specified completion date for that phase and a zero day duration.

3.3.4.3. Phase “X” Hammock

Include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" hammock activity shall be logically tied to the earliest and latest activities in the phase.

3.3.5. Default Progress Data Disallowed

Do not automatically update Actual Start and Finish dates with default mechanisms that may be included in the scheduling software. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the AS and AF dates on the Daily Quality Control report for every in-progress or completed activity, and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's updated schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Disable program features which calculate one of these parameters from the other.

3.3.6. Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule..

3.3.7. Negative Lags and Start to Finish Relationships

Lag durations contained in the project schedule shall not have a negative value. Do not use Start to Finish relationships (SF).

3.3.8. Calculation Mode

Schedule calculations shall retain the logic between predecessors and successors even when the successor activity starts and the predecessor activity has not finished. Software features that in effect sever the tie between

predecessor and successor activities when the successor has started and the predecessor logic is not satisfied (“progress override”) will not be allowed.

3.3.9. Milestones

Include milestone activities for each significant project event including but not limited to: milestone activities for each fast track design package released for construction; design complete; foundation/substructure construction complete; superstructure construction complete; building dry-in or enclosure complete to allow the initiation of finish activities; permanent power complete; and building systems commissioning complete.

3.3.10. Use of Primavera “P6”

If P6 is being used, the following settings are mandatory in the Preliminary Project Schedule, Initial Project Schedule and all schedule submissions to the Government:

3.3.10.1. Activity Codes shall be Project Level not Global or EPS level.

3.3.10.2. Calendars shall be Project Level not Global or Resource level.

3.3.10.3. Set Activity Duration Types to "Fixed Duration & Units".

3.3.10.4. Set Percent Complete Types to "Physical".

3.3.10.5. Use Default Time Period Admin Preferences "8.0 hr/day, 40 hr/week, 172 hr/month, 2000 hr/year". Set Calendar Work Hours/Day to 8.0 Hour days. This is not to mandate the Contractor’s work week. Alternate workweeks may be set up in “Calendar Settings”.

3.3.10.6. Set Schedule Option for defining Critical Activities "Longest Path".

3.3.10.7. Set Schedule Option for defining progressed activities "Retained Logic".

3.3.10.8. Set up Cost loading a single lump sum Resource. The Price/Unit shall be $1/hr, Default Units/Time shall be "8h/d", and select settings "Auto Compute Actuals" and "Calculate costs from units".

3.3.10.9. Activity ID's shall not exceed 10 characters.

3.3.10.10. Activity Names shall have the most defining and detailed description within the first 30 characters.

3.4. PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1. Preliminary Project Schedule Submission

Submit the Preliminary Project Schedule, defining the Contractor's planned operations for the first 90 calendar days for approval within 15 calendar days after the NTP is acknowledged. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. Detail it for the first 90 calendar days. It may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as previously specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required Plan and Program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, the planned submissions of all early design packages, permitting activities, design review conference activities and other non-construction activities intended to occur within the first 90 calendar days. Schedule any construction activities planned for the first 90 calendar days after NTP. Constrain planned construction activities by Government acceptance of the associated design package(s) and all other specified Program and Plan approvals. Activity code any activities that are summary in nature after the first 90 calendar days with Responsibility Code (RESP) and Feature of Work code (FOW1, FOW2, FOW3)

3.4.2. Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after NTP. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. The Initial Schedule shall be at a reasonable level of detail as determined by the Contracting Officer. Include detailed design and permitting activities, including but not limited to identification of individual design packages, design submission, reviews and conferences; permit submissions and any required Government actions; and long lead procurement activities required prior to design completion. The Initial Project Schedule shall include the entire construction sequence and all fast track construction activities, with as much detail as is known at the time but, as a minimum, shall include all construction start and completion milestone activities, and detailed construction activities through the dry-in milestone, including all activity coding and cost loading. Include the remaining construction, including cost loading, but it may be scheduled summary in nature. As the design proceeds and design packages are developed, fully detail the remaining construction activities concurrent with the monthly schedule updating process. Constrain construction activities by Government acceptance of associated designs. When the design is complete, incorporate into the then approved schedule update all remaining detailed construction activities that are planned to occur after the dry-in milestone.

3.4.3. Design Package Schedule Submission:

With each design package submitted to the Government, submit a frag-net schedule extracted from the then current Preliminary, Initial or Updated schedule which covers the activities associated with that Design Package including construction, procurement and permitting activities.

3.4.4. Periodic Schedule Updates

Based on the result of the meeting specified in PERIODIC SCHEDULE UPDATE MEETINGS, submit periodic schedule updates. These submissions shall enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of the Contracting Officer or authorized representative is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made. Update the schedule to include detailed lower WBS activities procurement and construction activities as the design progresses, but not later than the submission of the final, un-reviewed design submission for each separate design package. The Contracting Officer may require submission of detailed schedule activities for any distinct construction that is started prior to submission of a final design submission, if such activity is authorized.

3.4.5. Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used. A template SDEF compatible schedule backup file (sdef.prx) is available on the QCS website: www.rmssupport.com. The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per Day
2	RESP	4	Responsible Party (e.g. GC, subcontractor, USACE)
3	AREA	4	Area of Work
4	MODF	6	Modification or REA number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of Work

7	CATW	1	Category of Work
8	FOW1	10	Feature of Work (used up to 10 characters in length)
9	FOW2	10	Feature of Work (used up to 20 characters in length)
10	FOW3	10	Feature of Work (used up to 30 characters in length)

3.5. SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1. Data CD's

Provide two sets of data CD's containing the project schedule in the backup format. Each CD shall also contain all previous update backup files. File medium shall be CD. Label each CD, indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file names. Each schedule shall have a unique file name as determined by the Contractor.

3.5.2. Narrative Report

Provide a Narrative Report with the Preliminary, Initial, and each Periodic Update of the project schedule, as the basis of the progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths where the total float is less than or equal to 20 work days, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to communicate to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through its analysis. Identify and explain why any activities that, based their calculated late dates, should have either started or finished during the update period but did not.

3.5.3. Approved Changes Verification

Include only those project schedule changes in the schedule submission that have been previously approved by the Contracting Officer. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.5.4. Schedule Reports

The format, filtering, organizing and sorting for each schedule report shall be as directed by the Contracting Officer. Typically reports shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. The following lists typical reports that will be requested. One or all of these reports may be requested for each schedule submission.

3.5.4.1. Activity Report

A list of all activities sorted according to activity number.

3.5.4.2. Logic Report

A list of detailed predecessor and successor activities for every activity in ascending order sorted by activity number.

3.5.4.3. Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.4.4. Earnings Report by CLIN

A compilation of the Contractor's Total Earnings on the project from the NTP to the data date. This report shall reflect the earnings of specific activities based on the agreements made in the schedule update meeting defined herein. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining progress payments. Group activities by CLIN Item number and sort by activity number. This report shall: sum all activities coded to a particular CLIN and provide a CLIN Item percent earned value; and complete and sum CLIN items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Quantity to Date, Percent Complete (based on cost), and Earnings to Date.

3.5.5. Network Diagram

The network diagram is required for the Preliminary, Initial and Periodic Updates. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.5.1. Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.5.2. Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3. Critical Path

Clearly show the critical path.

3.5.5.4. Banding

Organize activities as directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.5.5.5. S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.6. PERIODIC SCHEDULE UPDATE MEETINGS

Conduct periodic schedule update meetings for the purposes of reviewing the Contractor’s proposed out of sequence corrections, determining causes for delay, correcting logic, maintaining schedule accuracy and determining earned value. Meetings shall occur at least monthly within five days of the proposed schedule data date and after the Contractor has updated the schedule with Government concurrence respecting actual start dates, actual finish dates, remaining durations and percent complete for each activity it intend to status. Match the acutal start and finish dates with the dates exported, as described in paragraph 3.3.5. Provide a computer with the scheduling software loaded and a projector during the meeting which allows all meeting participants to view the proposed schedule update during the meeting. The meeting and resultant approvable schedule update shall be a condition precedent to a formal submission of the update as described in SUBMISSION REQUIREMENTS and to the submission of an invoice for payment. The meeting will be a working interactive exchange which will allow the Government and the Contractor the opportunity review the updated schedule on a real time and interactive basis. The Contractor’s authorized scheduling representative will organize, sort, filter and schedule the update as requested by the Government. The meeting will last no longer than 8 hours. A rough draft of the proposed activity logic corrections and narrative report shall be provided to the Government 48 hours in advance of the meeting. The

Contractor's Project Manager and Authorized Scheduler shall attend the meeting with the Authorized Representative of the Contracting Officer.

3.6.1. Update Submission Following Progress Meeting

Submit a complete update of the project schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 working days after the periodic schedule update meeting, reflecting only those changes made during the previous update meeting.

3.6.2. Staus of Activities

Update statusing information, including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD) and Percent Complete shall be subject to the approval of the Government prior to the meeting. As a minimum, address the following items on an activity by activity basis during each progress meeting:

3.6.2.1. Actual Start and Finish Dates

Accurately status the AS and/or AF dates for each activity currently in-progress or completed since the last update The Government may allow an AF date to be assigned with the percent complete less than 100% to account for the value of work remaining but not restraining successor activities. Only assign AS dates when actual progress occurs on an activity.

3.6.2.2. Remaining Duration

Update the estimated RD for all incomplete activities independent of Percent Complete. Remaining durations may exceed the activity OD or may exceed the activity's prior update RD if the Government considers the current OD or RD to be understated based on current progress, insufficient work crews actually manning the job, unrealistic OD or deficiencies that must be corrected that restrain successor activities.

3.6.2.3. Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be statused 100 percent complete. To allow for proper schedule management, cost load the correction of punch list from Government pre-final inspection activity(ies) not less than 1% of the total contract value, which activity(ies) may be declared 100 percent complete upon completion and correction of all punch list work identified during Government pre-final inspection(s).

3.6.2.4. Logic Changes

Specifically identify and discuss all logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, and other changes that have been made pursuant to contract provisions. The Government will only approve logic revisions for the purpose of keeping the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.

3.6.2.5. Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule that does not represent the actual or planned prosecution and progress of the work.

3.7. REQUESTS FOR TIME EXTENSIONS

In the event the Contractor believes it is entitled to an extension of the contract performance period, completion date, or any interim milestone date, furnish the following for a determination by the Contracting Officer: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of

proof of excusable delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is a condition precedent to any approvals by the Government. In response to each Request For Proposal issued by the Government, the Contractor shall submit a schedule impact analysis demonstrating whether or not the change contemplated by the Government impacts the critical path.

3.7.1. Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with its request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay, will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.7.2. Submission Requirements

Submit a justification for each request for a change in the contract completion date of less than 2 weeks based upon the most recent schedule update at the time of the NTP or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

3.7.2.1. A list of affected activities, with their associated project schedule activity number.

3.7.2.2. A brief explanation of the causes of the change

3.7.2.3. An analysis of the overall impact of the changes proposed.

3.7.2.4. A sub-network of the affected area

Identify activities impacted in each justification for change by a unique activity code contained in the required data file.

3.7.3. Additional Submission Requirements

The Contracting Officer may request an interim update with revised activities for any requested time extension of over 2 weeks. Provide this disk within 4 days of the Contracting Officer's request.

3.7.4. If Progress Falls Behind the Approved Project Schedule

3.7.4.1. Should progress fall behind the approved schedule (more than 20 work days of negative float) due to Contractor generated problems, promptly provide a supplemental recovery or completion schedule that illustrates its efforts to regain time to assure a completion by the required contract completion date.

3.7.4.2. The supplemental recovery or completion schedule will not replace the original, approved schedule as the official contract schedule. Continue to update the original, approved schedule on at least a monthly basis. In addition, the Contractor and the Contracting Officer will monitor the supplemental recovery or completion schedule on at least a bi-weekly basis to determine its effect on regaining the rate of progress to assure project completion by the contractually required completion date.

3.7.4.3. Do not artificially improve progress by simply revising the schedule logic, modifying or adding constraints, or shortening future work activity durations. Resource and manpower load the supplemental recovery schedule or completion schedule with crew size and productivity for each remaining activity, indicating overtime, weekend work, and/or double shifts needed to regain the schedule, in accordance with FAR 52.236.15, without additional cost to the Government. Indicate assumptions made and the basis for any logic, constraint, or duration changes used in the creation of the supplemental recovery or completion schedule in a narrative submitted for the Contracting Officer’s approval. Any additional resources or manpower must be evident at the work site. Do not modify the official contract schedule to include these assumptions.

3.7.4.4. Failure to perform work and maintain progress in accordance with the supplemental recovery or completion schedule may result in an interim and final unsatisfactory performance rating and/or may result in corrective action by the Contracting Officer in accordance with FAR 52.236-15.

3.8. DIRECTED CHANGES

If the NTP is issued for changes prior to settlement of price and/or time, submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The Contracting Officer will approve proposed revisions to the schedule prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9. WEEKLY PROGRESS MEETINGS

3.9.1. The Government and the Contractor shall meet weekly (or as otherwise mutually agreed to) between the meetings described in paragraph PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. The then current and approved schedule update shall be used for the purposes of this meeting and for the production and review of reports. The Contractor’s Project Manager and the Authorized Representative of the Contracting Officer shall attend. The weekly progress meeting will address the status of RFI’s, RFP’s and Submittals.

3.9.2. Provide a bar chart produced by the scheduling software, organized by Total Float and Sorted by Early Start Date, and a two week “look-ahead” schedule by filtering all schedule activities to show only current ongoing activities and activities schedule to start during the upcoming two weeks, organized by Work Area Code (AREA) and sorted by Early Start Date.

3.9.3. The Government and the Contractor shall jointly review the reports. If it appears that activities on the longest path(s) which are currently driving the calculated completion date (driving activities), are not progressing satisfactorily and therefore could jeopardize timely project completion, corrective action must be taken immediately. Corrective action includes but is not limited to: increasing the number of work crews; increasing the number of work shifts; increasing the number of hours worked per shift; and determining if Government responsibility coded activities require Government corrective action.

3.10. OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

3.11. TRANSFER OF SCHEDULE DATA INTO RMS/QCS

Download and upload the schedule data into the Resident Management System (RMS) prior to RMS databases being transferred to the Government and is considered to be additional supporting data in a form and detail required by the Contracting Officer pursuant to FAR 52.232-5 - Payments under Fixed-Price Construction Contracts. The receipt of a proper payment request pursuant to FAR 52.232-27 - Prompt Payment for Construction Contracts is contingent upon the Government receiving both acceptable and approvable hard copies and electronic export from QCS of the application for progress payment.

End of Section 01 32 01.00 10

SECTION 01 33 00
SUBMITTAL PROCEDURES

1.0 GENERAL

1.1. DEFINITIONS

1.2. NOT USED

1.3. SUBMITTAL CLASSIFICATION

1.4. APPROVED OR CONCURRED WITH SUBMITTALS

1.5. DISAPPROVED SUBMITTALS

1.6. WITHHOLDING OF PAYMENT

1.7. GENERAL

1.8. SUBMITTAL REGISTER

1.9. SCHEDULING

1.10. TRANSMITTAL FORM (ENG FORM 4025)

1.11. SUBMITTAL PROCEDURES

1.12. CONTROL OF SUBMITTALS

1.13. GOVERNMENT APPROVED SUBMITTALS

1.14. INFORMATION ONLY SUBMITTALS

1.15. STAMPS

1.0 GENERAL

1.1. DEFINITIONS

1.1.1. Submittal

Contract Clauses "FAR 52.236-5, Material and Workmanship," paragraph (b) and "FAR 52.236-21, Specifications and Drawings for Construction," paragraphs (d), (e), and (f) apply to all "submittals."

1.1.2. Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by SD numbers and titles as follows.

SD-01 Preconstruction Submittals

- Certificates of insurance.
- Surety bonds.
- List of proposed subcontractors.
- List of proposed products.
- Construction Progress Schedule.
- Submittal register.
- Schedule of prices.
- Accident Prevention Plan.
- Work plan.
- Quality control plan.
- Environmental protection plan.

SD-02 Shop Drawings

- Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.
- Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.
- Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

- Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.
- Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

- Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.
- Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.
- Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

- Calculations, mix designs, analyses or other data pertaining to a part of work.
- Design submittals, design substantiation submittals and extensions of design submittals.

SD-06 Test Reports

- Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must

have been within three years of date of contract award for the project.)

- Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.
- Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.
- Investigation reports.
- Daily checklists.
- Final acceptance test and operational test procedure.

SD-07 Certificates

- Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.
- Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.
- Confined space entry permits.
- Text of posted operating instructions.

SD-08 Manufacturer's Instructions

- Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

- Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- Factory test reports.

SD-10 Operation and Maintenance Data

- Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

SD-11 Closeout Submittals

- Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

1.1.3. Approving Authority

Office authorized to approve submittal.

1.1.4. Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.2. NOT USED

1.3. SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.3.1. Designer of Record Approved (DA)

1.3.1.1. Designer of Record (DOR) approval is required for all extensions of design, critical materials, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings". Provide the Government the number of copies designated hereinafter of all DOR approved submittals, after the DOR has taken appropriate action. The DOR shall ensure that submittals conform to the Solicitation, the Accepted Proposal and the completed design, however see below for those submittals proposing a deviation to the contract or a substitution of a material, system, or piece of equipment that was identified by manufacturer, brand name or model description in the accepted contract proposal.

1.3.1.2. The DOR shall ensure that the submittals comply with all applicable Buy American Act and Trade Agreement Act clauses in the contract. The DOR may confer with the Contracting Officer's Representative for advice and interpretation of those clauses, as necessary.

1.3.1.3. The Government may, but is not required to, review any or all DOR approved submittals for conformance to the solicitation, accepted proposal and the completed design. Except for submittals designated as deviating from the Solicitation, the Accepted Proposal or completed design, the Contractor may proceed with acquisition and installation upon DOR approval. Government Approved (GA)

1.3.2. Government Approved (GA)

Government approval is required for any item specifically designated as requiring Government approval in the Solicitation, for internal and external color finish selections and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.3.3. Government Conformance Review of Design (CR)

The Government will review all intermediate and final design submittals for conformance with the technical requirements of the solicitation. Section 01 33 16 **DESIGN AFTER AWARD** covers the design submittal and review process in detail. Review will be only for conformance with the applicable codes, standards and contract requirements. Design data includes the design documents described in Section 01 33 16 **DESIGN AFTER AWARD**. Generally, design submittals should be identified as SD-05 Design Data submittals.

1.3.4. Designer of Record Approved/Government Conformance Review (DA/CR)

1.3.4.1. Deviations to the Accepted Design. Designer of Record approval and the Government’s concurrence are required for any proposed deviation from the accepted design which still complies with the contract (the Solicitation and Accepted Proposal) before the Contractor is authorized to proceed with material acquisition or installation. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings.” If necessary to facilitate the project schedule, the Contractor and the DOR may discuss a submittal proposing a deviation with the Contracting Officer's Representative prior to officially submitting it to the Government. However, the Government reserves the right to review the submittal before providing an opinion, if it deems it necessary. In any case, the Government will not formally agree to or provide a preliminary opinion on any deviation without the DOR's approval or recommended approval. The Government reserves the right to non-concur with any deviation from the design, which may impact furniture, furnishings, equipment selections or operations decisions that were made, based on the reviewed and concurred design.

1.3.4.2. Substitutions. Unless prohibited or provided for otherwise elsewhere in the Contract, where the accepted contract proposal named products, systems, materials or equipment by manufacturer, brand name and/or by model number or other specific identification, and the Contractor desires to substitute manufacturer or model after award, submit a requested substitution for Government concurrence. Include substantiation, identifying information and the DOR’s approval, as meeting the contract requirements and that it is equal in function, performance, quality and salient features to that in the accepted contract proposal.

1.3.5. Designer of Record Approved/Government Approved (DA/GA)

Any proposed deviation to the solicitation and/or the accepted proposal constitutes a change to the contract. In addition to the above stated requirements for proposed deviations to the accepted design, both Designer of Record and Government Approval and, where applicable, a contract modification are required before the Contractor is

authorized to proceed with material acquisition or installation for any proposed deviation to the contract. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings". The Government reserves the right to accept or reject any such proposed deviation at its discretion.

1.3.6. Information Only

All submittals not requiring Designer of Record or Government approval will be for information only. Provide the Government “For Information Only” copies of all submittals not requiring Government approval or concurrence, after the Designer of Record has taken the appropriate action.

1.4. APPROVED OR CONCURRED WITH SUBMITTALS

Do not construe the Contracting Officer's approval of or concurrence with submittals as a complete check, but only that design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal. Approval or concurrence will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for design, dimensions, all design extensions, such as the design of adequate connections and details, etc., and the satisfactory construction of all work. The Government won’t consider re-submittals for the purpose of substituting previously approved materials or equipment unless accompanied by an explanation of why a substitution is necessary.

1.5. DISAPPROVED SUBMITTALS

Make all corrections required by the Contracting Officer, obtain the Designer of Record's approval when applicable, and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. Resubmit any "information only" submittal found to contain errors or unapproved deviations from the Solicitation or Accepted Proposal as one requiring "approval" action, requiring both Designer of Record and Government approval. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, provide prompt notice in accordance with the Contract Clause "Changes" to the Contracting Officer.

1.6. WITHHOLDING OF PAYMENT

No payment for materials incorporated in the work will be made if all required Designer of Record or required Government approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.7. GENERAL

Make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, the Contractor’s Quality Control (CQC) System Manager and the Designer of Record, if applicable, shall check, approve, sign, and stamp all items, indicating action taken. Clearly idenify proposed deviations from the contract requirements. Include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Schedule and make submittals requiring Government approval prior to the acquisition of the material or equipment covered thereby. Pick up and dispose of samples remaining upon completion of the work in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.8. SUBMITTAL REGISTER (GA)

Develop a complete list of submittals, including each separate design package submittal. Submit the initial submittal register within 15 days after Notice to Proceed, including, as a minimum, the design packages and other initial submittals required elsewhere in the contract. The Designer of Record shall identify required submittals in the

specifications, and use the list to prepare the Submittal Register, utilizing the government-provided software, QCS (see Section 01 45 01.10), to create the ENG Form 4288. Appendix R is a preliminary submittal register input form for use with the Quality Management System and the Resident Office Management System (QCS and RMS). The Government will provide the Contractor the actual Excel Spreadsheet version of this sample input form after award to modify and to use for input into QCS. The Excel Spreadsheet is not totally inputable into QCS, so additional keystroke input will be necessary. The sample input form is not all-inclusive. In addition, additional submittals may be required by other parts of the contract. After award, the parties will meet to discuss contract specific (or task order specific for a task order contract) distribution for the submittals all-inclusive and additional submittals may be required by other parts of the contract. Develop and complete the submittal register as the design is completed. Submit it to the Contracting Officer with the un-reviewed final design package submission or as soon as the design specifications are completed, if before the final design submission. When applicable, if the Contractor elects to fast track design and construction, using multiple design package submissions, update the submittal register to reflect the submittals associated with each design submission, clearly denoting all revisions to the previous submission. The submittal register serves as a scheduling document for submittals and for control of submittal actions throughout the contract period. Coordinate the submit dates and need dates used in the submittal register with dates in the Contractor prepared progress schedule. Submit monthly updates to the submittal register showing the Contractor action codes and actual dates with Government action codes and actual dates or until all submittals have been satisfactorily completed. Revise and submit the submittal register when revising the progress schedule.

1.9. SCHEDULING

Schedule submittals covering component items forming a system or items that are interrelated to be coordinated and submitted concurrently. Schedule certifications to be submitted with the pertinent drawings. Allow adequate time (a minimum of 15 calendar days exclusive of mailing time) and show on the register for those items requiring Government approval or concurrence. No delay damages or time extensions will be allowed for time lost in late submittals by the Contractor.

1.10. TRANSMITTAL FORM (ENG FORM 4025)

Use the transmittal form (ENG Form 4025) for submitting submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor or are included in the QCS software if the Contractor is required to use QCS for this contract. Use a separate transmittal form for each specification section Complete this form by filling out all the heading blank spaces and identify each item submitted. Exercise special care to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

1.11. SUBMITTAL PROCEDURES

Make submittals as follows:

1.11.1. Procedures

The Government will further discuss detailed submittal procedures with the Contractor at the Post-Award Conference.

1.11.2. Deviations

For submittals which include proposed deviations requested by the Contractor, check the column "variation" of ENG Form 4025. Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.12. CONTROL OF SUBMITTALS

Carefully control his procurement operations to ensure that each individual submittal is made on or before the scheduled submittal date shown on the approved "Submittal Register."

1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS

Upon completion of review of submittals requiring Government approval or concurrence, the Government will stamp and date the submittals as approved or concurred.. The Government will retain zero(0) copies of the submittal and return zero(0) copy(ies) of the submittal.

1.14. INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. The Government will retain zero(0) copies of information only submittals.

1.15. STAMPS

Use stamps similar to the following on the submittal data to certify that the submittal meets contract requirements:

CONTRACTOR

(FIRM NAME)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheet(s)

Signature: _____

Title: _____

Date: _____

For design-build construction, both the Contractor Quality Control System Manager and the Designer of Record shall stamp and sign to certify that the submittal meets contract requirements.

SECTION 01 33 16
DESIGN AFTER AWARD

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ATTACHMENT C TRACKING COMMENTS IN DRCHECKS

ATTACHMENT D SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

ATTACHMENT E LEED SUBMITTALS

ATTACHMENT F BUILDING INFORMATION MODELING REQUIREMENTS

ATTACHMENT G DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT

1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.1.1. The information contained in this section applies to the design required after award. After award, the Contractor will develop the accepted proposal into the completed design, as described herein.

1.1.2. The Contractor may elect to fast track the design and construction that is, proceed with construction of parts of the sitework and facilities prior to completion of the overall design. To facilitate fast tracking, the Contractor may elect to divide the design into no more than six (6) design packages per major facility type and no more than three (3) design packages for site and associated work. Designate how it will package the design, consistent with its overall plan for permitting (where applicable) and construction of the project. See Sections 01 33 00 SUBMITTAL PROCEDURES and 01 32 01.00 10 PROJECT SCHEDULE for requirements for identifying and scheduling the design packaging plan in the submittal register and project schedule. See also Sections 01 10 00 STATEMENT OF WORK and 01 57 20.00 10 ENVIRONMENTAL PROTECTION for any specified permit requirements. If early procurement of long-lead item construction materials or installed equipment, prior to completion of the associated design package, is necessary to facilitate the project schedule, also identify those long-lead items and how it will assure design integrity of the associated design package to meet the contract requirements (The Contract consists of the Solicitation requirements and the accepted proposal). Once the Government is satisfied that the long-lead items meet the contract requirements, the Contracting Officer will allow the Contractor to procure the items at its own risk.

1.1.3. The Contractor may proceed with the construction work included in a separate design package after the Government has reviewed the final (100%) design submission for that package, review comments have been addressed and resolved to the Government's satisfaction and the Contracting Officer (or the Administrative Contracting Officer) has agreed that the design package may be released for construction.

1.1.4. INTEGRATED DESIGN. To the maximum extent permitted for this project, use a collaborative, integrated design process for all stages of project delivery with comprehensive performance goals for siting, energy, water, materials and indoor environmental quality and ensures incorporation of these goals. Consider all stages of the building lifecycle, including deconstruction.

1.2. DESIGNER OF RECORD

Identify, for approval, the Designer of Record (“DOR”) that will be responsible for each area of design. One DOR may be responsible for more than one area. Listed, Professional Registered, DOR(s) shall account for all areas of design disciplines. The DOR’s shall stamp, sign, and date each design drawing and other design deliverables under their responsible discipline at each design submittal stage (see contract clause Registration of Designers). If the deliverables are not ready for release for construction, identify them as "preliminary" or "not for release for construction" or by using some other appropriate designation. The DOR(s) shall also be responsible for maintaining the integrity of the design and for compliance with the contract requirements through construction and documentation of the as-built condition by coordination, review and approval of extensions of design, material, equipment and other construction submittals, review and approval or disapproval of requested deviations to the accepted design or to the contract, coordination with the Government of the above activities, and by performing other typical professional designer responsibilities.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. PRE-WORK ACTIVITIES & CONFERENCES

3.1.1. Design Quality Control Plan

Submit for Government acceptance, a Design Quality Control Plan in accordance with Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL before design may proceed.

3.1.2. Post Award Conference

3.1.2.1. The government will conduct a post award contract administration conference at the project site, as soon as possible after contract award. This will be coordinated with issuance of the contract notice to proceed (NTP). The Contractor and major sub-contractor representatives shall participate. All designers need not attend this first meeting. Government representatives will include COE project delivery team members, facility users, facility command representatives, and installation representatives. The Government will provide an agenda, meeting goals, meeting place, and meeting time to participants prior to the meeting.

3.1.2.2. The post award conference shall include determination and introduction of contact persons, their authorities, contract administration requirements, discussion of expected project progress processes, and coordination of subsequent meetings for quality control (see Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL), Partnering (see below and SCR: Partnering), and the initial design conference (see below).

3.1.2.3. The government will introduce COE project delivery team members, facility users, facility command representatives, and installation representatives. The DB Contractor shall introduce major subcontractors, and other needed staff. Expectations and duties of each person shall be defined for all participants. A meeting roster shall be developed and distributed by the government with complete contact information including name, office, project role, phone, mailing and physical address, and email address.

3.1.3. Partnering & Project Progress Processes

3.1.3.1. The initial Partnering conference may be scheduled and conducted at any time with or following the post award conference. The Government proposes to form a partnership with the DB Contractor to develop a cohesive building team. This partnership will involve the COE project delivery team members, facility users, facility command representatives, installation representatives, Designers of Record, major subcontractors, contractor quality control staff, and contractor construction management staff. This partnership will strive to develop a cooperative management team drawing on the strengths of each team member in an effort to achieve a quality project within budget and on schedule. This partnership will be bilateral in membership and participation will be totally voluntary. All costs, excluding labor and travel expenses, shall be shared equally between the Government and the Contractor. The Contractor and Government shall be responsible for their own labor and travel costs. Normally, partnering meetings will be held at or in the vicinity of the project installation.

3.1.3.2. As part of the partnering process, the Government and Contractor shall develop, establish, and agree to comprehensive design development processes including conduct of conferences, expectations of design development at conferences, fast-tracking, design acceptance, Structural Interior Design (SID)/ Furniture, Fixtures & Equipment (FF&E) design approval, project closeout, etc. The government will explain contract requirements and the DB Contractor shall review their proposed project schedule and suggest ways to streamline processes.

3.1.4. Initial Design Conference

The initial design conference may be scheduled and conducted at the project installation any time after the post award conference, although it is recommended that the partnering process be initiated with or before the initial design conference. Any design work conducted after award and prior to this conference should be limited to site and is discouraged for other items. All Designers of Record shall participate in the conference. The purpose of the meeting is to introduce everyone and to make sure any needs the contractor has are assigned and due dates established as well as who will get the information. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning the BIM Implementation Plan demonstration at this meeting. The DB Contractor shall conduct the initial design conference.

3.1.5. Pre-Construction Conference

Before starting construction activities, the Contractor and Government will jointly conduct a pre-construction administrative conference to discuss any outstanding requirements and to review local installation requirements for start of construction. It is possible there will be multiple Pre-Construction Conferences based on the content of the design packages selected by the Contractor. The Government will provide minutes of this meeting to all participants.

3.2. STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

The stages of design submittals described below define Government expectations with respect to process and content. The Contractor shall determine how to best plan and execute the design and review process for this project, within the parameters listed below. As a minimum, the Government expects to see at least one interim design submittal, at least one final design submittal before construction of a design package may proceed and at least one Design Complete submittal that documents the accepted design. The Contractor may sub-divide the design into separate packages for each stage of design and may proceed with construction of a package after the Government accepts the final design for that package. See discussion on waivers to submission of one or more intermediate design packages where the parties partner during the design process. See also Attachment F, BUILDING INFORMATION MODELING REQUIREMENTS for discussion concerning BIM and the various stages of design submittals and over-the-shoulder progress reviews**.**

3.2.1. Site/Utilities

To facilitate fast-track design-construction activities the contractor may submit a final (100%) site and utility design as the first design submittal or it may elect to submit interim and final site and utility design submittals as explained below. Following review, resolution, and incorporation of all Government comments, and submittal of a satisfactory set of site/utility design documents, after completing all other pre-construction requirements in this contract and after the pre-construction meeting, the Government will allow the Contractor to proceed with site development activities, including demolition where applicable, within the parameters set forth in the accepted design submittal. For the first site and utility design submission, whether an interim or final, the submittal review, comment, and resolution times from this specification apply, except that the Contractor shall allow the Government a 14 calendar day review period, exclusive of mailing time. No on-site construction activities shall begin prior to written Government clearance to proceed.

3.2.2. Interim Design Submittals

The Contractor may submit either a single interim design for review, representing a complete package with all design disciplines, or split the interim design into smaller, individual design packages as it deems necessary for fast-track construction purposes. As required in Section 01 32 01.00 10 PROJECT SCHEDULE, the Contractor shall schedule its design and construction packaging plan to meet the contract completion period. This submission is the Government's primary opportunity to review the design for conformance to the solicitation and to the accepted contract proposal and to the Building Codes at a point where required revisions may be still made, while minimizing lost design effort to keep the design on track with the contract requirements. The requirements for the interim design review submittals and review conferences are described hereinafter. This is not necessarily a hold point for the design process; the Contractor may designate the interim design submittal(s) as a snapshot and proceed with design development at its own risk. See below for a waiver, where the parties establish an effective over-the-shoulder progress review procedure through the partnering process that would eliminate the need for or expedite a formal intermediate design review on one or more individual design packages.

3.2.3. Over-the-Shoulder Progress Reviews

To facilitate a streamlined design-build process, the Government and the Contractor may agree to one-on-one reviewer or small group reviews, electronically, on-line (if available within the Contractor's standard design practices) or at the Contractor's design offices or other agreed location, when practicable to the parties. The Government and Contractor will coordinate such reviews to minimize or eliminate disruptions to the design process. Any data required for these reviews shall normally be provided in electronic format, rather than in hard copy. If the Government and Contractor establish and implement an effective, mutually agreeable partnering procedure for regular (e.g., weekly) over-the shoulder review procedures that allow the Government reviewers the opportunity to keep fully informed of the progress, contents, design intent, design documentation, etc. of the design package, the Government will agree to waive or to expedite the formal intermediate design review period for that package. The Contractor shall still be required to submit the required intermediate design documentation, however the parties may agree to how that material will be provided, in lieu of a formal consolidated submission of the package. It should be noted that Government funding is extremely limited for non-local travel by design reviewers, so the maximum use of virtual teaming methods must be used. Some possible examples include electronic file sharing, interactive software with on-line or telephonic conferencing, televideo conferencing, etc. The Government must still perform its Code and Contract conformance reviews, so the Contractor is encouraged to partner with the reviewers to find ways to facilitate this process and to facilitate meeting or bettering the design-build schedule. The Contractor shall maintain a fully functional configuration management system as described herein to track design revisions, regardless of whether or not there is a need for a formal intermediate design review. The formal intermediate

review procedures shall form the contractual basis for the official schedule, in the event that the partnering process determines that the formal intermediate review process to be best suited for efficient project execution. However, the Government pledges to support and promote the partnering process to work with the Contractor to find ways to better the design schedule.

3.2.4. Final Design Submissions

This submittal is required for each design package prior to Government acceptance of that design package for construction. The requirements for the final design submittal review conferences and the Government's acceptance for start of construction are described herein after.

3.2.5. Design Complete Submittals

After the final design submission and review conference for a design package, revise the design package to incorporate the comments generated and resolved in the final review conferences, perform and document a back-check review and submit the final, design complete documents, which shall represent released for construction documents. The requirements for the design complete submittals are described hereinafter.

3.2.6. Holiday Periods for Government Review or Actions

Do not schedule meetings, Government reviews or responses during the last two weeks of December or other designated Government Holidays (including Friday after Thanksgiving). Exclude such dates and periods from any durations specified herein for Government actions.

3.2.7. Late Submittals and Reviews

If the Contractor cannot meet its scheduled submittal date for a design package, it must revise the proposed submittal date and notify the government in writing, at least one (1) week prior to the submittal, in order to accommodate the Government reviewers' other scheduled activities. If a design submittal is over one (1) day late in accordance with the latest revised design schedule, or if notification of a proposed design schedule change is less than seven (7) days from the anticipated design submission receipt date, the Government review period may be extended up to seven (7) days due to reviewers' schedule conflicts. If the Government is late in meeting its review commitment and the delay increases the Contractor's cost or delays completion of the project, the Suspension of Work and Defaults clauses provide the respective remedy or relief for the delay.

3.3. DESIGN CONFIGURATION MANAGEMENT

3.3.1. Procedures

Develop and maintain effective, acceptable design configuration management (DCM) procedures to control and track all revisions to the design documents after the Interim Design Submission through submission of the As-Built documents. During the design process, this will facilitate and help streamline the design and review schedule. After the final design is accepted, this process provides control of and documents revisions to the accepted design (See Special Contract Requirement: Deviating From the Accepted Design). The system shall include appropriate authorities and concurrences to authorize revisions, including documentation as to why the revision must be made. Include the DCM procedures in the Design Quality Control Plan. The DCM data shall be available to the Government reviewers at all times. The Contractor may use its own internal system with interactive Government concurrences, where necessary or may use the Government's "DrChecks Design Review and Checking System" (see below and Attachment C).

3.3.2. Tracking Design Review Comments

Although the Contractor may use its own internal system for overall design configuration management, the Government and the Contractor shall use the DrChecks Design Review and Checking System to initiate, respond to, resolve and track Government design compliance review comments. This system may be useful for other data which needs to be interactive or otherwise available for shared use and retrieval. See Attachment C for details on how to establish an account and set-up the DrChecks system for use on the project.

3.3.3. Design and Code Checklists

Develop and complete various discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists with each design submittal, as applicable, as part of the project documentation. See Section 01 45 04.00 10 Contractor Quality Control, Attachment D for a Sample Fire Protection and Life Safety Code review checklist and Attachment E for LEED SUBMITTALS.

3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1. General

At least one interim design submittal, review and review conference is required for each design package (except that, per paragraph 3.2.1, the Contractor may skip the interim design submission and proceed directly to final design on the sitework and utilities package). The DB Contractor may include additional interim design conferences or over-the-shoulder reviews, as needed, to assure continued government concurrence with the design work. Include the interim submittal review periods and conferences in the project schedule and indicate what part of the design work is at what percentage of completion. The required interim design conferences shall be held when interim design requirements are reached as described below. See also Paragraph: **Over-the-Shoulder Progress Reviews** for a waiver to the formal interim design review.

3.4.2. Procedures

After receipt of an Interim Design submission, allow the Government fourteen (14) calendar days after receipt of the submission to review and comment on the interim design submittal. For smaller design packages, especially those that involve only one or a few separate design disciplines, the parties may agree on a shorter review period or alternative review methods (e.g., over-the–shoulder or electronic file sharing), through the partnering process. For each interim design review submittal, the COR will furnish, to the Contractor, a single consolidated, validated listing of all comments from the various design sections and from other concerned agencies involved in the review process using the DrChecks Design Review and Checking System. The review will be for conformance with the technical requirements of the solicitation and the Contractor's RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he/she must clearly outline, with ample justification, the reasons for noncompliance within five (5) days after receipt of these comments in order that the comment can be resolved. Furnish disposition of all comments, in writing, through DrChecks. The Contractor is cautioned that if it believes the action required by any comment exceeds the requirements of this contract, that it should take no action and notify the COR in writing immediately. The Interim Review conference will be held for each design submittal at the installation. Bring the personnel that developed the design submittal to the review conference. The conference will take place the week after the receipt of the comments by the Contractor. For smaller fast-track packages that involve only a few reviewers, the parties may agree to alternative conferencing methods, such as teleconferencing, or televideo, where available, as determined through Partnering.

3.4.3. Conference Documentation

3.4.3.1. In order to facilitate and accelerate the Government code and contract conformance reviews, identify, track resolution of and maintain all comments and action items generated during the design process and make this available to the designers and reviewers prior to the Interim and subsequent design reviews.

3.4.3.2. The DB Contractor shall prepare meeting minutes and enter final resolution of all comments into DrChecks. Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Incorporate valid comments. The Government reserves the right to reject design document submittals if comments are significant. Participants shall determine if any comments are critical enough to require further design development prior to government concurrence. Participants shall also determine how to proceed in order to obtain government concurrence with the design work presented.

3.5. INTERIM DESIGN REQUIREMENTS

Interim design deliverables shall include drawings, specifications, and design analysis for the part of design that the Contractor considers ready for review.

3.5.1. Drawings

Include comments from any previous design conferences incorporated into the documents to provide an interim design for the “part” submitted.

3.5.2. Design Analyses

3.5.2.1. The designers of record shall prepare and present design analyses with calculations necessary to substantiate and support all design documents submitted. Address design substantiation required by the applicable codes and references and pay particular attention to the following listed items:

3.5.2.2. For parts including sitework, include site specific civil calculations.

3.5.2.3. For parts including structural work, include structural calculations.

(a) Identify all loads to be used for design.

(b) Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.

(c) Provide calculations for all principal roof, floor, and foundation members and bracing and secondary members.

(d) Provide complete seismic analyses for all building structural, mechanical, electrical, architectural, and building features as dictated by the seismic zone for which the facility is being constructed.

(e) Computer generated calculations must identify the program name, source, and version. Provide input data, including loads, loading diagrams, node diagrams, and adequate documentation to illustrate the design. The schematic models used for input must show, as a minimum, nodes/joints, element/members, materials/properties, and all loadings, induced settlements/deflections, etc., and a list of load combinations. Include an output listing for maximum/minimum stresses/forces and deflections for each element and the reactions for each loading case and combination.

(f) See also the Security (Anti-Terrorism) requirements below for members subject to Anti-Terrorist Force Protection (ATFP) and Progressive Collapse requirements.

(g) Fully coordinate and integrate the overall structural design between two different or interfacing construction types, such as modular and stick-built or multistory, stacked modular construction. Provide substantiation of structural, consolidation/settlement analysis, etc., as applicable, through the interfaces.

3.5.2.4. For Security (Anti-Terrorism): Provide a design narrative and calculations where applicable, demonstrating compliance with each of the 22 standards in UFC 4-010-01, which includes Design of Buildings to Resist Progressive Collapse (use the most recent version of UFC 4-023-03, regardless of references to any specific version in UFC 4-010-01). Where sufficient standoff distance is not being provided, show calculations for blast resistance of the structural system and building envelope. Show complete calculations for members subjected to ATFP loads, e.g., support members of glazed items (jambs, headers, sills) connections of windows to support members and connections of support members to the rest of the structure. For 3 story and higher buildings, provide calculations to demonstrate compliance with progressive collapse requirements.

3.5.2.5. For parts including architectural work, include building floor area analysis.

3.5.2.6. For parts including mechanical work, include HVAC analysis and calculations. Include complete design calculations for mechanical systems. Include computations for sizing equipment, compressed air systems, air duct design, and U-factors for ceilings, roofs and exterior walls and floors. Contractor shall employ commercially available energy analysis techniques to determine the energy performance of all passive systems and features. Use of hourly energy load computer simulation is required (see paragraph 3.5.5.2 for list of acceptable software). Based on the results of calculations, provide a complete list of the materials and equipment proposed with the manufacturer's published cataloged product installation specifications and roughing-in data.

3.5.2.7. For parts including life safety, include building code analysis and sprinkler and other suppression systems. Notwithstanding the requirements of the Codes, address the following:

(a) A registered fire protection engineer (FPE) must perform all fire protection analyses. Provide the fire protection engineer’s qualifications. See Section 01 10 00, paragraph 5 for qualifications.

(b) Provide all references used in the design including Government design documents and industry standards used to generate the fire protection analysis.

(c) Provide classification of each building in accordance with fire zone, building floor areas and height and number of stories.

(d) Provide discussion and description of required fire protection requirements including extinguishing equipment, detection equipment, alarm equipment and water supply. Alarm and detection equipment shall interface to requirements of Electronic Systems.

(e) Provide hydraulic calculations based on water flow test for each sprinkler system to insure that flow and pressure requirements can be met with current water supply. Include copies of Contractor's water flow testing done to certify the available water source.

3.5.2.8. For parts including plumbing systems:

(a) List all references used in the design.

(b) Provide justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.

(c) Detail calculations for systems such as sizing of domestic hot water heater and piping; natural gas piping; LP gas piping and tanks, fuel oil piping and tanks, etc., as applicable.

(d) When the geotechnical report indicates expansive soils are present, indicate in the first piping design submittal how piping systems will be protected against damage or backfall/backflow due to soil heave (from penetration of slab to the 5 foot building line).

3.5.2.9. For elevator systems:

(a) List all criteria codes, documents and design conditions used.

(b) List any required permits and registrations for construction of items of special mechanical systems and equipment.

3.5.2.10. For parts including electrical work, include lighting calculations to determine maintained foot-candle levels, electrical load analysis and calculations, electrical short circuit and protective device coordination analysis and calculations and arc fault calculations.

3.5.2.11. For parts including telecommunications voice/data (including SIPRNET, where applicable), include analysis for determining the number and placement of outlets

3.5.2.12. For Cathodic Protection Systems, provide the following stamped report by the licensed corrosion engineer or NACE specialist with the first design submission. The designer must be qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. He/she must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection Specialist, or must be a registered professional engineer with a minimum of five years experience in corrosion control and cathodic protection, Clearly describe structures, systems or components in soil or water to be protected. Describe methods proposed for protection of each.

3.5.2.13. Air Barrier System: Provide a narrative of the design and installation requirements for the Air Barrier system. As part of the design quality control process an air barrier consultant shall review drawing details to assure that details of critical Air Barrier components are properly detailed and incorporated during the design drawings and process (i.e. window flashing details, penetration in air barrier details, door flashing details, roofing/ceiling barrier interface details and etc.). Furnish the Government written review details and results.

3.5.3. Geotechnical Investigations and Reports:

3.5.3.1. The contractor’s licensed geotechnical engineer shall prepare a final geotechnical evaluation report, to be submitted along with the first foundation design submittal. Make this information available as early as possible during the over-the-shoulder progress review process. Summarize the subsurface conditions and provide recommendations for the design of appropriate utilities, foundations, floor slabs, retaining walls, embankments, and pavements. Include compaction requirements for fill and backfill under buildings, sidewalks, other structures and open areas. Recommend foundation systems to be used, allowable bearing pressures for footings, lateral load

resistance capacities for foundation systems, elevations for footings, grade beams, slabs, etc. Provide an assessment of post-construction settlement potential including total and differential. Provide recommendations regarding lateral earth pressures (active, at-rest, passive) to be used in the design of retaining walls. Include the recommended spectral accelerations and Site Class for seismic design along with an evaluation of any seismic hazards and recommendations for mitigation, if required. Include calculations to support the recommendations for bearing capacity, settlement, and pavement sections. Include supporting documentation for all recommended design parameters such as Site Class, shear strength, earth pressure coefficients, friction factors, subgrade modulus, California Bearing Ratio (CBR), etc. Provide earthwork recommendations, expected frost penetration, expected groundwater levels, recommendations for dewatering and groundwater control and the possible presence of any surface or subsurface features that may affect the construction of the project such as sinkholes, boulders, shallow rock, old fill, old structures, soft areas, or unusual soil conditions. Include pH tests, salinity tests, resistivity measurements, etc., required to design corrosion control and grounding systems. Include the raw field data. Arrange a meeting with the Government subsequent to completion and evaluation of the site specific geotechnical exploration to outline any differences encountered that are inconsistent with the Government provided preliminary soils information. Clearly outline differences which require changes in the foundation type, or pavement and earthwork requirements from that possible and contemplated using the Government furnished preliminary soils investigation, which result in a change to the design or construction. Any equitable adjustment is subject to the provisions of the contract's Differing Site Conditions Clause.

3.5.3.2. Vehicle Pavements: The Contractor's geotechnical report shall contain flexible and rigid pavement designs, as applicable for the project, including design CBR and modulus of subgrade reaction and the required compaction effort for subgrades and pavement layers. Provide Information on the types of base course materials available in the area and design strengths.

3.5.3.3. The Contractor and the professional geotechnical engineer consultant shall certify in writing that the design of the project has been developed consistent with the Contractor's final geotechnical report. The certification shall be stamped by the consulting professional geotechnical engineer and shall be submitted with the first design submission. If revisions are made to the initial design submission, a new certification shall be provided with the final design submission.

3.5.4. LEED Documentation:

Assign a LEED Accredited Professional, responsible to track LEED planning, performance and documentation for each LEED credit through construction closeout. Incorporate LEED credits in the plans, specifications and design analyses. Develop LEED supporting documentation as a separable portion of the Design Analysis and provide with each required design submittal. Include the LEED Project checklist for each non-exempt facility (one checklist may be provided for multiple facilities in accordance with the LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects and the LEED SUBMITTALS (Attachment E, herein) with each submittal. Final design submittal for each portion of the work must include all required design documentation relating to that portion of work (example - all site credit design documents with final site design). Submittal requirements are as indicated in Attachment E, LEED SUBMITTALS. Submit all documentation indicated on Attachment E as due at final design at final design submittal (for fast-track projects with multiple final design submittals, this shall be at the last scheduled final design submittal). All project documentation related to LEED shall conform to USGBC requirements for both content and format, including audit requirements and be separate from other design analyses. Maintain and update the LEED documentation throughout project progress to construction closeout and shall compile product data, receipts, calculations and other data necessary to substantiate and support all credits claimed. The Government may audit any or all individual credits. Audit documentation is not required to be submitted unless requested. These requirements apply to all projects. If the project requires the Contractor to obtain USGBC certification, the Contractor shall also be responsible for obtaining USGBC certification and shall provide written evidence of certification with the construction closeout LEED documentation submittal. Install the USGBC building plaque at the location indicated by the Government upon receipt. If Contractor obtains USGBC interim design review, submit the USGBC review to the Government within 30 days of receipt for information only.

3.5.4.1. LEED Documentation for Technology Solution Set. If the Solicitation provides a Prescriptive Technology Solution Set, use of the Technology Solution set has no effect on LEED documentation requirements. Provide all required LEED documentation, including energy analysis, in accordance with LEED requirements when using the Technology Solution Set.

3.5.5. Energy Conservation:

3.5.5.1. Refer to Section 01 10 00, Paragraph 5. Interim and Final Design submittals shall demonstrate that each building including the building envelope, HVAC systems, service water heating, power, and lighting systems meet the Mandatory Provisions and the Prescriptive Path requirements of ASHRAE 90.1. Use Compliance Documentation forms available from ASHRAE and included in the ASHRAE 90.1 User's Manual for this purpose. The Architectural Section of the Design Analysis shall include completed forms titled "Building Envelope Compliance Documentation Parts I and II". The Heating Ventilating and Air Conditioning (HVAC) Section of the Design Analysis shall include a completed form titled "HVAC Simplified Approach Option - Part I" if this approach is allowed by the Standard. Otherwise, the HVAC Section of the Design Analysis shall include completed forms titled "HVAC Mandatory Provisions - Part II" and "HVAC Prescriptive Requirements - Part III". The Plumbing Section of the Design Analysis shall include a completed form titled "Service Water Heating Compliance Documentation". The Electrical Section of the Design Analysis shall include an explanatory statement on how the requirements of ASHRAE 90.1 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

3.5.5.2. Interim and Final Design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document (a) the baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1 and (b) the energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract. Use the USGBC Energy and Atmosphere (EA) Credit 1 compliance template / form or an equivalently detailed form for documenting compliance with the energy reduction requirements. This template / form is titled PERFORMANCE RATING METHOD and is available when the project is registered for LEED. The calculation methodology used for this documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with two exceptions: a) receptacle and process loads may be omitted from the calculation; and b) the definition of the terms in the formula for Percentage Improvement found in paragraph G1.2 are modified as follows: Baseline Building Performance shall mean the annual energy consumption calculated for a building design intended for use as a baseline for rating above standard design meeting the minimum requirements of the energy standard, and Proposed Building Performance shall mean annual energy consumption calculated for the proposed building design intended for construction. This calculation shall address all energy consuming systems in a single integrated methodology. Include laboratory fume hoods and kitchen ventilation loads in the energy calculation. They are not considered process loads. Individual calculations for heating, cooling, power, lighting, power, etc. systems will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, EnergyPlus by DOD/DOE.

3.5.6. Specifications

Specifications may be any one of the major, well known master guide specification sources (use only one source) such as MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2004 numbering system), etc. (including specifications from these sources). Manufacturers' product specifications, utilizing CSI's Manu-Spec, three part format may be used in conjunction with the selected specifications. The designers of record shall edit and expand the appropriate Specifications to insure that all project design requirements, current code requirements, and regulatory requirements are met. Specifications shall clearly identify, where appropriate, specific products chosen to meet the contract requirements (i.e., manufacturers' brand names and model numbers or similar product information).

3.5.7. Building Rendering

Present and provide a draft color computer, artist, or hand drawn rendering with the conceptual design submittal of the building exterior. Perspective renderings shall include a slightly overhead view of the entire building to encompass elevations and the roof configuration of the building. After Government review and acceptance, provide a final rendering, including the following:

Three (3) 18" x 24" color prints, framed and matted behind glass with project title underneath the print.

One (1) Image file (high resolution) in JPG format on CD for those in the submittal distribution list.

3.5.8. Interim Building Design Contents

The following list represents what the Government considers should be included in the overall completed design for a facility or project. It is not intended to limit the contractor from providing different or additional information as needed to support the design presented, including the require design analyses discussed above. As the Contractor develops individual design packages and submits them for Interim review, include as much of the applicable information for an individual design package as is developed at the Interim design level for review purposes. These pieces shall be developed as the design progresses toward the design complete stage.

3.5.8.1. Lawn and Landscaping Irrigation System

3.5.8.2. Landscape, Planting and Turfing

3.5.8.3. Architectural

(a) Design Narrative

(b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations

(c) Finish schedule

(d) All required equipment

(e) Special graphics requirements

(f) Door and Window Schedules

(g) Hardware sets using BHMA designations

(h) Composite floor plan showing all pre-wired workstations

(i) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements

(j) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements

(k) Air Barrier Design: Details of all Air Barrier components, (i.e. window flashing details, penetrations in air barrier details, door flashing details, roofing/ceiling barrier interface details and etc.)

3.5.8.4. Structural Systems. Include:

(a) Drawings showing principal members for roof and floor framing plans as applicable

(b) Foundation plan showing main foundation elements where applicable

(c) Typical sections for roof, floor, and foundation conditions

3.5.8.5. Plumbing Systems

(a) Show locations and general arrangement of plumbing fixtures and major equipment

(b) Plan and isometric riser diagrams of all areas including hot water, cold water, waste and vent piping. Include natural gas (and meter as required), (natural gas and meter as required), (LP gas), (fuel oil) and other specialty systems as applicable.

(c) Include equipment and fixture connection schedules with descriptions, capacities, locations, connection sizes and other information as required

3.5.8.6. HVAC Systems

(a) Mechanical Floor Plans: The floor plans shall show all principle architectural features of the building which will affect the mechanical design. The floor plans shall also show the following:

(1) Room designations.

(2) Mechanical legend and applicable notes.

(3) Location and size of all ductwork and piping.

(4) Location and capacity of all terminal units (i.e., registers, diffusers, grilles, hydronic baseboards).

(5) Pre-Fabricated Paint Spray Booth (where applicable to project scope)

(6) Paint Preparation Area (where applicable to project scope)

(7) Exhaust fans and specialized exhaust systems.

(8) Thermostat location.

(9) Location of heating/cooling plant (i.e., boiler, chiller, cooling tower, etc).

(10) Location of all air handling equipment.

(11) Air balancing information.

(12) Flue size and location.

(13) Piping diagram for forced hot water system (if used).

(b) Equipment Schedule: Provide complete equipment schedules. Include:

(1) Capacity

(2) Electrical characteristics

(3) Efficiency (if applicable)

(4) Manufacturer's name

(5) Optional features to be provided

(6) Physical size

(7) Minimum maintenance clearances

(a) Details: Provide construction details, sections, elevations, etc., only where required for clarification of methods and materials of design.

(b) HVAC Controls: Submit complete HVAC controls equipment schedules, sequences of operation, wiring and logic diagrams, Input/Output Tables, equipment schedules, and all associated information. See the Statement of Work for additional specific requirements.

3.5.8.7. Fire Protection and Life Safety.

(a) Provide plan for each floor of each building that presents a compendium of the total fire protection features being incorporated into the design. Include the following types of information:

(1) The location and rating of any fire-resistive construction such as occupancy separations, area separations, exterior walls, shaft enclosures, corridors, stair enclosures, exit passageways, etc.

(2) The location and coverage of any fire detection systems

(3) The location and coverage of any fire suppression systems (sprinkler risers, standpipes, etc.)

(4) The location of any other major fire protection equipment

(5) Indicate any hazardous areas and their classification

(6) Schedule describing the internal systems with the following information: fire hazard and occupancy classifications, building construction type, GPM/square foot sprinkler density, area of operation and other as required

(b) Working plans and all other materials submitted shall meet NFPA 13 requirements, with respect to required minimum level of detail.

3.5.8.8. Elevators. Provide:

(a) Description of the proposed control system

(b) Description, approximate capacity and location of any special mechanical equipment for elevators.

3.5.8.9. Electrical Systems.

(a) Electrical Floor Plan(s): Show all principle architectural features of the building which will affect the electrical design. Show the following:

(1) Room designations.

(2) Electrical legend and applicable notes.

(3) Lighting fixtures, properly identified.

(4) Switches for control of lighting.

(5) Receptacles.

(6) Location and designation of panelboards. Clearly indicate type of mounting required (flush or surface) and reflect accordingly in specifications.

(7) Service entrance (conduit and main disconnect).

(8) Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment.

(b) Building Riser Diagram(s) (from pad-mounted transformer to unit load center panelboard): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.

(c) Load Center Panelboard Schedule(s): Indicate the following information:

(1) Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting.

(2) Branch Circuit Designations.

(3) Load Designations.

(4) Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)

(5) Branch Circuit Connected Loads (AMPS).

(6) Special Features

(d) Lighting Fixture Schedule(s): Indicate the following information:

(1) Fixture Designation.

(2) General Fixture Description.

(3) Number and Type of Lamp(s).

(4) Type of Mounting.

(5) Special Features.

(e) Details: Provide construction details, sections, elevations, etc. only where required for clarification of methods and materials of design.

3.5.8.10. Electronic Systems including the following responsibilities:

(a) Fire Detection and Alarm System. Design shall include layout drawings for all devices and a riser diagram showing the control panel, annunciator panel, all zones, radio transmitter and interfaces to other systems (HVAC, sprinkler, etc.)

(b) Fire Suppression System Control. Specify all components of the Fire Suppression (FS) System in the FS section of the specifications. Clearly describe how the system will operate and interact with other systems such as the fire alarm system. Include a riser diagram on the drawings showing principal components and interconnections with other systems. Include FS system components on drawing legend. Designate all components shown on floor plans “FS system components” (as opposed to “Fire Alarm components”). Show location of FS control panels, HVAC control devices, sensors, and 120V power panel connections on floor plans. Indicate zoning of areas by numbers (1, 2, 3) and detectors sub-zoned for cross zoning by letter designations (A and B). Differentiate between ceiling mounted and under floor detectors with distinct symbols and indicate sub-zone of each.

(c) Public Address System

(d) Special Grounding Systems. Completely reflect all design requirements in the specifications and drawings. Specifications shall require field tests (in the construction phase), witnessed by the Government, to determine the effectiveness of the grounding system. Include drawings showing existing construction, if any.

(e) Cathodic Protection.

(f) Intrusion Detection, Card Access System

(g) Central Control and Monitoring System

(h) Mass Notification System

(i) Electrical Power Distribution Systems

3.5.8.11. Separate detailed Telecommunications drawings for Information Systems including the following responsibilities:

(a) Telecommunications Cabling

(b) Supporting Infrastructure

(c) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones

(d) Include a layout of the voice/data outlets (including voice only wall & pay phones) on telecommunication floor plan drawing, location of SIPRNET data outlets (where applicable), and a legend and symbol definition to indicate height above finished floor. Show size of conduit and cable type and size on Riser Diagram. Do not show conduit runs between backboard and outlets on the floor plans. Show underground distribution conduit and cable with sizing from point of presence to entrance facility of building.

(e) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID's

(f) Communication Equipment Rooms - Plan Views - Tech and AMEP/Elevations - Racks and Walls. Elevations with a detailed look at all telecomm rooms. Indicate technology layout (racks, ladder-racks, etc.), mechanical/electrical layout, rack elevation and backboard elevation. They may also be an enlargement of a congested area of T1 or T2 series drawing.

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

A final design review and review conference will be held upon completion of final design at the project installation, or – where equipment is available - by video teleconference or a combination thereof, for any design package to receive Government acceptance to allow release of the design package for construction. For smaller separate design packages, the parties may agree on alternative reviews and conferences (e.g., conference calls and electronic file sharing, etc.) through the Partnering process. Include the final design conference in the project schedule and shall indicate what part of the design work is at 100% completion. The final design conference will be held after the Government has had seven (7) calendar days after receipt of the submission to review the final design package and supporting data. For smaller packages, especially those involving only one or a few design disciplines the parties may agree on a shorter period.

3.7. FINAL DESIGN REQUIREMENTS

Final design deliverables for a design package shall consist of 100% complete drawings, specifications, submittal register and design analyses for Government review and acceptance. The 100% design submission shall consist of drawings, specifications, updated design analyses and any permits required by the contract for each package submitted. In order to expedite the final design review, prior to the conference, ensure that the design configuration management data and all review comment resolutions are up-to-date. Include the 100% SID and 100% FF&E binders for government approval. The Contractor shall have performed independent technical reviews (ITR's) and back-checks of previous comment resolutions, as required by Section 01 45 04.00 10 CONTRACTOR QUALITY CONTROL, including providing documentation thereof. Use DrChecks or other acceptable comment tracking system during the ITR and submit the results with each final design package

3.7.1. Drawings

3.7.1.1. Submit drawings complete with all contract requirements incorporated into the documents to provide a 100% design for each package submitted.

3.7.1.2. Prepare all drawings with the Computer-Aided Design and Drafting (CADD)/Computer-Aided Design (CAD) system, organized and easily referenced electronically, presenting complete construction information.

3.7.1.3. Drawings shall be complete. The Contractor is encouraged to utilize graphics, views, notes, and details which make the drawings easier to review or to construct but is also encouraged to keep such materials to those that are necessary.

3.7.1.4. Provide detail drawings that illustrate conformance with the contract. Include room finish schedules, corresponding color/finish/special items schedules, and exterior finish schedules that agree with the submitted SID binders.

3.7.1.5. The design documents shall be in compliance with the latest version of the A/E/C CAD Standard, available at https://cadbim.usace.army.mil/CAD. Use the approved vertical Corps of Engineers title blocks and borders on all drawings with the appropriate firm name included within the title block area.

3.7.1.6. CAD System and Building Information Modeling (BIM) (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order.)

All CAD files shall be fully compatible with MicroStation V8 or higher. Save all design CAD files as MicroStation V8 or higher files. All submitted BIM Models and associated Facility Data shall be fully compatible with Bentley BIM file format and the USACE Bentley BIM v8 Workspace.

(a) CAD Data Final File Format: During the design development capture geo-referenced coordinates of all changes made to the existing site (facility footprint, utility line installations and alterations, roads, parking areas, etc) as a result of this contract. There is no mandatory methodology for how the geo-referenced coordinates will be captured, however, Engineering and Construction Bulletin No. 2006-15, Subject: Standardizing Computer Aided Design (CAD) and Geographic Information Systems (GIS) Deliverables for all Military Design and Construction Projects identifies the format for final as-built drawings and data sets to be delivered to the government. Close-out requirements at the as-built stage; require final geo-referenced GIS Database of the new facility along with all exterior modifications. The Government will incorporate this data set into the Installation's GIS Masterplan or Enterprise GIS System. See also, Section 01 78 02.00 10 Closeout Submittals.

(b) Electronic Drawing Files: In addition to the native CAD design files, provide separate electronic drawing files (in editable CAD format and Adobe Acrobat PDF version 7.0 or higher) for each project drawing.

(c) Each file (both CAD and PDF) shall represent one complete drawing from the drawing set, including the date, submittal phase, and border. Each drawing file shall be completely independent of any data in any other file, including fonts and shapes not included with the basic CAD software program utilized. Fonts that are not included as part of the default CAD software package installation or recognized as an allowable font by the A/E/C CAD Standard are not acceptable in delivered CAD files. All displayed graphic elements on all levels of the drawing files shall be part of the project drawing image. The drawing files shall not contain any graphic element that is not part of the drawing image.

(d) Deliver BIM Model and associated Facility Data files in their native format. At a minimum, BIM files shall address major architecture design elements, major structural components, mechanical systems and electrical/communication distribution and elements as defined in Attachment F. See Attachment F for additional BIM requirements.

(e) Drawing Index: Provide an index of drawings sheet in CAD as part of the drawing set, and an electronic list in Microsoft Excel of all drawings on the CD. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

(f) Hard Copies: Plot submitted hard copy drawings directly from the "electronic drawing files" and copy for quantities and sizes indicated in the distribution list at the end of this specification section. The Designers of Record shall stamp, sign and date original hard copy sheets as Released For Construction, and provide copies for distribution from this set.

3.7.2. Design Analyses

3.7.2.1. The designers of record shall update, finalize and present design analyses with calculations necessary to substantiate and support all design documents submitted.

3.7.2.2. The responsible DOR shall stamp, sign and date the design analysis. Identify the software used where, applicable (name, version, vendor). Generally, provide design analyses, individually, in an original (file copy) and one copy for the assigned government reviewer.

3.7.2.3. All disciplines review the LEED design analysis in conjunction with their discipline-specific design analysis; include a copy of the separable LEED design analysis in all design analysis submittals.

3.7.2.4. Do not combine multi-disciplined volumes of design-analysis, unless multiple copies are provided to facilitate multiple reviewers (one copy per each separate design analysis included in a volume).

3.7.3. Specifications

Specifications shall be 100% complete and in final form.

3.7.4. Submittal Register

Prepare and update the Submittal Register and submit it with the 100% design specifications (see Specification Section 01 33 00, SUBMITTAL PROCEDURES) with each design package. Include the required submittals for each specification section in a design package in the submittal register.

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

This form itemizes the types, quantities and costs of various equipment and systems that comprise the project, for the purpose of transferring the new construction project from the Corps Construction Division to the Installation's inventory of real property. The Government will furnish the DB Contractor's design manager a DD Form 1354 checklist to use to produce a draft Form 1354. Submit the completed checklist and prepared draft Form DD 1354 with the 100% design in the Design Analysis. The Corps will use these documents to complete the final DD 1354 upon completion of construction.

3.7.6. Acceptance and Release for Construction

3.7.6.1. At the conclusion of the Final Design Review (after resolutions to the comments have been agreed upon between DOR and Government reviewers), the Contracting Officer or the ACO will accept the Final Design Submission for the design package in writing and allow construction to start for that design package. The Government may withhold acceptance until all major corrections have been made or if the final design submission requires so many corrections, even though minor, that it isn't considered acceptably complete.

3.7.6.2. Government review and acceptance of design submittals is for contract conformance only and shall not relieve the Contractor from responsibility to fully adhere to the requirements of the contract, including the Contractor’s accepted contract proposal, or limit the Contractor’s responsibility of design as prescribed under Special Contract Requirement: “Responsibility of the Contractor for Design” or limit the Government’s rights under the terms of the contract. The Government reserves the right to rescind inadvertent acceptance of design submittals containing contract deviations not separately and expressly identified in the submittal for Government consideration and approval.

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

After the Final Design Submission and Review Conference and after Government acceptance of the Final Design submission, revise the design documents for the design package to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents. Label the final design complete documents “FOR CONSTRUCTION” or use similar language. In addition to the final drawings and specifications, the following deliverables are required for distribution and field use. The deliverable includes all documentation and supporting design analysis in final form, as well as the final review comments, disposition and the back-check. As part of the quality assurance process, the Government may perform a back-check of the released for construction documentation. Promptly correct any errors or omissions found during the Government back-check. The Government may withhold retainage from progress payments for work or materials associated with a final design package until this submittal has been received and the Government determines that it is complete.

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

General: The documents which the Contractor shall submit to the Government for each submittal are listed and generally described in preceding paragraphs in this Section. Provide copies of each design submittal and design substantiation as follows (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order):

Activity and Address	Drawing Size (Full Size) **ANSI D** Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) **11" x 17"** Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF& **.dgn**)	Furniture Submittal (Per Attachment B)	Structural Interior Design Submittal	BIM Data DVD (Per Attach F)
Commander, U.S.Army Engineer District **Detroit**	0/0	6/0	6/0	10	1	2	1
Commander, U.S.Army Engineer District, Center of Standardization **Huntsville/Child Development Centers**	0/0	2/0	2/0	2	N/A	0	0
Installation	1/0	6/0	6/0	10	2	0	0
U.S.Army Corps of Engineers Construction Area Office	1/0	6/0	6/0	10	1	0	0
Information Systems Engineering Command (ISEC)	0/0	0/0	0/0	1	N/A	N/A	1
Huntsville Engineer & Support Center, Central Furnishings Program	N/A	N/A	N/A	N/A	1 Interim/Refer to attachment B for the final submission Qty	N/A	N/A
Other Offices	0/0	0/0	0/0	0	N/A	0	0

***NOTE: For partial sets of drawings, specifications and design analyses, see paragraph 3.9.3.3, below.**

****NOTE: When specified below in 3.9.2, furnish Installation copies of Drawings as paper copies, in lieu of the option to provide secure web-based submittals.**

3.9.2. Web based Design Submittals

Except for full or half-sized drawings for Installation personnel, as designated in the Table above, Web based design submittals will be acceptable as an alternative to the paper copies listed in the Table above, provided a single hard-copy PDF based record set is provided to the Contracting Officer for record purposes. Where the contract requires the Contractor to submit documents to permitting authorities, still provide those authorities paper copies (or in an alternate format where required by the authority). Web based design submittal information shall be provided with adequate security and availability to allow unlimited access those specifically authorized to Government reviewers while preventing unauthorized access or modification. File sizes must be of manageable size for reviewers to quickly download or open on their computers. As a minimum, drawings shall be full scale on American National Standards Institute (ANSI) D sheets (34" x 22"). In addition to the optional website, provide the BIM data submission on DVD to each activity and address noted above in paragraph 3.9.1 for each BIM submission required in Attachment F.

3.9.3. Mailing of Design Submittals

3.9.3.1. Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract (or individual task order if this is an indefinite delivery/indefinite quantity, task order contract). Mail the submittals to six (6) different addresses. Assemble drawing sheets, specs, design analyses, etc. into individual sets; do not combine duplicate pages from individual sets so that the government has to assemble a set.

3.9.3.2. Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

3.9.3.3. Provide partial sets of drawings, specifications, design analyses, etc., as designated in the Table in paragraph 3.9.1, to those reviewers who only need to review their applicable portions of the design, such as the various utilities. The details of which office receives what portion of the design documentation will be worked out after award.

3.10. AS-BUILT DOCUMENTS

Provide as-built drawings and specifications in accordance with Section 01 78 02.00 10, CLOSEOUT SUBMITTALS. Update LEED design phase documentation during construction as needed to reflect construction changes and advancing project completion status (example - Commissioning Plan updates during construction phase) and include updated LEED documentation in construction closeout submittal.

ATTACHMENT A
STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS

1.0 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. Develop the SID in conjunction with the furniture footprint.

2.0 STRUCURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

2.1. FORMAT AND SCHEDULE

Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the Contractor may proceed to final design with the interior finishes scheme presented.

The SID information and samples are to be submitted in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Structural Interior Design" package. Include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Design submittal requirements include, but are not limited to:

2.1.1. Narrative of the Structural Interior Design Objectives

The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.

2.1.2. Interior Color Boards

Identify and key each item item on the color boards to the contract documents to provide a clear indication of how and where each item will be used. Arrange finish samples to the maximum extent possible by room type in order to illustrate room color coordination. Label all samples on the color boards with the manufacturer's name, patterns and colors name and number. Key or code samples to match key code system used on contract drawings.

Material and finish samples shall indicate true pattern, color and texture. Provide photographs or colored photocopies of materials or fabrics to show large overall patterns in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.

Color boards shall include but not be limited to original color samples of the following:

All walls finishes and ceiling finishes, including corner guards, acrylic wainscoting and wall guards/chair rail finishes

All tile information, including tile grout color and tile patterns.

- All flooring finishes, including patterns.
- All door, door frame finishes and door hardware finishes
- All signage, wall base, toilet partitions, locker finishes and operable/folding partitions and trim

- All millwork materials and finishes (cabinets, counter tops, etc.)
- All window frame finishes and window treatments (sills, blinds, etc.)

Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

2.1.3. Exterior Color Boards

Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. Provide original color samples of all exterior finishes including but not limited to the following:

- All Roof Finishes
- All Brick and Cast Stone Samples
- All Exterior Insulation and Finish Samples
- All Glass Color Samples
- All Exterior Metals Finishes
- All Window & Door Frame Finishes
- All Specialty Item Finishes, including trim

Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

2.2. STRUCTURAL INTERIOR DESIGN DOCUMENTS

2.2.1. General

Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

2.2.2. Finish Color Schedule

Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations. Key the finish code to the color board samples and drawings.

2.2.3. Interior Finish Plans

Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.

2.2.4. Furniture Footprint Plans

Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

2.2.5. Interior Signage

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

2.2.6. Interior Elevations, Sections and Details

Indicate material, color and finish placement.

ATTACHMENT B
FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS

1.0 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

1.1. FORMAT AND SCHEDULE

Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The Contractor's interior designer, NOT A FURNITURE DEALER, shall develop the design. FF&E is the selection, layout, specification and documentation of furniture and includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the Structural Interior Design (SID) portion of the interior design. Develop the FF&E package concurrently with the building design to ensure that there is coordination between the electrical outlets, switches, J-boxes, communication outlets and connections, and lighting as appropriate. In addition, coordinate layout with other building features such as architectural elements, thermostats, location of TV's, GF/GI equipment (for example computers, printers, copiers, shredders, faxes), etc. Locate furniture in front of windows only if the top of the item falls below the window and unless otherwise noted, do not attach furniture including furniture systems to the building. If project has SIPRNET and/or NIPRNET, coordinate furniture layout with SIPRNET and NIPRNET separation requirements. Verify that access required by DOIM for SIPRNET box and conduit is provided. The DOR shall interview appropriate Government personnel to determine FF&E requirements for furniture and furnishings prior to preparation of the scheme to be presented. Determine FFE items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade. Present original sets of the scheme to reviewers at an interim design conference upon completion of the interim architectural submittal or three months prior to the submittal of the final FF&E package (whichever comes first).

Design may proceed to final with the FF&E scheme presented at the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers.

Provide six copies of the electronic versions of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide unbound, electronic drawings in CAD and BIM. Provide all files needed to v,/iew complete drawings. Submit all text documents in Microsoft Word or Excel..

Submit four copies of the final and complete FF&E information and samples in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first). Use more than one binder when there are numerous pages with thick samples. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out for upholstery and finish boards. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Provide electronic copies of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide six compact disks with all drawings files needed to view the complete drawings unbound and in the latest version AutoCAD. Provide six additional compact disks of all text documents in Microsoft Word or Excel.

Design submittal requirements include, but are not limited to:

1.1.1. Narrative of Interior Design Objectives

Provide a narrative description of the furniture, to include functional, safety and ergonomic considerations, durability, sustainability, aesthetics, and compatibility with the building design.

1.1.2. Furniture Order Form

Prepare one Furnishings Order Form for each item specified in the design. This form identifies all information required to order each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:

(a) Furniture item illustration and code

(b) Furniture item name

(c) Job name, location, and date

(d) General Services Administration (GSA) FSC Group, part, and section

(e) GSA Contract Number, Special Item Number (SIN), and contract expiration date

(f) Manufacturer, Product name and Product model number or National Stock Number (NSN)

(g) Finish name and number (code to finish samples)

(h) Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)

(i) Dimensions

(j) Item location by room number and room name

(k) Quantity per room

(l) Total quantity

(m) Special instructions for procurement ordering and/or installation (if applicable)

(n) Written Product Description: include a non-proprietary paragraph listing the salient features of the item to include but not limited to:

(1) required features and characteristics

(2) ergonomic requirements

(3) functional requirements

(4) testing requirements

(5) furniture style

(6) construction materials

(7) minimum warranty

The following is an example for “m” features and characteristics, ergonomic requirements and functional requirements:

Chair Description:

(1) Mid-Back Ergonomic Task Chair

(2) Pneumatic Gaslift; Five Star Base

(3) Mesh Back; Upholstered Seat

(4) Height and Width Adjustable Task Arms:

a. Arm Height: 6”- 11” (+-1/2”)

b. Arm Width: 2”– 4” adjustment

(5) Height Adjustable Lumbar Support

(6) Adjustable Seat Height 16”-21” (+- 1”)

(7) Sliding Seat Depth Adjustment 15”-18” (+-1”)

(8) Standard Hard Casters (for carpeted areas)

(9) Overall Measurements:

a. Overall width: 25” - 27”

b. Overall depth: 25”– 28”

(10) Must have a minimum of the following adjustments (In addition to the above):

a. 360 Degree Swivel

b. Knee-Tilt with Tilt Tension

c. Back angle

d. Forward Tilt

e. Forward Tilt and Upright Tilt Lock

For projects with systems furniture, also provide a written description of the following minimum requirements:

(1) Type furniture systems (panel, stacking panels, spine wall, desk based system, or a combination)

(2) Minimum noise reduction coefficient (NRC)

(3) Minimum sound transfer coefficient (STC)

(4) Minimum flame spread and smoke development

(5) UL testing for task lighting and electrical system

(6) Panel widths and heights and their locations (this may be done on the drawings)Worksurface types and sizes (this may be done on the drawings)

(7) Worksurface edge type

(8) Varying panel/cover finish materials and locations (locations may be shown on the drawings)

(9) Storage requirements

(10) Keyboard requirements

(11) Lock and keying requirements

(12) Accessory components (examples: tack boards, marker boards, paper management)

(13) Electrical and communication raceway requirement; type, capacity and location (base, beltline, below and/or above beltline)

(14) Locations of communication cables (base, beltline, below and/or above beltline, top channel)

(15) Types of electrical outlets

(16) Types of communication jacks; provided and installed by others

(17) Locations of electrical outlets and communication jacks (this may be done on the drawings)

(18) Type of cable (examples: Cat. 5, Cat. 6, fiber optic; UTP or STP, etc.) system needs to support; provided and installed by others

1.1.3. Manufacturer & Alternate Manufacturer List

Provide a table consisting of all the major furniture items in the order forms and two alternate manufacturers for each item. ALTERNATE MANUFACTURER ITEMS MUST BE SELECTED FROM GSA SCHEDULE AND MEET ALL THE SALIENT FEATURES OF THE ORIGINALLY SPECIFIED ITEM. Provide manufacturer name, address, telephone number, product series and product name for each item and the two alternate items. Major furniture items include, but are not limited to, casegoods, furniture systems, seating, and tables. Organize matrix by item code and item name.

1.1.4. FF&E Procurement List

Provide a table that lists all FF&E furniture, mission unique equipment and building Contractor Furnished/Contractor Installed (CF/CI) items. Give each item a code and name and designate whether item will be procured as part of the FF&E furniture, mission unique equipment or the building construction contract. Use the item code to key all FF&E documents including location plans, color boards, data sheets, cost estimate, etc. Divide the FF&E package into different sections based on this listing, applies to order forms and cost estimates.

1.1.5. Points of Contact (POCs)

Provide a comprehensive list of POCs needed to implement the FF&E package. This would include but not be limited to appropriate project team members, using activity contacts, interior design representatives, construction contractors and installers involved in the project. In addition to name, address, phone, fax and email, include each contact's job function. Divide the FF&E package into different sections based on this listing, applies to order forms and cost estimates.

1.1.6. Color Boards

Provide color boards for all finishes and fabrics for all FF&E items. Finishes to be included but not limited to paint, laminate, wood finish, fabric, etc.

1.1.7. Itemized Furniture Cost Estimate

Provide an itemized cost estimate of furnishings keyed to the plans and specifications of products included in the package. This cost estimate should be based on GSA price schedules. The cost estimate must include separate line items for general contingency, installation, electrical hook-up for systems furniture or other furniture requiring hardwiring by a licensed electrician, freight charges and any other related costs. Installation and freight quotes from vendors should be used in lieu of a percentage allowance when available. Include a written statement that the pricing is based on GSA schedules. An estimate developed by a furniture dealership may be provided as support information for the estimate, but must be separate from the contractor provided estimate.

1.2. INTERIOR DESIGN DOCUMENTS

1.2.1. Overall Furniture and Area Plans

Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. Key all the items on the drawings by furniture item code. Do not provide manufacturer specific information such as product names and numbers on drawings, Drawings shall be non-proprietary. This is typical for FFE on all plans, including those mentioned below.

1.2.2. Workstation Plans

Show each typical workstation configuration in plan view. In addition, provide either elevations or an isometric view. Drawings shall illustrate panels and all major components for each typical workstation configuration. Identify workstations using the same numbering system as shown on the project drawings. Key components to a legend on each sheet which identifies and describes the components along with dimensions. Provide the plan, elevations and isometric of each typical workstation together on the same drawing sheet.

1.2.3. Panel Plans

Show panel locations and critical dimensions from finished face of walls, columns, panels including clearances and aisle widths. Key panel assemblies to a legend which shall include width, height, configuration of frames, panel fabric and finishes (if there are different selections existing within a project), powered or non-powered panel and wall mount locations.

1.2.4. Desk Plans

Provide typical free standing desk configurations in plan view. In addition, provide either elevation or an isometric view and identify components to clearly represent each desk configuration.

1.2.5. Reflected Ceiling Plans

Provide typical plans showing ceiling finishes and heights, lighting fixtures, heating ventilation and air conditioning supply and return, and sprinkler head placement for coordination of furniture.

1.2.6. Electrical and Telecommunication Plans

Show power provisions including type and locations of feeder components, activated outlets and other electrical componentsShow locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

1.2.7. Artwork Placement Plans

Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

1.2.8. Window Drapery Plans

Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

1.3. FURNITURE SELECTION

1.3.1. Select furniture from the GSA Schedules. Specify furniture available open market when an item is not available on the GSA Schedules. Provide justification fort items not available on the GSA Schedules.

1.3.2. To the greatest extent possible when specifying furniture work within a manufacturer's family of furniture for selections, example: Steelcase, Turnstone, Brayton International, Metro, and Vecta are all Steelcase companies. Each alternate should also be specified from a manufacturer's family of furniture, example: first set of alternates would be specified from Knoll's family of furniture and the second from Herman Miller family of furniture. It may be necessary to make some selections from other than a manufacturer's family of furniture if costs are not reasonable for particular items, some items are not available or appropriate for the facility or the items are not on GSA Schedule. If this occurs, consider specifying product from an open line that is accessible by numerous dealerships. Select office furniture including case goods, tables, storage, seating, etc. that is compatible in style, finish and color. Select furniture that complies with ANSI/BIFMA and from manufacturer's standard product line as shown in the most recent published price list and/or amendment and not custom product.

1.4. CONSTRUCTION

1.4.1. Provide knee space at workstations and tables that is not obstructed by panels/legs that interfere with knee space of seated person and specificy modesty panels at walls to be of a height or be hinged to allow access to building wall electrical outlets and communication jacks. Provide desks, storage and tables with leveling devices to compensate for uneven floors.

1.4.2. Unless otherwise noted, specify workstations and storage of steel construction. Provide high pressure laminate worksurface tops constructed to prevent warpage (thermallyfused worksurfaces are not acceptable). Provide user friendly features such as radius edges. Do not use sharp edges and exposed connections and ensure the underside of desks, tables and worksurfaces are completely and smoothly finished. Provide abutting worksurfaces that mate closely and are of equal heights when used in side-by-side configurations in order to provide a continuous and level worksurface.

1.4.3. Drawers shall stay securely closed when in the closed position and protect wires from damage during drawer operation. Include a safety catch to prevent accidental removal when fully open

1.4.4. Unless otherwise noted, provide lockable desks and workstations, filing cabinets and storage. Key all locks within a one person office the same; key all one person offices within a building differently. If an office or open office area has more than one workstation, key all the workstations differently, but key all locks within an individual workstation the same. Use tempered glass glazing when glazing is required. Use light-emitting diode (LED)/solid state lighting where task lighting is required in furniture.

1.5. FINISHES AND UPHOLSTERY

1.5.1. Specify neutral colors for casegoods, furniture systems, storage and tables. Specify desk worksurfaces and table tops that are not too light or too dark in color and have a pattern to help hide soiling. Accent colors are allowed in break and lounge areas. Keep placement of furniture systems panel fabric accent colors to a minimum. All finishes shall be cleanable with ordinary household cleaning solutions.

1.5.2. Use manufacturer's standard fabrics; including textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Customers Own Material (COM) can be used in headquarter buildings in command suites with executive furniture. Coordinate specific locations with Corps of Engineers Interior Designer.

1.5.3. Specify seating upholstery that meets Wyzenbeek Abrasion Test, 55,000 minimum rubs. Specify a soil retardant finish for woven fabrics if Crypton or vinyl upholstery is not provided for seating in dining areas. Use manufacturer's standard fabrics. This includes textile manufacturers fabrics that have been graded into the furniture manufactures fabric grades and are available through their GSA Schedule. Specify upholstery and finish colors and patterns that help hide soiling. Specify finishes that can be cleaned with ordinary household cleaning solutions.

1.6. ACCESSORIES

1.6.1. Specify all accessories required for completely finished furniture installation. Provide filing cabinets and storage for office supplies. Provide tack surfaces at workstations with overhead storage. Provide tackable surfaces at workstations with overhead storage.

1.6.2. Not Used.

1.6.3. Workstations are to be equipped with stable keyboard trays that have height adjustability, tilting capability, including negative tilt, have a mouse pad at same height as the keyboard tray that can accommodate both left and right handed users, and retractable under worksurface.

1.7. MISSION UNIQUE EQUIPMENT

Funding for FF&E furniture items and mission unique equipment (MUE) items are from two different sources. Separate the designs and procurement documentation for FFE items and MUE. MUE includes, but is not limited to, items such as commerical appliances, fitness equipment, IT equipment and supporting carts. The User will purchase and install mission unique equipment items, unless otherwise noted. Identify locations of known MUE items such as commercial appliances, etc. for space planning purposes.

1.8. SUSTAINABILITY

1.8.1. For all designs provided regardless of facility type, make every effort to implement all aspects of sustainability to the greatest extent possible for all the selections made in the FF&E package. This includes but is not limited to the selection of products that consider: **Material Chemistry and Safety of Inputs** (What chemicals are used in the construction of the selections?); **Recyclability** (Do the selections contain recycled content?); **Disassembly** (Can the selections be disassembled at the end of their useful life to recycle their materials?).

1.8.2. Make selections to the greatest extent possible of products that possess current McDonough Braungart Design Chemistry (MBDC) certification or other "third-party" certified Cradle to Cradle program, Forest Stewardship Council (FSC) certification, GREENGAURD certification or similar "third-party" certified products consisting of low-emitting materials.

1.9. FURNITURE SYSTEMS

1.9.1. General.

Where appropriate, design furniture systems in open office areas. Coordinate style and color of furniture systems with other storage, seating, etc. in open office areas. Minimize the number of workstation typicals and the parts and pieces required for the design to assist in future reconfiguration and inventorying.

1.9.2. Connector Systems.

Specify a connector system that allows removal of a single panel or spine wall within a typical workstation configuration without requiring disassembly of the workstation or removal of adjacent panels. Specify connector system with tight connections and continuous visual seals. When Acoustical panels are used, provide connector system with continuous acoustical seals. Specify concealed clips, screws, and other construction elements, where possible.

1.9.3. Panels and Spine Walls

Specify panels and spine walls with hinged or removable covers that permit easy access to the raceway when required but are securely mounted and cannot be accidentally dislodged under normal conditions. Panels shall be capable of structurally supporting more than 1 fully loaded component per panel per side. Raceways are to be an integral part of the panel and must be able to support lay-in cabling and have a large capacity for electrical and IT. Do not thread cables through the frame.

1.9.4. Electrical And Information/Technology (IT)

Design furniture with electrical systems that meets requirements of UL 1286 when powered panels are required and UL approved task lights that meet requirements of NFPA 70. Dependent on user requirements and Section 01 10 00, paragraph 3 requirements, it is recommended that workstation electrical and IT wiring entry come from the building walls to eliminate the use of power poles and access at the floor. Design electrical and IT systems that are easily accessed in the spine wall and panels without having to move return panels and components. Electrical and IT management will be easily accessible by removable wall covers which can be removed while workstation components are still attached. Specify connector system that has continuation of electrical and IT wiring within workstations and workstation to workstation.

1.9.5. Pedestals

Specify pedestals that are interchangeable from left to right, and right to left, and retain pedestal locking system capability.

1.10. EXECUTIVE FURNITURE

1.10.1. Design for executive furniture in command areas, coordinate specific locations with Corps of Engineers Interior Designer. Use upgraded furniture, upholsteries and finishes in command suites. This includes but is not limited to wood casegoods, seating and tables. Select executive furniture casegoods from a single manufacturer and style line, to include workstations, credenzas, filing, and storage, etc.

1.10.2. Specify furniture with wood veneer finish with mitered solid wood edge of same wood type. Other executive office furniture such as seating, tables, executive conference room furniture, etc. shall be compatible in style, finish and color with executive furniture casegoods.

1.11. SEATING

1.11.1. General

Specify appropriate chair casters and glides for the floor finish where the seating is located. All task seating shall support up to a minimum of 250 lbs.

1.11.2. Desk and Guest Seating

Select ergonomic desk chairs with casters, waterfall front, swivel, tilt, variable back lock, adjustable back height or adjustable lumbar support, pneumatic seat height adjustment, and padded, contoured upholstered seat and back. Desk and guest chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Depending on scale of desk chair provide seat pan forward and back adjustment to increase or decrease depth of seat pan. All desk chairs shall have an adjustable seat height range of 4 1/2", range to include 16 1/2-20". Select guest chairs that are compatible in style, finish and color with the desk chairs.

1.11.3. Conference Room Seating

At tables, select ergonomic conference seating with casters, non-upholstered arms, waterfall front, swivel, tilt, pneumatic seat height adjustment, and padded, contoured seat and back, unless otherwise noted. Select arm height and/or design that allows seating to be moved up closely to the table top. Conference chair backs may be other than upholstered such as mesh fabric if it is ergonomically designed, forms to back and is comfortable. Perimeter conference chairs shall be compatible in style, finish and color with conference seating at the tables.

1.11.4. Lounge, Waiting and Reception Area Seating

Select seating with arms and cushioned, upholstered seat and back. In heavy use areas, arms shall be easily cleaned such as non-upholstered arms or upholstered arms with wood arm caps unless otherwise noted.

1.11.5. Break Room Seating

Select stackable seating that is easily cleaned. Seating shall be appropriate for table and counter heights as applicable with non-upholstered arms if arms are required. Chairs shall have metal legs and composite materials for seats.

1.12. FILING AND STORAGE.

Select storage and shelving units that meet customer’s functional load requirements for stored items. Specify counterweights for filing cabinets when required by the manufacturer for stability. File drawers shall allow only one drawer to be opened at a time. Provide heavy duty storage and shelving if information is not available.

1.13. TRAINING TABLES.

raining tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or castered as necessary. Plastic laminate self edges are unacceptable. Specify power and data requirements and dollies as required.

1.14. FURNITURE WARRANTIES.

Specify manufacturer's performance guarantees or warranties that include parts, labor and transportation as follows:

Furniture System, unless otherwise noted – 10 year minimum
Furniture System Task Lights – 2 year minimum, excluding bulbs
Furniture System Fabric – 3 year minimum
Wood Desks - 10 year minimum

Metal Desks – 12 year minimum
Seating, unless otherwise noted - 10 year minimum
Seating Mechanisms and Pneumatic Cylinders - 10 years
Seating Fabric - 3 years minimum
Wood Filing and Storage - 10 year minimum

Tables, unless otherwise noted - 10 year minimum
Table Mechanisms – 5 year minimum
Table Ganging Device - 1 year minimum
Items not listed above - 1 year minimum

ATTACHMENT C
TRACKING COMMENTS IN DRCHECKS

1.0 General

The Government and DB Contractor shall set up the project in Dr Checks. Throughout the design process, the parties shall enter, track, and back-check comments using the DrChecks system. Government and Contractor reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate for the review conference exactly what action will be taken or why the action is not required. After the design review conference and prior to the next design submittal for the package, the DOR's will annotate those comments that require DOR action, design revision, etc. to show how and where it has been addressed in the design documents, This shall be part of the required design configuration management plan. Comments considered critical by the conference participants shall be flagged as such.

2.0 DrChecks Review Comments

The Contractor and the Government shall monitor DrChecks to assure all comments are annotated and resolved prior to the next submittal. Print and include the DrChecks comments and responses and included in the design analysis for record in the next design submittal for that package.

2.1. Upon review of comments prior to the design review conference, the DOR(s) shall identify whether they concur, non-concur, mark it "for information only" or mark it "check and resolve". Indicate exactly what action will be taken or why the action is not required.

2.2. Conference participants (reviewers) will expect coordination between Design Analysis calculations and the submitted design. Reviewers will also focus on the design submittal's satisfaction of the contract requirements.

2.3. After the conference, the DOR(s) shall formally respond to each applicable comment in DrChecks a second time prior to the next submittal, clearly indicating what action was taken and what drawing/spec/design analysis changed. Designers of Record are encouraged to directly contact reviewers to discuss and agree to the formal comment responses rather than relying only on DrChecks and review meetings to discuss comments. With the next submittal, reviewers will back-check answers to the comments against the new submittal, in addition to reviewing additional design work.

2.4. Clearly annotate in DrChecks those comments that, in the DB Contractor's opinion, require effort outside the scope of the contract. Do not proceed with work outside the contract until a modification to the contract is properly executed, if one is necessary.

3.0 DrChecks Initial Account Set-Up

To initialize an office's use of DrChecks, choose a contact person within the office to call the DrChecks Help Desk at 800-428-HELP, M-F, 8AM-5PM, Central time. This POC will be given an office password to distribute to others in the office. Individuals can then go to the hyperlink at http://www.projnet.org and register as a first time user. Upon registration, each user will be given a personal password to the DrChecks system.

3.1. Once the office and individuals are registered, the COE's project manager or lead reviewer will assign the individuals and/or offices to the specific project for review. At this point, persons assigned can make comments, annotate comments, and close comments, depending on their particular assignment.

4.0 DrChecks Reviewer Role

The Contractor is the technical reviewer and the Government is the compliance reviewer of the DB's design documents. Each reviewer enters their own comments into the Dr Checks system. To enter comments:

4.1. Log into DrChecks.

4.2. Click on the appropriate project.

4.3. Click on the appropriate review conference. An Add comment screen will appear.

4.4. Select or fill out the appropriate sections (particularly comment discipline and type of document for sorting) of the comment form and enter the comment in the space provided.

4.5. Click the Add Comment button. The comment will be added to the database and a fresh screen will appear for the next comment you have.

4.6. Once comments are all entered, exit DrChecks by choosing “My Account” and then Logout.

5.0 DrChecks Comment Evaluation (Step 1 of 2)

The role of the DOR(s) is to evaluate and respond to the comments entered by the Government’s and DB Contractor’s reviewers. To respond to comments:

5.1. Log into DrChecks.

5.2. Click on the appropriate project.

5.3. Under “Evaluate” click on the number under “Pending”.

5.4. Locate the comments that require your evaluation. (Note: If you know the comment number you can use the Quick Pick window on your home page in DrChecks; enter the number and click on go.)

5.5. Select the appropriate evaluation radio button (concur, non-concur, for information only, or check and resolve) and respond with a brief explanation in the Discussion field. An explanation other than to say “concur” is not necessary for “Concur”, but may be useful for the Design Configuration Management purposes.

5.6. Click on the Add button. The evaluation will be added to the database and a fresh screen will appear with the next comment.

5.7. Once evaluations are all entered, exit DrChecks by choosing “My Account” and then Logout.

6.0 DrChecks Comment Evaluation (Step 2 of 2)

This is where the DOR(s) respond to each applicable comment in DrChecks after the design review conference, prior to the next submittal, clearly indicating what action was taken and what drawing/spec/design analysis changed. Respond to the previous comments, following the same steps as above, adding the narrative in the discussion field.

7.0 DrChecks Back-Check

At the following design conference, (where applicable) or at some other agreed time, Government and Contractor reviewers will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and that all revisions have been completed. Reviewers shall either enter additional back-check comments, if necessary, or close those where actions are complete.

7.1. Log into DrChecks.

7.2. Click on the appropriate project.

7.3. Under “My Backcheck” click on the number under “Pending”.

7.4. If you agree with the designer’s response select “Close Comment” and add a closing response if desired.

7.5. If you do not agree with the designer’s response or the submittal does not reflect the response given, select “Issue Open”, enter additional information.

7.6. Click on the Add button. The back-check will be added to the database and a fresh screen will appear with the next comment.

7.7. Once back-checks are all entered, exit DrChecks by choosing “My Account” and then Logout. The design is completed and final when there are no pending comments to be evaluated and there are no pending or open comments under back-check.

ATTACHMENT D
SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

Instructions: Use the information outlined in this document to provide the minimum requirement for development of Fire Protection and Life Safety Code submittals for all building projects. Additional and supplemental information may be used to further develop the code review. Insert N/A after criteria, which may be “not applicable”.

1.0 SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

1.1. Project Name (insert name and location)

1.2. Applicable Codes and Standards

1.2.1. Unified Facilities Criteria (UFC): 3-600-01, Design: Fire Protection Engineering For Facilities

1.2.2. International Building Code (IBC) for fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements, except as modified by UFC 3-600-01.

1.2.3. National Fire Protection Association (NFPA) 101 Life Safety Code (latest edition), for building egress and life safety and applicable criteria in UFC 3-600-01.

1.2.4. ADA and ABA Accessiblity Guidelines. For Buildings and Facilities See Section 01 10 00, Paragraph 3 for facility specific criteria.

1.3. Occupancy Classification
IBC chapters 3 and 4

1.4. Construction Type
IBC chapter 6

1.5. Area Limitations
IBC chapter 5, table 503

1.6. Allowable Floor Areas
IBC section 503, 505

1.7. Allowable area increases
IBC section 506, 507

1.8. Maximum Height of Buildings
IBC section 504

1.9. Fire-resistive substitution

1.10. Occupancy Separations
IBC table 302.3.2

1.11. Fire Resistive Requirements

1.11.1. Exterior Walls - [_____] hour rating, IBC table 601, 602

1.11.2. Interior Bearing walls - [_____] hour rating

1.11.3. Structural frame - [_____] hour rating

1.11.4. Permanent partitions - [_____] hour rating

1.11.5. Shaft enclosures - [_____] hour rating

1.11.6. Floors & Floor-Ceilings - [_____] hour rating

1.11.7. Roofs and Roof Ceilings - [_____] hour rating

1.12. Automatic Sprinklers and others used to determine the need for automatic Extinguishing Equipment, Extinguishing Systems, Foam Systems, Standpipe

1.12.1. UFC 3-600-01, chapters 4 and 6 systems, wet chemical systems, etc. State which systems are required and to what criteria they will be designed.

1.12.2. UFC 3-600-01, Appendix B Occupancy Classification. Note the classification for each room. This may be accomplished by classifying the entire building and noting exceptions for rooms that differ (E.g. The entire building is Light Hazard except boiler room and storage rooms which are [_____], etc.)

1.12.3. UFC 3-600-01, Chapter 3 Sprinkler Design Density, Sprinkler Design Area, Water Demand for Hose Streams (supply pressure and source requirements).

1.12.4. UFC 3-600-01, Chapter 4 Coverage per sprinkler head. Extended coverage sprinkler heads are not permitted.

1.12.5. Available Water Supply. Provide the results of the water flow tests showing the available water supply static pressure and residual pressure at flow. Based on this data and the estimated flow and pressure required for the sprinkler system, determine the need for a fire pump.

1.12.6. NFPA 13, Para. 8.16.4.6.1. Provide backflow preventer valves as required by the local municipality, authority, or water purveyor. Provide a test valve located downstream of the backflow preventer for flow testing the backflow preventer at full system demand flow. Route the discharge to an appropriate location outside the building.

1.13. Kitchen Cooking Exhaust Equipment

Describe when kitchen cooking exhaust equipment is provided for the project. Type of extinguishing systems for the equipment should be provided. per NFPA 96. Show all interlocks with manual release switches, fuel shutoff valves, electrical shunt trips, exhaust fans, and building alarms.

1.14. Portable Fire Extinguishers, fire classification and travel distance. per NFPA 10

1.15. Enclosure Protection and Penetration Requirements. - Opening Protectives and Through Penetrations

1.15.1. IBC Section712, 715 and Table 715.3. Mechanical rooms, exit stairways, storage rooms, janitor [_____] hour rating. IBC Table 302.1.1

1.15.2. Fire Blocks, Draft Stops, Through Penetrations and Opening Protectives

1.16. Fire Dampers. Describe where fire dampers and smoke dampers are to be used (IBC Section 716 and NFPA 90A}. State whether isolation smoke dampers are required at the air handler.

1.17. Detection Alarm and Communication. UFC 3-600-01, (Chapter 5); NFPA 101 para. 3.4 (chapters 12-42); NFPA 72

1.18. Mass Notification. Describe building/facility mass notification system (UFC 4-021-01) type and type of base-wide mass notification/communication system. State whether the visible notification appliances will be combined with the fire alarm system or kept separate. (Note: Navy has taken position to combine visible notification appliances with fire alarm).

1.19. Interior Finishes (classification). NFPA 101.10.2.3 and NFPA 101.7.1.4

1.20. Means of Egress

1.20.1. Separation of Means of Egress, NFPA 101 chapters 7 and 12-42; NFPA101.7.1.3

1.20.2. Occupant Load, NFPA101.7.3.1 and chapters 12-42.

1.20.3. Egress Capacity (stairs, corridors, ramps and doors) NFPA101.7.3.3

1.20.4. Number of Means of Egress, NFPA101.7.4 and chapters 12-42.

1.20.5. Dead end limits and Common Path of Travel, NFPA 101.7.5.1.6 and chapters 12-42.

1.20.6. Accessible Means of Egress (for accessible buildings), NFPA101.7.5.4

1.20.7. Measurement of Travel Distance to Exits, NFPA101.7.6 and chapters 12-42.

1.20.8. Discharge from Exits, NFPA101.7.7.2

1.20.9. Illumination of Means of Egress, NFPA101.7.8

1.20.10. Emergency Lighting, NFPA101.7.9

1.20.11. Marking of Means of Egress, NFPA101.7.10

1.21. Elevators, UFC 3-600-01, Chapter 6; IBC and ASME A17.1 - 2000,(Safety Code for Elevators and Escalators)

1.22. Accessibility Requirements, ADA and ABA Accessibility Guidelines for Buildings and Facilities

1.23. Certification of Fire Protection and Life Safety Code Requirements. (Note: Edit the Fire team membership if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features for this project in accordance with the attached completed form(s).

1.24. Designer of Record. Certification of Fire protection and Life Safety Code Requirements. (Note: Edit the Fire team members if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features of this project.

Fire Protection Engineer of Record:

_____

Signature and Stamp

Date

OR

Architect of Record:

_____

Signature and Stamp

Date

Mechanical Engineer of Record:

_____

Signature and Stamp

Date

Electrical Engineer of Record:

_____

Signature/Date

ATTACHMENT E
LEED SUBMITTALS

LEED Credit Paragraph	Contractor Check Here if Credit is Claimed	**LEED-NC v3 Submittals (OCT09)**		Provide for Credit Audit Only		Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
GENERAL							
	GENERAL - All calculations shall be in accordance with LEED 2009 Reference Guide.						
	GENERAL: Obtain excel version of this spreadsheet at http://en.sas.usace.army.mil/enWeb, "Engineering Criteria".						
	GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach.						
	GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only.						
	NOTE: Each submittal indicated with "**" differs from LEED certified project submittals by either having a different due date or being an added submittal not required by GBCI.						
	NOTE: Projects seeking LEED certification need only submit to GBCI whatever documentation is acceptable to GBCI (for example, licensed professional certifications). This checklist identifies what must be submitted to the Government for internal review purposes. Government review of LEED documentation in no way supercedes or modifies the requirements and rulings of of GBCI for purposes of compliance with project requirement to obtain LEED certifiaction.						
	GENERAL - Audit documentation may include but is not limited to what is indicated in this table.						
			Closeout		List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents.		Proj Engr (PE)
CATEGORY 1 - SUSTAINABLE SITES							
SSPR1		Construction Activity Pollution Prevention (PREREQUISITE)	**Final Design		List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design		Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program.		CIV
SS1		Site Selection	Final Design		Statement confirming that project does not meet any of the prohibited criteria.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design	X	LEED Site plan drawing that shows all proposed development, line depicting boundary of all bodies of water and/or wetlands within 100 feet of project boundary and a line depicting 5' elevation above 100 year flood line that falls within project boundary. Not required if neither condition applies.		CIV
SS2		Development Density & Community Connectivity	Final Design		Option 1: LEED Site vicinity plan showing project site and surrounding development. Show density boundary or note drawing scale.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: Table indicating, for project site and all surrounding sites within density radius (keyed to site vicinity plan), site area and building area. Project development density calculation. Density radius calculation. Development density calculation within density radius.		CIV
			Final Design		Option 2: LEED Site vicinity plan showing project site, the 1/2 mile community radius, pedestrian walkways and the locations of the residential development(s) and Basic Services surrounding the project site.		CIV
			Final Design		Option 2: List (including business name and type) of all Basic Services facilities within the 1/2 mile radius, keyed to site vicinity plan.		CIV
SS3		Brownfield Redevelopment	Final Design		Narrative describing contamination and the remediation activities included in project. Include statement indicating how site was determined to be a brownfield.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS4.1		Alternative Transportation: Public Transportation Access	Final Design		Statement indicating which option for compliance applies. State whether public transportation is existing or proposed and, if proposed, cite source of this information.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: LEED Site vicinity plan showing project site, mass transit stops and pedestrian path to them with path distance noted.		CIV
			Final Design		Option 2: LEED Site vicinity plan showing project site, bus stops and pedestrian path to them with path distance noted.		CIV
SS4.2		Alternative Transportation: Bicycle Storage & Changing Rooms	Final Design		FTE calculation. Bicycle storage spaces calculation. Shower/changing facilities calculation.		CIV
			Final Design		List of drawings that show the location(s) of bicycle storage areas. Statement indicating distance from building entrance.		CIV
			Final Design		List of drawings that show the location(s) of shower/changing facilities and, if located outside the buiding, statement indicating distance from building entrance.		ARC

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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
SS4.3		Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	Final Design		Statement indicating which option for compliance applies. FTE calculation. Statement indicating total parking capacity of site.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: Low-emission & fuel-efficient vehicle calculation.		CIV
			Final Design		Option 1: List of drawings and specification references that show location and number of preferred parking spaces for low-emission & fuel-efficient vehicles and signage.		CIV
			Final Design		Option 1: Statement indicating quantity, make, model and manufacturer of low-emission & fuel-efficient vehicles to be provided. Statement confirming vehicles are zero-emission or indicating ACEEE vehicle scores.		CIV
			Final Design		Option 2: Low-emission & fuel-efficient vehicle parking calculation.		CIV
			Final Design		Option 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design		Option 3: Low-emission & fuel-efficient vehicle refueling station calculation.		CIV
			Final Design		Option 3: List of drawings and specifications indicating location and number of refueling stations, fuel type and fueling capacity for each station for an 8-hour period.		CIV
			Closeout	X	Option 3: Construction product submittals indicating what was provided and confirming compliance with respect to fuel type and fueling capacity for each station for an 8-hour period.		CIV
SS4.4		Alternative Transportation: Parking Capacity	Final Design		Statement indicating which option for compliance applies.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: Preferred parking calculation including number of spaces required, total provided, preferred spaces provided and percentage.		CIV
			Final Design		Option 2: FTE calculation. Preferred parking calculation including number of spaces provided, preferred spaces provided and percentage.		CIV
			Final Design		Options 1 and 2: List of drawings and specification references that show location and number of preferred parking spaces and signage.		CIV
			Final Design		Option 3: Narrative indicating number of spaces required and provided and describing infrastructure and support programs with description of project features to support them.		CIV
SS5.1		Site Development: Protect or Restore Habitat	**Final Design		Option 1: List of drawing and specification references that convey site disturbance limits.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			**Final Design		Option 2: LEED site plan drawing that delineates boundaries of each preserved and restored habitat area with area (sf) noted for each.		CIV
			**Final Design		Option 2: Percentage calculation of restored/preserved habitat to total site area. List of drawings and specification references that convey restoration planting requirements.		CIV
SS5.2		Site Development: Maximize Open Space	Final Design		Option 2: LEED site plan drawing delineating boundary of vegetated open space adjacent to building with areas of building footprint and designated open space noted.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS6.1		Stormwater Design: Quantity Control	Final Design		Statement indicating which option for compliance applies.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Option 1: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf) -OR - Narrative describing site conditions, measures and controls to be implemented to prevent excessive stream velocities and erosion.		CIV
			Final Design		Option 2: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf). Indicate percent reduction in each.		CIV
SS6.2		Stormwater Design: Quality Control	Final Design		For non-structural controls, list all BMPs used and, for each, describe the function of the BMP and indicate the percent annual rainfall treated. List all structural controls and, for each, describe the pollutant removal and indicate the percent annual rainfall treated.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
SS7.1		Heat Island Effect: Non-Roof	**Final Design		LEED site plan drawing indicating locations and quantities of each paving type, including areas of shaded pavement. Percentage calculation indicating percentage of reflective/shaded/open grid area.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV

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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
SS7.2		Heat Island Effect: Roof	Final Design		Option 1: Percentage calculation indicating percentage of SRI compliant roof area. List of drawings and specification references that convey SRI requirements and roof slopes.		ARC
			Final Design		Option 1: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout		Option 1: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X	Option 1: Manufacturer published product data or certification confirming SRI		PE
			Final Design		Option 2: Percentage calculation indicating percentage of vegetated roof area.		ARC
			Final Design		Option 3: Combined reflective and green roof calculation.		ARC
			Final Design		Option 3: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope.		ARC
			**Closeout		Option 3: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope.		PE
			Closeout	X	Option 3: Manufacturer published product data or certification confirming SRI		PE
SS8		Light Pollution Reduction	Final Design		Interior Lighting: List of drawings and specification references that convey interior lighting requirements (location and type of all installed interior lighting, location of non-opaque exterior envelope surfaces, allowing confirmation that maximum candela value from interiorfixtures does not intersect non-opaque building envelope surfaces). - OR - List of drawings and specification references that show automatic lighting controls compliance with credit requirement.		ELEC
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		ELEC
			Final Design		Exterior Lighting: List of drawings and specification references that convey exterior lighting requirements (location and type of all site lighting and building façade/landscape lighting).		ELEC
			Final Design		Exterior Site Lighting Power Density (LPD): Tabulation for exterior site lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all site lighting.		ELEC
			Final Design		Exterior Building Facade/Landscape Lighting Power Density (LPD): Tabulation for exterior building facade/landscape lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all building facade/landscape lighting.		ELEC
			Final Design		Exterior Lighting IESNA Zone: Indicate which IESNA zone is applicable to the project.		ELEC
			Final Design		Exterior Lighting Site Lumen table indicating, for each fixture type, quantity installed, initial lamp lumens per luminaire, initial lamp lumens above 90 degrees from Nadir, total lamp lumens and total lamp lumens above 90 degrees. Percentage of site lamp lumens above 90 degrees from nadir to total lamp lumens.		ELEC
			Final Design		Exterior Lighting Narrative describing analysis used for addressing requirements for light trespass at site boundary and beyond.		ELEC
CATEGORY 2 – WATER EFFICIENCY							
WEPR1		Water Use Reduction: 20% Reduction	Final Design		Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design		Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design		Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC

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			Final Design		Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design		Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Closeout	X	Manufacturer published product data or certification confirming fixture water usage.		PE
WE1.1		Water Efficient Landscaping: Reduce by 50%	Final Design		Statement indicating which option for compliance applies.		CIV
			**Final Design		Delineation and labeling of "LEED Project site boundary" on site plan.		CIV
			Final Design		Calculation indicating, for baseline and design case, total water applied, total potable water applied, total non-potable water applied. Design case percent potable water reduction. If nonpotable water is used, indicate source of nonpotable water.		CIV
			Final Design		List of landscape plan drawings.		CIV
			Final Design		Narrative describing landscaping and irrigation design strategies, including water use calculation methodology used to determine savings and, if non-potable water is used, specific information about source and available quantity.		CIV
WE1.2		Water Efficient Landscaping: No Potable Water Use or No Irrigation	Same as WE1.1		Same as WE1.1		CIV
WE2		Innovative Wastewater Technologies	Final Design		Statement confirming which option for compliance applies.		MEC
			Final Design		Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio.		MEC
			Final Design		Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users		MEC
			Final Design		Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation.		MEC
			Final Design		Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage.		MEC
			Final Design		Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage.		MEC
			Final Design		Option 1: If onsite non-potable water is used, identify source(s), indicate annual quantity from each source and indicate total annual quantity from all onsite non-potable water sources.		MEC
			Final Design		Option 1: Summary calculation indicating baseline annual water consumption, design case annual water consumption, non-potable annual water consumption and total percentage annual water savings.		MEC
			Final Design		Option 2: Statement confirming on-site treatment of all generated wastewater to tertiary standards and all treated wastewater is either infiltrated or used on-site.		MEC
			Final Design		Option 2: List of drawing and specification references that convey design of on-site wastewater treatment features.		CIV
			Final Design		Option 2: On-site water treatment quantity calculation indicating all on-site wastewater source(s), annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from each source and totals for annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from all sources.		CIV
			Final Design		Option 2: Wastewater summary calculation indicating design case annual flush fixture water usage, annual on-site water treatment and percentage sewage convyance reduction.		MEC
			Final Design		Narrative describing project strategy for reduction of potable water use for sewage conveyance, including specific information on reclaimed water usage and treated wastewater usage.		MEC
WE3		Water Use Reduction: 30% - 40% Reduction	Same as WEPR1		Same as WEPR1		MEC
CATEGORY 3 – ENERGY AND ATMOSPHERE							

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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
EAPR1		Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	**Final Design		**Owner's Project Requirements document		ALL
			**Final Design		**Basis of Design document for commissioned systems		MEC, ELEC
			**Final Design		**Commissioning Plan		MEC, ELEC
			Closeout		Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout		Commissioning Report		PE
EAPR2		Minimum Energy Performance (PREREQUISITE)	Final Design		Statement listing the mandatory provisions of ASHRAE 90.1 that project meets relative to compliance with this prerequisite and indicating which compliance path was used.		MEC ELEC ARC
			Final Design		Statement indicating which compliance path option applies.		MEC
			Final Design		Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design		Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design		Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design		Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design		Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design		Option 1: Energy type summary lising, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design		Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design		Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design		Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design		Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design		Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design		Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design		Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design		Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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PAR		**FEATURE**	**DUE AT**		**REQUIRED DOCUMENTATION**	**DATE**	**REV**
			Final Design		Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design		Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EAPR3		Fundamental Refrigerant Management (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies.		MEC
			Final Design		Option 2: Narrative describing phase out plan, including specific information on phase out dates and refrigerant quantities.		MEC
EA1		Optimize Energy Performance	Final Design		Statement indicating which compliance path option applies.		MEC
			Final Design		Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology.		MEC
			Final Design		Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score.		MEC
			Final Design		Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category		MEC
			Final Design		Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design		MEC
			Final Design		Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type		MEC
			Final Design		Option 1: Energy type summary lising, for each energy type, utility rate description, units of energy and units of demand		MEC
			Final Design		Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost		MEC
			Final Design		Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined		MEC
			Final Design		Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative		MEC
			Final Design		Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use.		MEC
			Final Design		Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design		Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings.		MEC
			Final Design		Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost.		MEC
			Final Design		Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost.		MEC

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			Final Design		Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features		MEC
			Final Design		Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates)		MEC
EA2.1		On-Site Renewable Energy	Final Design		Statement indicating which compliance path option applies.		ELEC
			Final Design		List all on-site renewable energy sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost. Indicate total annual energy use (all sources), total annual energy cost (all sources) and percent renewable energy cost.		ELEC MEC
			Final Design		Option 1: Indicate, for renewable energy,proposed design total annual energy generated and annual cost.		ELEC MEC
			Final Design		Option 2: Indicate CBECS building type and building gross area. Provide the following CBECS data: median annual electrical intensity, median annual non-electrical fuel intensity, average electric energy cost, average non-electric fuel cost, annual electric energy use and cost, annual non-electric fuel use and cost.		ELEC MEC
			Final Design		Option 2: Narrative describing renewable systems and explaining calculation method used to estimate annual energy generated, including factors influencing performance.		ELEC MEC
EA2.2		On-Site Renewable Energy	Same as EA2.1		Same as EA2.1		ELEC MEC
EA2.3		On-Site Renewable Energy	Same as EA2.1		Same as EA2.1		ELEC MEC
EA3		Enhanced Commissioning	**Final Design		**Owner's Project Requirements document (OPR)		ALL
			**Final Design		**Basis of Design document for commissioned systems (BOD)		ELEC MEC
			**Final Design		**Commissioning Plan		ELEC MEC
			Closeout		Statement confirming all commissioning requirements have been incorporated into construction documents.		PE
			Closeout		**Commissioning Report		PE
			**Final Design		Statement by CxA confirming Commissioning Design Review		
			Closeout		Statement by CxA confirming review of Contractor submittals for compliance with OPR and BOD		PE
			Closeout		**Systems Manual		PE
			Closeout		Statement by CxA confirming completion of O&M staff and occupant training		PE
			Closeout		**Scope of work for post-occupancy review of building operation, including plan for resolution of outstanding issues		PE
			**Predesign		Statement confirming CxA qualifications and contractual relationships relative to work on this project, demonstrating that CxA is an independent third party.		MEC
EA4		Enhanced Refrigerant Management	Final Design		Refrigerant impact calculation table with all building data and calculation values as shown in LEED 2009 Reference Guide Example Calculations		MEC
			Final Design		Narrative describing any special circumstances or explanatory remarks		
			Closeout	X	Cut sheets highlighting refrigerant data for all HVAC components.		PE
EA5		Measurement & Verification	Closeout		Statement indicating which compliance path option applies.		PE
			Closeout		Measurement and Verification Plan including Corrective Action Plan		PE
			Closeout		**Scope of work for post-occupancy implementation of M&V plan including corrective action plan.		PE
EA6		Green Power	Closeout		Statement indicating which compliance path option applies.		PE
			Closeout		Option 1: Indicate proposed design total annual electric energy usage		PE
			Closeout		Option 2: Indicate actual total annual electric energy usage		PE
			Closeout		Option 3: Calculation indicating building type, total gross area, median electrical intensity and annual electric energy use		PE

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			Closeout		Green power provider summary table indicating, for each purchase type, provider name, annual quantity green power purchased and contract term. Indicate total annual green power use and indicate percent green power		PE
			Closeout		Narrative describing how Green Power or Green Tags are purchased		PE
CATEGORY 4 – MATERIALS AND RESOURCES							
MRPR1		Storage & Collection of Recyclables (PREREQUISITE)	Final Design		Statement confirming that recycling area will accommodate recycling of plastic, metal, paper, cardboard and glass. Narrative indicating any other materials addressed and coordination with pickup.		ARC
MR1.1		Building Reuse: Maintain 55% of Existing Walls, Floors & Roof	**Final Design		If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design		Spreadsheet listing, for each building structural/envelope element, the existing area and reused area. Total percent reused.		ARC
MR1.2		Building Reuse: Maintain 75% of Existing Walls, Floors & Roof	Same as MR1.1		Same as MR1.1		ARC
MR1.3		Building Reuse: Maintain 95% of Existing Walls, Floors & Roof	Same as MR1.1		Same as MR1.1		ARC
MR1.4		Building Reuse: Maintain 50% of Interior Non-Structural Elements	**Final Design		If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building.		ARC
			**Final Design		Spreadsheet listing, for each building interior non-structural element, the existing area and reused area. Total percent reused.		ARC
MR2.1		Construction Waste Management: Divert 50% From Disposal	**Preconstruction		Waste Management Plan		PE
			**Construction Quarterly and Closeout		Spreadsheet calculations indicating material description, disposal/diversion location (or recycling hauler), weight, total waste generated, total waste diverted, diversion percentage		PE
			**Construction Quarterly and Closeout		Receipts/tickets for all items on spreadsheet		PE
MR2.2		Construction Waste Management: Divert 75% From Disposal	Same as MR2.1		Same as MR2.1		PE
MR3.1		Materials Reuse: 5%	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each reused/salvaged material, material description, source or vendor, cost. Total reused/salvaged materials percentage.		PE
MR3.2		Materials Reuse: 10%	Same as MR3.1		Same as MR3.1		PE
MR4.1		Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each recycled content material, material name/description, manufacturer, cost, post-consumer recycled content percent, pre-consumer recycled content percent, source of recycled content data. Total post-consumer content materials cost, total pre-consumer content materials cost, total combined recycled content materials cost, recycled content materials percentage.		PE
			Final Design or NLT Preconstruction		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	X	Manufacturer published product data or certification, confirming recycled content percentages in spreadsheet		PE
MR4.2		Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Same as MR4.1		Same as MR4.1		PE
MR5.1		Regional Materials:10% Extracted, Processed & Manufactured Regionally	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each regional material, material name/description, manufacturer, cost, percent compliant, harvest distance, manufacture distance, source of manufacture and harvest location data. Total regional materials cost, regional materials percentage.		PE
			Preconstruction		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	X	Manufacturer published product data or certification confirming regional material percentages in spreadsheet		PE

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MR5.2		Regional Materials:20% Extracted, Processed & Manufactured Regionally	Same as MR5.1		Same as MR5.1		PE
MR6		Rapidly Renewable Materials	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage.		PE
			Final Design		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		ARC
			Closeout	X	Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet		PE
MR7		Certified Wood	Closeout		Statement indicating total materials value and whether default or actual.		PE
			Closeout		Spreadsheet calculations indicating, for each certified wood material, material name/description, vendor, cost, wood component percent, certified wood percent of wood component, FSC chain of custody certificate number. Total certified wood product value, certified wood materials percentage.		PE
			Final Design or NLT Preconstruction		**Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal.		PE
			Closeout	X	Vendor invoices, FSC chain of custody certificates and anufacturer published product data or certification confirming all certified wood materials percentages in spreadsheet.		PE
INDOOR ENVIRONMENTAL QUALITY							
EQPR1		Minimum IAQ Performance (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design		Narrative describing the project's ventilation design, including specifics about fresh air intake volumes and special considerations.		MEC
EQPR2		Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Final Design		Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements.		ARC
			Final Design		List of drawing and specification references that convey conformance to applicable requirements (signage, exhaust system, room separation details, etc).		ARC
EQ1		Outdoor Air Delivery Monitoring	Final Design		Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design		List of drawing and specification references that convey conformance to applicable requirements.		MEC
			Final Design		Narrative describing the project's ventilation design and CO2 monitoring system, including specifics about monitors, operational parameters and setpoints.		MEC
			Closeout	X	Cut sheets for CO2 monitoring system.		PE
EQ2		Increased Ventilation	Final Design		Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements.		MEC
			Final Design		Narrative describing the project's ventilation design, including specifics about zone fresh air intake volumes and demonstrating compliance.		MEC
			Final Design		Option 2: Narrative describing design method used for determining natural ventilation design, including calculation methodology/model results and demonstrating compliance.		MEC
			Final Design		List of drawing and specification references that convey conformance to applicable requirements.		MEC
EQ3.1		Construction IAQ Management Plan: During Construction	**Preconstruction		Construction IAQ Management Plan		PE
			Closeout		Statement confirming whether air handling units were operated during construction		PE
			Closeout		Dated jobsite photos showing examples of IAQ management plan practices being implemented. Label photos to indicate which practice they demonstrate. Minimum one photo of each practice at each building.		PE

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			Closeout		Spreadsheet indicating, for each filter installed during construction, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy.		PE
EQ3.2		Construction IAQ Management Plan: Before Occupancy	**Preconstruction		Construction IAQ Management Plan		PE
			Closeout		Statement indicating which option for compliance applies and confirming that required activities have occurred that meet the applicable requirements.		PE
			Closeout		Option 1a: Narrative describing the project's flushout process, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout		Option 1b: Narrative describing the project's pre-occupancy and post-occupancy flushout processes, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance.		PE
			Closeout		Option 2: Narrative describing the project's IAQ testing process, including specifics about contaminants tested for, locations, remaining work at time of test, retest parameters and special considerations (if any).		PE
			Closeout		Option 2: IAQ testing report demonstrating compliance.		PE
EQ4.1		Low Emitting Materials: Adhesives & Sealants	Closeout		Spreadsheet indicating, for each applicable indoor adhesive, sealant and sealant primer used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout		Spreadsheet indicating, for each applicable indoor aerosol adhesive, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor aerosol adhesives were used for the project.		PE
			Closeout	X	Manufacturer published product data or certification confirming material VOCs in spreadsheet		PE
EQ4.2		Low Emitting Materials: Paints & Coatings	Closeout		Spreadsheet indicating, for each applicable indoor paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data.		PE
			Closeout		Spreadsheet indicating, for each applicable indoor anti-corrosive/anti-rust paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor anti-corrosive/anti-rust paints were used for the project .		PE
			Closeout	X	Manufacturer published product data or certification confirming material VOCs in spreadsheet		PE
EQ4.3		Low Emitting Materials: Flooring Systems	Closeout		Spreadsheet indicating, for each indoor flooring system used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data.		PE
			Closeout		Spreadsheet indicating, for each indoor carpet cushion used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data - OR - Statement confirming no indoor carpet cushion was used for the project.		PE
			Closeout	X	Manufacturer published product data or certification confirming material compliance label in spreadsheet		PE
EQ4.4		Low Emitting Materials: Composite Wood & Agrifiber Products	Closeout		Spreadsheet indicating, for each indoor composite wood and agrifiber product used, the manufacturer, product name/model number, if it contains added urea formaldehyde (yes/no) and source of LEED compliance data.		PE
			Closeout	X	Manufacturer published product data or certification confirming material urea formaldehyde in spreadsheet		PE
EQ5		Indoor Chemical & Pollutant Source Control	Closeout		Spreadsheet indicating, for each permanent entryway system used, the manufacturer, product name/model number and description of system.		PE
			Final Design		List of drawing and specification references that convey locations and installation methods for entryway systems.		ARC
			Final Design		Spreadsheet indicating, for each chemical use area, the room number, room name, description of room separation features (walls, floor/ceilings, openings) and pressure differential from surrounding spaces with doors closed - OR - Statement confirming that project includes no chemical use areas and that no hazardous cleaning materials are needed for building maintenance.		ARC MEC
			Final Design		If project includes chemical use areas: List of drawing and specification references that convey locations of chemical use areas, room separation features and exhaust system.		ARC MEC

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			Final Design		If project includes places where water and chemical concentrate mixing occurs: List of drawing and specification references that convey provisions for containment of hazardous liquid wastes OR - Statement confirming that project includes no places where water and chemical concentrate mixing occurs.		ARC MEC
			Closeout		If project includes chemical use areas: Spreadsheet indicating, for AHUs/mechanical ventilation equipment serving occupied areas, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy (yes/no) - OR - Statement confirming that project does not use mechanical equipment for ventilation of occupied areas.		PE
EQ6.1		Controllability of Systems: Lighting	Final Design		Calculation indicating total number of individual workstations, number of workstations with individual lighting controls and the percentage of workstations with individual lighting controls.		ELEC
			Final Design		For each shared multi-occupant space, provide a brief description of lighting controls.		ELEC
			Final Design		Narrative describing lighting control strategy, including type and location of individual controls and type and location of controls in shared multi-occupant spaces.		ELEC
EQ6.2		Controllability of Systems: Thermal Comfort	Final Design		Calculation indicating total number of individual workstations, number of workstations with individual thermal comfort controls and the percentage of workstations with individual thermal comfort controls.		MEC
			Final Design		For each shared multi-occupant space, provide a brief description of thermal comfort controls.		MEC
			Final Design		Narrative describing thermal comfort control strategy, including type and location of individual and shared multi-occupant controls.		MEC
EQ7.1		Thermal Comfort: Design	Final Design		Design criteria spreadsheet indicating, for spring, summer, fall and winter, maximum indoor space design temperature, minimum indoor space design temperature and maximum indoor space design humidity.		MEC
			Final Design		Narrative describing method used to establish thermal comfort control conditions and how systems design addresses the design criteria, including compliance with the referenced standard.		MEC
EQ7.2		Thermal Comfort: Verification	Final Design		Narrative describing the scope of work for the thermal comfort survey, including corrective action plan development		MEC
			Final Design		List of drawing and specification references that convey permanent monitoring system.		MEC
EQ8.1		Daylight & Views: Daylight 75% of Spaces	Final Design		Option 2: Table indicating all regularly occupied spaces with space area and space area with compliant daylight zone. Sum of regularly occupied areas and regularly occupied areas withcompliant daylight zone. Percentage calculation of areas withcompliant daylight zone to total regularly occupied areas.		ARC
			Final Design		Option 1: Simulation model method, software and output data		ELEC
			Final Design		Option 1: Table indicating all regularly occupied spaces with space area, space area with minimum 25 footcandles daylighting illumination, and method of providing glare control. Sum of regularly occupied areas and regularly occupied areas with 25 fc daylighting. Percentage calculation of areas with 25 fc daylighting to total regularly occupied areas.		ELEC
			Final Design		For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.		ARC
			Final Design		List of drawing and specification references that convey exterior glazed opening head and sill heights, glazing performance properties and glare control/sunlight redirection devices.		ARC
			Closeout	X	Manufacturer published product data or certification confirming glazing Tvis in spreadsheet		PE
EQ8.2		Daylight & Views: Views for 90% of Spaces	Final Design		Table indicating all regularly occupied spaces with space area and space area with access to views. Sum of regularly occupied areas and regularly occupied areas with access to views. Percentage calculation of areas with views to total regularly occupied areas.		ARC
			Final Design		For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space.		ARC
			Final Design		LEED Floor plan drawings showing line of sight diagramming of views areas in each regularly occupied space. List of drawing/specification references that convey exterior glazed opening head and sill heights.		ARC
INNOVATION & DESIGN PROCESS							

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IDc1.1		Innovation in Design	Final Design		Narrative decribing intent, requirement for credit, project approach to the credit. List of drawings and specification references that convey implementation of credit. All other documentation that validates claimed credit.		
IDc1.2		Innovation in Design	Final Design				
IDc1.3		Innovation in Design	Final Design				
IDc1.4		Innovation in Design	Final Design				
IDc2		LEED Accredited Professional	Final Design		Narrative indicating name of LEED AP, company name of LEED AP, description of LEED AP's role and responsiblilities in the project.		ARC

ATTACHMENT F
Version 05-31-2011

BUILDING INFORMATION MODELING REQUIREMENTS

1.0 Section 1 - General

1.1. Definitions. See Section 7 for definitions of terms used in this document.

1.2. Submittal Format

1.2.1. The Model shall be developed using Building Information Modeling ("BIM") supplemented with Computer Aided Design ("CAD") content as necessary to produce a complete set of Construction Documents. Printed design submittal drawings shall be ANSI D size, suitable for half-size scaled reproduction.

1.2.2. BIM submittals shall conform to the requirements of Sections 3 and 4 below.

1.2.3. For each Center of Standardization (CoS) facility type included in this Project, all Models and associated Facility Data shall be submitted in . The submittals shall be fully operable, compatible, and editable within the native BIM tools.

2.0 Section 2 – Design Requirements

2.1. Use of BIM for Design. Contractor shall use BIM application(s) and software(s) to develop Project designs consistent with the following requirements.

2.1.1. Baseline Model. The Contractor will not be provided a baseline multi-discipline BIM Project Model.

2.1.2. USACE BIM Workspace.

2.1.3. Reference. Refer to ERDC TR-06-10, "U.S. Army Corps of Engineers Building Information Modeling Road Map" from the CAD/BIM Technology Center website for more information on the USACE BIM implementation goals.

2.1.4. Industry Foundation Class (IFC) Support. The Contractor's selected BIM application(s) and software(s) must be consistent with the current IFC property sets. Any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment must be submitted for Government acceptance.

2.1.5. BIM Project Execution Plan.

2.1.5.1. Develop a BIM Project Execution Plan ("Plan" or "PxP") documenting the BIM uses, analysis technologies and workflows.

2.1.5.2. Contractors shall utilize the link for the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template located in Attachment H to develop an acceptable Plan.

2.2. BIM Requirements.

2.2.1. Facility Data. Develop the Facility Data to include material definitions and attributes that are necessary for the Project facility design and construction as described in Section 4.0. Additional data in support of Section 6.0 Contractor Electives is encouraged to be added to the Model.

2.2.2. Model Content. The Model and Facility Data shall include, at a minimum, the requirements of Section 4 below.

2.2.3. Model Granularity. Individual elements may vary in level of detail within the Model, but at a minimum must include all features that would be included on a quarter inch (1/4" = 1'0") scaled drawing (e.g., at least 1/16th, 1/8th and 1/4th), or on appropriately scaled civil drawings.

2.3. Output. Submitted Drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) from the Model and Facility Data. Drawings derived from the Model shall remain connected to the Model for the life of the Project and documented in the PxP. Drawings not derived from the Model shall also be documented in the PxP.

2.3.1. Drawings derived from the Model shall be compliant with the A/E/C CAD Standard. Deliver electronic CAD files used for the creation of the Construction Documents per requirements in Section 01 33 16, the criteria of the USACE Louisville District, and as noted herein.

2.3.2. The CAD file format specified for drawings shall not dictate which application(s) are used for development and execution of the Model and Facility Data. Application(s) used shall be documented in the PxP.

2.4. Quality Control Parameters. Implement quality control ("QC") parameters for the Model, including:

2.4.1. Model Standards Checks. QC validation ensures that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Identify and report non-compliant elements and submit a corrective action plan. Provide the Government with detailed justification and request Government acceptance for any non-compliant element that the Contractor proposes to be allowed to remain in the Model.

2.4.2. CAD Standards Checks. QC checking ensures that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per requirements in Section 01 33 16. Identify and report non-compliant content and submit a corrective action plan.

2.4.3. Other Parameters. Develop such other QC parameters as Contractor deems appropriate for the Project and provide to the Government for acceptance.

2.5. Design and Construction Reviews. Perform design and construction reviews at each submittal stage under Section 3 to test the Model, including:

2.5.1. Visual Checks. Checking to ensure the design intent has been followed and that there are no unintended elements in the Model.

2.5.2. Interference Management Checks. Locate conflicting spatial data in the Model where two elements are occupying the same space. Log hard interferences (e.g., mechanical vs. structural, or mechanical vs. mechanical, overlaps in the same location) and soft interferences, (e.g., conflicts regarding equipment clearance, service access, fireproofing, insulation, code space requirements) in a written report and resolve.

2.5.3. IFC Coordination View. Provide an IFC Coordination View in IFC Express format for all deliverables. Provide exported property set data for all IFC supported named building elements.

2.5.4. Other Parameters. Develop other design and construction review parameters as the Contractor deems appropriate for the Project and provide to the Government for acceptance.

3.0 Section 3 – Submittal Requirements

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with the PxP deliverables at stages as described below.

3.1.2. For each Interim Design Submittal as set forth in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.4 and 2.5 above have been completed. This report shall be discussed as part of the review process and shall address cross-discipline interferences, if any.

3.1.3. At each Interim Design Submittal as set forth in Paragraphs 3.3 through 3.6, provide the Government with:

3.1.3.1. The Model, Facility Data, Workspace and CAD Data files in the native BIM/CAD format.

3.1.3.2. A copy of the Model in an interactive review format such as Bentley Navigator, Autodesk Navisworks, Adobe 3D PDF 7.0 (or later), Google Earth KMZ or other format per PxP requirements. The format for reviews can change between submittals.

3.1.3.3. A list of all submitted electronic files including a description, directory, and file name for each file submitted. For all CAD printed sheets, include a list of the sheet titles and sheet numbers. Identify which files have been produced from the Model and Facility Data.

3.1.4. The Government shall confirm acceptability of all submittals identified in Section 3 in coordination with the USACE Geographic District BIM Manager.

3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the PxP where, in addition to Paragraph 3.1.4, the USACE Geographic District BIM Manager will coordinate with the USACE CoS BIM Manager to confirm acceptability of the Plan or advise as to additional processes or activities necessary to be incorporated into the PxP.

3.2.2. Within thirty (30) days after the acceptance of the PxP, conduct a demonstration to review the Plan for clarification, and to verify the functionality of planned Model technology workflow and processes. If modifications are required, the Contractor shall complete the modifications and resubmit the PxP performing a subsequent demonstration for Government acceptance. There will be no payment for design or construction until the PxP is completed and accepted by the Government. The Government may also withhold payment if there is design and construction for unacceptable performance in executing the accepted PxP.

3.3. Interim Design Submittals.

3.3.1. BIM and CAD Data. Submit the Model with Facility Data per the requirements identified in Paragraphs 2.2 and 2.3 as applicable to the Interim Design package(s).

3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. BIM and CAD Data. Submit the Model with Facility Date per the requirements identified in Paragraphs 2.2 and 2.3. Acceptance according to Paragraph 3.1.4 is required before commencement of construction, as described in Paragraph 3.7.6 of Section 01 33 16.

3.5. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model, including interference management and design change tracking information.

3.6. Final As-Built BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built construction conditions for Government acceptance, as specified in Section 01 78 02.00 10, PROJECT CLOSEOUT.

4.0 Section 4 – BIM Model Minimum Requirements and Output

4.1. General Provisions. The Model shall be developed to include the systems described below as they would be built, the processes of installing them, and to reflect final as-built construction conditions. The deliverable Model at the Interim Design Stage and at the Final Design Stage (“released for construction”) shall be developed to include as many of the systems described below as are necessary and appropriate at that design stage.

4.2. Architectural/Interior Design. The Architectural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.2.1. Spaces. The Model shall include spaces defining actual net square footage and net volume, and holding data to develop the room finish schedule including room names and numbers. Include program information to verify design space against programmed space, using this information to validate area quantities.

4.2.2. Walls and Curtain Walls. Each wall shall be depicted to the exact height, length, width and ratings (thermal, acoustic, fire) to properly reflect wall types. The Model shall include all walls, both interior and exterior, and the necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.2.3. Doors, Windows and Louvers. Doors, windows and louvers shall be depicted to represent their actual size, type and location. Doors and windows shall be modeled with the necessary intelligence to produce accurate window and door schedules.

4.2.4. Roof. The Model shall include the roof configuration, drainage system, penetrations, specialties, and the necessary intelligence to produce accurate plans, building sections and generic wall sections where roof design elements are depicted.

4.2.5. Floors. The floor slab(s) shall be developed in the Structural Model and then referenced by the Architectural Model.

4.2.6. Ceilings. All heights and other dimensions of ceilings, including soffits, ceiling materials, or other special conditions shall be depicted in the Model with the necessary intelligence to produce accurate plans, building sections and wall sections where ceiling design elements are depicted.

4.2.7. Vertical Circulation. All continuous vertical components (i.e., non-structural shafts, architectural stairs, handrails and guardrails) shall be accurately depicted and shall include the necessary intelligence to produce accurate plans, elevations and sections in which such design elements are referenced.

4.2.8. Architectural Specialties. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and millwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations, sections and schedules in which such design elements are referenced.

4.2.9. Signage. The Model shall include all signage and the necessary intelligence to produce accurate plans and schedules.

4.2.10. Schedules. Provide door, window, hardware sets using BHMA designations, flooring, wall finish, and signage schedules from the Model, indicating the type, materials and finishes used in the design.

4.3. Furniture. The furniture Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing, and have necessary intelligence to produce accurate plans. Representation of furniture elements is to be 2D. Contractor may provide a minimal number of 3D representations as examples. Examples of furniture include, but are not limited to, desks, furniture systems, seating, tables, and office storage.

4.3.1. Furniture Coordination. Furniture that makes use of electrical, data or other features shall include the necessary intelligence to produce coordinated documents and data.

4.4. Equipment. The Model may vary in level of detail for individual elements. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and schedules, indicating the configuration, materials, finishes, mechanical, and electrical requirements.. Examples of equipment include but are not limited to copiers, printers, refrigerators, ice machines and microwaves.

4.4.1. Schedules. Provide furniture and equipment schedules from the model indicating the materials, finishes, mechanical, and electrical requirements.

4.5. Structural. The Structural systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.5.1. Foundations. All necessary foundation and/or footing elements, with necessary intelligence to produce accurate plans and elevations.

4.5.2. Floor Slabs. Structural floor slabs shall be depicted with all necessary recesses, curbs, pads, closure pours, and major penetrations accurately depicted.

4.5.3. Structural Steel. All steel columns, primary and secondary framing members, and steel bracing for the roof and floor systems (including decks), including all necessary intelligence to produce accurate structural steel framing plans, related building/wall sections, and schedules.

4.5.4. Cast-in-Place Concrete. All walls, columns, beams, including necessary intelligence to produce accurate plans and building/wall sections, depicting cast-in-place concrete elements.

4.5.5. Expansion/Contraction Joints. Joints shall be accurately depicted.

4.5.6. Stairs. All framing members for stair systems, including necessary intelligence to produce accurate plans and building/wall sections depicting stair design elements.

4.5.7. Shafts and Pits. All shafts and pits, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.

4.5.8. Openings and Penetrations. All major openings and penetrations that would be included on a quarter inch (1/4”=1’0”) scaled drawing.

4.6. Mechanical. The Mechanical systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Small diameter (less than 1-1/2” NPS) field-routed piping is not required to be depicted in the Model. Additional minimum Model requirements include:

4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution for supply, return, ventilation and exhaust ducts, control systems, registers, diffusers, grills, and hydronic baseboards with necessary intelligence to produce accurate plans, elevations, building/wall sections and schedules.

4.6.1.1. Mechanical Piping. All necessary piping and fixture layouts, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, and schedules.

4.6.2. Plumbing. All necessary plumbing piping and fixture layouts, floor and area drains, and related equipment, including necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules.

4.6.3. Equipment Clearances. All Mechanical equipment clearances shall be modeled for use in interference management and maintenance access requirements.

4.6.4. Elevator Equipment. All necessary equipment and control systems, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.7. Electrical/Telecommunications. The Electrical and Telecommunications systems Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Small diameter (less than 1-1/2”Ø) field-routed conduit is not required to be depicted in the Model. Additional minimum Model requirements include:

4.7.1. Interior Electrical Power and Lighting. All necessary interior electrical components (i.e., lighting, receptacles, special and general purpose power receptacles, lighting fixtures, panelboards, cable trays and control systems), including necessary intelligence to produce accurate plans, details and schedules. Lighting and power built into furniture/equipment shall be modeled.

4.7.2. Special Electrical. All necessary special electrical components (i.e., security, mass notification, public address, nurse call and other special electrical occupancy sensors, and control systems), including necessary intelligence to produce accurate plans, details and schedules.

4.7.3. Grounding. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, and bonding), including necessary intelligence to produce accurate plans, details and schedules.

4.7.4. Telecommunications. All existing and new telecommunications service controls and connections, both above ground and underground, with necessary intelligence to produce accurate plans, details and schedules. Cable tray routing shall be modeled without detail of cable contents.

4.7.5. Exterior Building Lighting. All necessary exterior lighting including all lighting fixtures, relevant existing and proposed support utility lines and equipment with necessary intelligence to produce accurate plans, details and schedules.

4.7.6. Equipment Clearances. All Electrical equipment clearances shall be modeled for use in interference management and maintenance access requirements.

4.8. Fire Protection. The fire protection system Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a quarter inch (1/4”=1’0”) scaled drawing. Additional minimum Model requirements include:

4.8.1. Fire Protection System. All relevant fire protection components (i.e., branch piping, sprinkler heads, fittings, drains, pumps, tanks, sensors, control panels) with necessary intelligence to produce accurate plans, elevations, building/wall sections, riser diagrams, and schedules. All fire protection piping shall be modeled.

4.8.2. Fire Alarms. Fire alarm/mass notification devices and detection system shall be indicated with necessary intelligence to produce accurate plans depicting them.

4.9. Civil. The Civil Model may vary in level of detail for individual elements, but at a minimum must include all features that would be included on a one inch (1”=100’) scaled drawing. Additional minimum Model requirements include:

4.9.1. Terrain (DTM). All relevant site conditions and proposed grading, including necessary intelligence to produce accurate Project site topographical plans and cross sections.

4.9.2. Drainage. All existing and new drainage piping, including upgrades thereto, including necessary intelligence to produce accurate plans and profiles for the Project site.

4.9.3. Storm Water and Sanitary Sewers. All existing and new sewer structures and piping, including upgrades thereto, with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles .

4.9.4. Utilities. All necessary new utilities connections from the Project building(s) to the existing or newly-created utilities, and all existing above ground and underground utility conduits, including necessary intelligence to produce accurate plans and site-sections.

4.9.5. Roads and Parking. All necessary roadways, parking lots, and parking structures, including necessary intelligence to produce accurate plans, profiles and cross-sections.

5.0 Section 5 - Ownership and Rights in Data

5.1. Ownership. The Government has ownership of and rights at the date of Closeout Submittal to all CAD files, BIM Model, and Facility Data developed for the Project in accordance with FAR Part 27, clauses incorporated in Section 00 72 00, Contract Clauses and Special Contract Requirement 1.14 GOVERNMENT RE-USE OF DESIGN (Section 00 73 00). The Government may make use of this data following any deliverable.

6.0 Section 6 – Contractor Electives

6.1. Applicable Criteria. If the Contractor elected to include one or more of the following features as an elective in its accepted contract proposal for additional credit, as described in the proposal submission

requirements and evaluation criteria, the requirements of paragraphs 6.2 through 6.5 are as applicable for those elective feature(s) that will be included in the project.

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements on the Whole Building Design Guide website (www.wbdg.org) , including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate records that would otherwise be printed and submitted in compliance with Project operations and maintenance handover requirements.

6.3. Project Scheduling using the Model. In the PxP and during the Initial Design Conference Submittal Demonstration, provide an overview of the use of BIM in the development and support of the Project construction schedule.

6.3.1. Submittal Requirements. During the Stages identified in Paragraphs 3.3 through 3.6, the Contractor shall deliver the construction schedule derived from the Model.

6.3.1.1. Construction Submittals – Over-The-Shoulder Progress Reviews. Periodic quality control meetings or construction progress review meetings shall include quality control reviews on the implementation and use of the Model for Project scheduling.

6.4. Cost Estimating. In the PxP and during the Initial Design Conference Submittal Demonstration, provide an overview of the use of BIM in the development and support of cost estimating, or other costing applications such as comparative cost analysis for proposed changes and estimate validation.

6.4.1. Submittal Requirements. During the Stages identified in Paragraphs 3.3 through 3.6, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project Completion. At Project completion, the Contractor shall provide an Micro Computer Aided Cost Estimating System Generation II (“MII”) Cost Estimate that follows the USACE Cost Engineering Military Work Breakdown System (“WBS”), a modified Uniformat, to at least the sub-systems level and uses quantity information supplied directly from Model output to the maximum extent possible, though other "gap" quantity information will be included by the contractor as necessary for a complete and accurate Cost Estimate. (See Paragraph 6.4.2.2).

6.4.2.1. Sub system level extracted quantities from the Model for use within the Estimate shall be provided according to how detailed line items or tasks should be installed/built so that accurate costs can be developed and/or reflected. When developing a Model, the contractor shall be cognizant of construction sequencing at the beginning stages of Model development, such as recognizing tasks performed on the first floor versus the same task on higher floors that will be more labor intensive and, therefore, need to have a separate quantity and be priced differently. Tasks and their extracted quantities from the Model shall be broken down by their location (proximity in the structure) as well as the complexity of installation.

6.4.2.2. At all design Stages it shall be acknowledged that BIM output will not generate all quantities that are necessary in order to develop a complete and accurate cost estimate of the Project based on the design alone. (An example of this would be plumbing that is less than 1.5" diameter and, therefore, not expected to be modeled due to permitted level of design granularity; this information is commonly referred to as “The Gap”. Quantities addressing “The Gap” and their associated costs shall be included in the final Project actual Cost Estimates as well even though not derived directly from the Model data).

6.5. Other Analyses and Reports. Structural, energy and efficiency, EPACT 2005 & EISA 2007, lighting design, daylighting, electrical power, psychrometric processing, shading, programming, LEED, fire protection, code compliance, Life Cycle Cost, acoustic, plumbing and other analyses that may be generated from the Model or reports summarizing the data compiled from these analyses shall be submitted in the form established by contractor in its accepted PxP.

7.0 Definitions

7.1. The following definitions apply specifically in the context of this attachment only.

7.2. “Model”: An electronic, three-dimensional representation of facility elements with associated intelligent attribute data (“Facility Data”).

7.3. “Facility Data”: The non-graphical information attached to objects in the Model that defines various characteristics of the object. Facility Data can include properties such as parametric values that drive physical sizes, material definitions and characteristics (e.g. wood, metal), manufacturer data, industry standards (e.g. AISC steel properties), and project identification numbers. Facility Data can also define supplementary physical entities that are not shown graphically in the Model, such as insulation around a duct, or hardware on a door.

7.4. “Workspace”: A collection of content libraries and supporting files that define and embody a BIM standard. A workspace includes BIM libraries such as wall types, standard steel shapes, furniture, HVAC fittings, and sprinkler heads. It also contains sheet libraries such as print/plot configurations, font and text style libraries, and sheet borders and title blocks. The USACE has developed Workspaces specific to USACE BIM standards; these workspaces are dependent on specific versions of the BIM applications they serve. All USACE BIM Workspaces can be downloaded from the CAD/BIM Technology Center (https://cadbim.usace.army.mil). In some cases, there is a specific Workspace for a given CoS Facility Standard Design.

7.5. “IFC”: Industry Foundation Class, a standard and file format used for the exchange of BIM data; see www.iai-tech.org. Note: In the context of this attachment, IFC does not mean “Issued For Construction.”

ATTACHMENT G
DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT

Organize electronic design submittal files in a subdirectory/file structure in accordance with the following table. The Contractor may suggest a slightly different structure, subject to the discretion of the government.

Design Submittal Directory and Subdirectory File Arrangement.

Directory	Sub-Directory	Sub-Directory or Files	Files
Submittal/Package Name	Narratives	PDF file or files with updated design narrative for each applicable design discipline	
	Drawings	PDF (subdirectory)	Single PDF file with all applicable drawing sheets - bookmarked by sheet number and name
		BIM (subdirectory) See Attachment F.	BIM project folder (with files) per the USACE Workspace. Include an Excel drawing index file with each drawing sheet listed by sheet #, name and corresponding dgn file name (Final Design & Design Complete only)
	Design Analysis & Calculations	Individual PDF files containing design analysis and calculations for each discipline applicable to the submittal	
		PDF file with Fire Protection and Life Safety Code Review checklist	
	LEED	PDF file with updated Leed Check List	
		PDF file or files with LEED Templates for each point with applicable documentation included in each file.	
		LEED SUBMITTALS	
	Energy Analysis	PDF with baseline energy consumption analysis	
		PDF with actual building energy consumption analysis	
	Specifications	Single PDF file with table of contents and all applicable specifications sections.	
		Submittal Register (Final Design & Design Complete submittal only)	
	Design Quality Control	PDF file or files with DQC checklist(s) and/or statements	
	Building Rendering(s)	PDF file of rendering for each building type included in contract (Final Design & Design Complete).	

ATTACHMENT H
USACE BIM Project Execution Plan (PxP) Template Version 1.0

This template is a tool that is provided to assist in the development of a USACE BIM Project Execution Plan as required per contract. The template provides a standard format for organizations to establish their general means and methods for meeting the scope and deliverable requirements in Attachment F. It was adapted from the buildingSMART alliance™ (bSa) Project "BIM Project Execution Planning" as developed by The Computer Integrated Construction (CIC) Research Group of The Pennsylvania State University. The bSa project is sponsored by The Charles Pankow Foundation, Construction Industry Institute (CII), Penn State Office of Physical Plant (OPP), and The Partnership for Achieving Construction Excellence (PACE). The template can be found at the following link:

https://mrsi.usace.army.mil/rfp/Shared%20Documents/USACE_BIM_PXP_TEMPLATE_V1.0.pdf

Please note: Instructions and examples to assist with the completion of this template are currently in grey. The text can and should be modified to suit the needs of the organization filling out the template. If modified, the format of the text should be changed to match the rest of the document. This can be completed, in most cases, by selecting the normal style in the template styles.

SECTION 01 45 01.10
QUALITY CONTROL SYSTEM (QCS)

1.0 GENERAL

1.1. CORRESPONDENCE AND ELECTRONIC COMMUNICATIONS

1.2. QCS SOFTWARE

1.3. SYSTEM REQUIREMENTS

1.4. RELATED INFORMATION

1.5. CONTRACT DATABASE

1.6. DATABASE MAINTENANCE

1.7. IMPLEMENTATION

1.8. DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

1.9. MONTHLY COORDINATION MEETING

1.10. NOTIFICATION OF NONCOMPLIANCE

1.0 GENERAL

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. The Contractor module, user manuals, updates, and training information can be downloaded from the RMS web site. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

- Administration
- Finances
- Quality Control
- Submittal Monitoring
- Scheduling
- Import/Export of Data
- Request for Information
- Accident Reporting
- Safety Exposure Manhours

1.1. CORRESPONDENCE AND ELECTRONIC COMMUNICATIONS

For ease and speed of communications, both Government and Contractor will exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.2. OTHER FACTORS

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01 32 01.00 10, PROJECT SCHEDULE, Section 01 33 00, SUBMITTAL PROCEDURES, and Section 01 45 04.00 10, CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the contract pricing for the work.

1.3. QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor shall be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.4. SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run QCS:

(a) Hardware

- IBM-compatible PC with 1000 MHz Pentium or higher processor
- 256 MB RAM for workstation / 512+ MB RAM for server
- 1 GB hard drive disk space for sole use by the QCS system
- Compact disk (CD) Reader, 8x speed or higher
- SVGA or higher resolution monitor (1024 x 768, 256 colors)
- Mouse or other pointing devise
- Windows compatible printer (Laser printer must have 4+ MB of RAM)
- Connection to the Internet, minimum 56K BPS

(b) Software

- MS Windows 2000 or higher
- MS Word 2000 or newer
- Latest version of : Netscape Navigator, Microsoft Internet Explorer, or other browser that supports HTML 4.0 or higher
- Electronic mail (E-mail), MAPI compatible
- Virus protection software that is regularly upgraded with all issued manufacturer's updates

1.5. RELATED INFORMATION

1.5.1. QCS USER GUIDE

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.5.2. CONTRACTOR QUALITY CONTROL (CQC) TRAINING

The use of QCS will be discussed with the Contractor's QC System Manager during the mandatory CQC Training class.

1.6. CONTRACT DATABASE

Prior to the pre-construction conference, the Government will provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by using the government's SFTP repository built into QCS import/export function. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.7. DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Data updates to the Government, e.g., daily reports, submittals, RFI's, schedule updates, payment requests, etc. shall be submitted using the government's SFTP repository built into QCS export function. If permitted by the Contracting Officer, email or CD-ROM may be used instead (see Paragraph DATA SUBMISSION VIA CD-ROM). The QCS database typically shall include current data on the following items:

1.7.1. ADMINISTRATION

1.7.1.1. Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver Contractor administrative data in electronic format.

1.7.1.2. Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format.

1.7.1.3. Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main)

office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

All Requests For Information (RFI) shall be exchanged using the Built-in RFI generator and tracker in QCS.

1.7.1.4. Equipment

The Contractor's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.7.1.5. Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.7.2. FINANCES

1.7.2.1. Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the design and construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.7.2.2. Payment Requests

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet prompt payment certification, and payment invoice in QCS. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment request, prompt payment certification, and payment invoice with supporting data by using the government's SFTP repository built into QCS export function. If permitted by the Contracting Officer, E-mail or a CD-ROM may be used. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.7.3. Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01 45 04.00 10, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a QCS update reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.7.3.1. Daily Contractor Quality Control (CQC) Reports

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01 45 04.00 10, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government within 24 hours after the date covered by the report. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.7.3.2. Deficiency Tracking

The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.7.3.3. QC Requirements

The Contractor shall develop and maintain a complete list of QC testing and required structural and life safety special inspections required by the International Code Council (ICC), transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via QCS.

1.7.3.4. Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.7.3.5. Labor and Equipment Hours

The Contractor shall log labor and equipment exposure hours on a daily basis. This data will be rolled up into a monthly exposure report.

1.7.3.6. Accident/Safety Tracking Reporting

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall utilize QCS to advise the Government of any accidents occurring on the jobsite. This supplemental entry is not to be considered as a substitute for completion of mandatory notification and reports, e.g., ENG Form 3394 and OSHA Form 300.

1.7.3.7. Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.7.3.8. Hazard Analysis

The Contractor shall use QCS to develop a hazard analysis for each feature of work included in its CQC Plan. The hazard analysis shall address any hazards, or potential hazards, that may be associated with the work

1.7.4. Submittal Management

The Government will provide the submittal register form, ENG Form 4288, SUBMITTAL REGISTER, in electronic format. The Contractor and Designer of Record (DOR) shall develop and maintain a complete list of all submittals, including completion of all data columns and shall manage all submittals. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update, ENG Form 4288, shall be produced using QCS. QCS and RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.7.5. Schedule

The Contractor shall develop a design and construction schedule consisting of pay activities, in accordance with Section 01 32 01.00 10, PROJECT SCHEDULE, as applicable. This schedule shall be input and maintained in the QCS database either manually or by using the Standard Data Exchange Format (SDEF) (see Section 01 32 01.00 10 PROJECT SCHEDULE). The updated schedule data shall be included with each pay request submitted by the Contractor.

1.7.5.1. Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data from RMS, and schedule data using SDEF.

1.8. IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.9. DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of QCS data is by using the government's SFTP repository built into QCS export function.. Other data should be submitted using E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of CD-ROM for data transfer. Data on CDs shall be exported using the QCS built-in export function. If used, CD-ROMs will be submitted in accordance with the following:

1.9.1. File Medium

The Contractor shall submit required data on CD-ROMs. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.9.2. Disk Or Cd-Rom Labels

The Contractor shall affix a permanent exterior label to each diskette and CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.9.3. File Names

The files will be automatically named by the QCS software. The naming convention established by the QCS software shall not be altered in any way by the Contractor.

1.10. MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions.

The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.11. NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

End of Section 01 45 01.10

SECTION 01 45 04.00 10
CONTRACTOR QUALITY CONTROL

1.0 GENERAL

1.1. REFERENCES

1.2. PAYMENT

2.0 PRODUCTS (NOT APPLICABLE)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

3.2. QUALITY CONTROL PLAN

3.3. COORDINATION MEETING

3.4. QUALITY CONTROL ORGANIZATION

3.5. SUBMITTALS AND DELIVERABLES

3.6. CONTROL

3.7. TESTS

3.8. COMPLETION INSPECTION

3.9. DOCUMENTATION

3.10. NOTIFICATION OF NONCOMPLIANCE

1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Refer to the latest edition, as of the date of the contract solicitation.

- ASTM INTERNATIONAL (ASTM)
- ASTM D 3740 Minimum Requirements for Agencies

  Engaged in the Testing and/or Inspection
  of Soil and Rock as Used in Engineering
  Design and Construction
- ASTM E 329 Agencies Engaged in the Testing

  and/or Inspection of Materials Used in
  Construction
- U.S. ARMY CORPS OF ENGINEERS (USACE)

  ER 1110-1-12 Quality Management

1.2. PAYMENT

There will be no separate payment for providing and maintaining an effective Quality Control program. Include all costs associated therewith in the applicable unit prices or lump-sum prices contained in the Contract Line Item Schedule.

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product, which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. The site project superintendent is responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager at the site, responsible for the overall site activities, including but not limited to quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site. Different contractors have different names for the on-site overall project supervisor. For clarification, the term “site project superintendent” refers to the Contractor’s senior site representative or “on-site manager”, or other similar title, as those terms are used in contract Clause 52.236-7, “Superintendence by the Contractor” and in the Division 00 Section(s) of the solicitation for this contract or task order,.or elsewhere in the contract. It does not refer to a construction superintendent, unless that person is also the Contractor’s permanently assigned senior site representative in charge of all on-site activities.

3.2. QUALITY CONTROL PLAN

Furnish for Government review, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Design and construction may begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. The Government will not permit work outside of the features of work included in an accepted interim plan to begin until acceptance of a CQC Plan or another interim plan containing the additional features of

work to be started. Where the applicable Code issued by the International Code Council calls for an inspection by the Building Official, the Contractor shall include the inspections in the Quality Control Plan and shall perform the inspections. The Designer of Record shall develop a program for any special inspections required by the applicable International Codes and the Contractor shall perform these inspections, using qualified inspectors. Include the special inspection plan in the QC Plan.

3.2.1. Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect/engineers (AE), fabricators, suppliers, and purchasing agents:

3.2.1.1. A description of the quality control organization. Include a chart showing lines of authority and an acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. A CQC System Manager shall report to the project superintendent or someone higher in the contractor's organization.

3.2.1.2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Also include those responsible for performing and documenting the inspections required by the International Codes and the special inspection program developed by the designer of record.

3.2.1.3. A copy of the letter to the CQC System Manager, signed by an authorized official of the firm, which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Furnish copies of these letters.

3.2.1.4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents subcontractors, designers of record, consultants, architect engineers (AE), offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3.2.1.5. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. Use only Government approved Laboratory facilities.

3.2.1.6. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

3.2.1.7. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

3.2.1.8. Reporting procedures, including proposed reporting formats.

3.2.1.9. A list of the definable features of work. A definable feature of work is a task, which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.1.10. A list of all inspections required by the International Codes and the special inspection program required by the code and this contract.

3.2.2. Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the Design Quality Control (DQC) plan:

3.2.2.1. The Contractor's QCP Plan shall provide and maintain a Design Quality Control (DQC) Plan as an effective quality control program which will assure that all services required by this design-build contract are performed and

provided in a manner that meets professional architectural and engineering quality standards. As a minimum, competent, independent reviewers identified in the DQC Plan shall review all documents. Use personnel who were not involved in the design effort to produce the design to perform the independent technical review (ITR). The ITR is intended as a quality control check of the design. Include, at least, but not necessarily limited to, a review of the contract requirements (the accepted contract or task order proposal and amended RFP), the basis of design, design calculations, the design configuration management documentation and check the design documents for errors, omissions, and for coordination and design integration. The ITR team is not required to examine, compare or comment concerning alternate design solutions but should concentrate on ensuring that the design meets the contract requirements. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

3.2.2.2. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit these completed checklists at each design phase as part of the project documentation.

3.2.2.3. A Design Quality Control Manager, who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated, shall implement the DQC Plan This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. Notify the Government, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

3.2.2.4. Develop and maintain effective, acceptable design configuration management (DCM) procedures to control and track all revisions to the design documents after the Interim Design Submission through submission of the As-Built documents. Include the DCM plan as a subset of the DQC Plan. See Section ‘Design After Award’.

3.2.3. Acceptance of Plan

Government acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4. Notification of Changes

After acceptance of the CQC Plan, notify the Government in writing of any proposed change. Proposed changes are subject to Government acceptance.

3.3. COORDINATION MEETING

After the Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor and the Government shall meet and discuss the Contractor's quality control system. Submit the CQC Plan for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. The Government will prepare minutes of the meeting for signature by both parties. . The minutes shall become a part of the contract file. There may be occasions when either party will call for subsequent conferences to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4. QUALITY CONTROL ORGANIZATION

3.4.1. Personnel Requirements

The requirements for the CQC organization are a CQC System Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure contract compliance. The CQC organization shall also include personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. Provide adequate office

space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly furnish complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a BA/BS graduate of an ACCE accredited construction management college program. The CQC system Manager may alternately be an engineering technician with at least 2 years of college and an ICC certification as a Commercial Building Inspector (Residential Building Inspector certification will be required for Military Family Housing projects). In addition, the CQC system manager shall have a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. Assign the CQC System Manager no other duties (except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00). Identify an alternate for the CQC System Manager in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager but the alternate may have other duties in addition to serving in a temporary capacity as the acting QC manager.

3.4.3. CQC Personnel

3.4.3.1. In addition to CQC personnel specified elsewhere in the contract provide specialized CQC personnel to assist the CQC System Manager in accordance with paragraph titled Area Qualifications.

3.4.3.2. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; **are not intended to be full time, but must be physically present at the construction site during work on their areas of responsibility**; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. **One person may cover more than one area, provided that they are qualified to perform QC activities for the designated areas below and provided that they have adequate time to perform their duties:**

3.4.4. Experience Matrix

3.4.4.1. Area Qualifications

3.4.4.1.1. Civil - Graduate Civil Engineer or (BA/BS) graduate in construction management with 4 years experience in the type of work being performed on this project or engineering technician with 5 yrs related experience.

3.4.4.1.2. Mechanical - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Mechanical Inspector with 5 yrs related experience.

3.4.4.1.3. Electrical - Graduate Electrical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Electrical Inspector with 5 yrs related experience.

3.4.4.1.4. Structural - Graduate Structural Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or person with an ICC certification as a Reinforced Concrete Special Inspector and Structural Steel and Bolting Special Inspector (as applicable to the type of construction involved) with 5 yrs related experience.

3.4.4.1.5. Plumbing - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience, or person with an ICC certification as a Commercial Plumbing Inspector with 5 yrs related experience.

3.4.4.1.6. Concrete, Pavements and Soils Materials Technician (present while performing tests) with 2 yrs experience for the appropriate area

3.4.4.1.7. Testing, Adjusting and Balancing Specialist must be a member (TAB) Personnel of AABC or an experienced technician of the firm certified by the NEBB (present while testing, adjusting, balancing).

3.4.4.1.8. Design Quality Control Manager Registered Architect or Professional Engineer (not required on the construction site)

3.4.4.1.9. Registered Fire Protection Engineer with 4 years related experience or engineering technician with 5 yrs related experience (but see requirements for Fire Protection Engineer of Record to witness final testing in Section 01 10 00, paragraph 5.10, Fire Protection).

3.4.4.1.10. QC personnel assigned to the installation of the telecommunication system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification. In lieu of BICSI certification, QC personnel shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. QC personnel shall witness and certify the testing of telecommunications cabling and equipment.

3.4.5. Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered at [Not Supplied - ConstructionReqQC : COURSE_LOCATION]. Inquire of the District or Division sponsoring the course for fees and other expenses involved, if any, for attendance at this course.

3.4.6. Organizational Changes

When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5. SUBMITTALS AND DELIVERABLES

Make submittals as specified in Section 01 33 00 ***SUBMITTAL PROCEDURES***. The CQC organization shall certify that all submittals and deliverables are in compliance with the contract requirements.

3.6. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The CQC organization shall conduct at least three phases of control for each definable feature of the construction work as follows:

3.6.1. Preparatory Phase

Perform this phase prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

3.6.1.1. A review of each paragraph of applicable specifications, reference codes, and standards. Make a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field at the preparatory inspection. Maintain these copies in the field, available for use by Government personnel until final acceptance of the work.

3.6.1.2. A review of the contract drawings.

3.6.1.3. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

3.6.1.4. Review of provisions that have been made to provide required control inspection and testing.

3.6.1.5. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

3.6.1.6. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

3.6.1.7. A review of the appropriate activity hazard analysis to assure safety requirements are met.

3.6.1.8. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

3.6.1.9. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

3.6.1.10. Discussion of the initial control phase.

3.6.1.11. Notify the Government at least 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2. Initial Phase

Accomplish this phase at the beginning of a definable feature of work. Include the following actions:

3.6.2.1. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

3.6.2.2. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

3.6.2.3. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

3.6.2.4. Resolve all differences.

3.6.2.5. Check safety to include compliance with and upgrading of the Accident Prevention plan and activity hazard analysis. Review the activity analysis with each worker.

3.6.2.6. Notify the Government at least 24 hours in advance of beginning the initial phase. The CQC System Manager shall prepare and attach to the daily CQC report separate minutes of this phase. Indicate exact location of initial phase for future reference and comparison with follow-up phases.

3.6.2.7. Repeat the initial phase any time acceptable specified quality standards are not being met.

3.6.3. Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

3.6.4. Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7. TESTS

3.7.1. Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements and project design documents. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory, or establish an approved testing laboratory at the project site. The Contractor may elect to use a laboratory certified and accredited by the Concrete and cement Reference Laboratory (CCRL) or by AASHTO Materials Reference Laboratory (AMRL) for testing procedures that those organizations certify. The Contractor shall perform the following activities and record and provide the following data:

3.7.1.1. Verify that testing procedures comply with contract requirements and project design documents.

3.7.1.2. Verify that facilities and testing equipment are available and comply with testing standards.

3.7.1.3. Check test instrument calibration data against certified standards.

3.7.1.4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

3.7.1.5. Include results of all tests taken, both passing and failing tests, recorded on the CQC report for the date taken. Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2. Testing Laboratories

3.7.2.1. Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2. Capability Recheck

If the selected laboratory fails the capability check, the Government will assess the Contractor a charge of $1,375 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3. Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4. Furnishing or Transportation of Samples for Government Quality Assurance Testing

The Contractor is responsible for costs incidental to the transportation of samples or materials. Deliver samples of materials for test verification and acceptance testing by the Government to the Corps of Engineers Laboratory, f.o.b., at the following address:

- For delivery by mail:

  [Not Supplied - ConstructionReqQC : LAB_NAME]

  [Not Supplied - ConstructionReqQC : LAB_ATTN]

  [Not Supplied - ConstructionReqQC : LAB_MAIL]

  [Not Supplied - ConstructionReqQC : LAB_STATE]
- For other deliveries:

  [Not Supplied - ConstructionReqQC : LAB_NAME_OTHER]

  [Not Supplied - ConstructionReqQC : LAB_ATTN_OTHER]

  [Not Supplied - ConstructionReqQC : LAB_MAIL_OTHER]

  [Not Supplied - ConstructionReqQC : LAB_STATE_OTHER]

The area or resident office will coordinate, exact delivery location, and dates for each specific test.

3.8. COMPLETION INSPECTION

3.8.1. Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. Prepare a punch list of items which do not conform to the approved drawings and specifications and include in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2. Pre-Final Inspection

As soon as practicable after the notification above, the Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. Accomplish these inspections and any deficiency corrections required by this paragraph within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3. Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall attend the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups and major commands may also attend. The Government will formally schedule the final acceptance inspection based upon results of the Pre-Final inspection. Provide notice to the Government at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9. DOCUMENTATION

3.9.1. Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers using government-provided software, QCS (see Section 01 45 01.10). The report includes, as a minimum, the following information:

3.9.1.1. Contractor/subcontractor and their area of responsibility.

3.9.1.2. Operating plant/equipment with hours worked, idle, or down for repair.

3.9.1.3. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

3.9.1.4. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the applicable control phase (Preparatory, Initial, Follow-up). List deficiencies noted, along with corrective action.

3.9.1.5. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

3.9.1.6. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.

3.9.1.7. Offsite surveillance activities, including actions taken.

3.9.1.8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

3.9.1.9. Instructions given/received and conflicts in plans and/or specifications.

3.9.1.10. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identity of the ITR team, the ITR review comments, responses and the record of resolution of the comments.

3.9.2. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, submit one report for every 7 days of no work and on the last day of a no work period. Account for all calendar days throughout the life of the contract. The first report following a day of no work shall be for that day only. The CQC System Manager shall sign and date reports. The report shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. The Contractor may submit these forms electronically, in lieu of hard copy.

3.10. NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

End of Section 01 45 04.00 10

SECTION 01 50 02
TEMPORARY CONSTRUCTION FACILITIES

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.2. AVAILABILITY AND USE OF UTILITY SERVICES

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.4. PROTECTION AND MAINTENANCE OF TRAFFIC

1.5. MAINTENANCE OF CONSTRUCTION SITE

1.0 OVERVIEW

1.1. GENERAL REQUIREMENTS

1.1.1. Site Plan

Prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Also indicate if the use of a supplemental or other staging area is desired.

1.2. AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1. See Section 00 72 00, Contract Clauses and Section 00 73 00, Special Contract Requirements, for Utility Availability requirements.

1.2.2. Sanitation

Provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

1.2.3. Telephone

Make arrangements and pay all costs for desired telephone facilities.

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1. Bulletin Board

Immediately upon beginning of onsite work, provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Display legible copies of the aforementioned data until work is completed. Remove the bulletin board from the site upon completion of the project.

1.3.2. Project and Safety Signs

Erect a project sign and a site safety sign with informational details as provided by the Government at the Post award conference, within 15 days prior to any work activity on project site. Update the safety sign data daily, with light colored metallic or non-metallic numerals. Remove the signs from the site upon completion of the project. Engineer Pamphlet EP 310-1-6a contains the standardized layout and construction details for the signs. It can be found through a GOOGLE Search or try http://www.usace.army.mil/publications/eng-pamphlets/ep310-1-6a/s-16.pdf.

1.4. PROTECTION AND MAINTENANCE OF TRAFFIC

Provide access and temporary relocated roads as necessary to maintain traffic. Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Take measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, as required by the State and local authorities having jurisdiction. Protect the traveling public from damage to person and property.

The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. Investigate the adequacy of existing roads and the allowable load limit on these roads. Repair any damage to roads caused by construction operations.

1.4.1. Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Construct haul roads with suitable grades and widths. Avoid sharp curves, blind corners, and dangerous cross traffic. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Provide adequate lighting to assure full and clear visibility for full width of haul road and work areas during any night work operations. Remove haul roads designated by the Contracting Officer upon completion of the work and restore those areas.

1.4.2. Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.5. MAINTENANCE OF CONSTRUCTION SITE

Mow grass and vegetation located within the boundaries of the construction site for the duration of the project, from NTP to contract completion. Edge or neatly trim grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers from NTP to contract completion.

End of Section 01 50 02

SECTION 01 57 20.00 10
ENVIRONMENTAL PROTECTION

1.0 GENERAL REQUIREMENTS

1.1. SUBCONTRACTORS

1.2. ENVIRONMENTAL PROTECTION PLAN

1.3. PROTECTION FEATURES

1.4. ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

1.5. NOTIFICATION

2.0 PRODUCTS (NOT USED)

3.0 EXECUTION

3.1. LAND RESOURCES

3.2. WATER RESOURCES

3.3. AIR RESOURCES

3.4. CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

3.5. RECYCLING AND WASTE MINIMIZATION

3.6. HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

3.7. BIOLOGICAL RESOURCES

3.8. INTEGRATED PEST MANAGEMENT

3.9. PREVIOUSLY USED EQUIPMENT

3.10. MILITARY MUNITIONS

3.11. TRAINING OF CONTRACTOR PERSONNEL

3.12. POST CONSTRUCTION CLEANUP

1.0 GENERAL REQUIREMENTS

Minimize environmental pollution and damage that may occur as the result of construction operations. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this contract. Comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations

1.1. SUBCONTRACTORS

Ensure compliance with this section by subcontractors.

1.2. ENVIRONMENTAL PROTECTION PLAN

1.2.1. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Define issues of concern within the Environmental Protection Plan as outlined in this section. Address each topic in the plan at a level of detail commensurate with the environmental issue and required construction task(s). Identify and discuss topics or issues which are not identified in this section, but which the Contractor considers necessary, after those items formally identified in this section. Prior to commencing construction activities or delivery of materials to the site, submit the Plan for review and Government approval. The Contractor shall meet with the Government prior to implementation of the Environmental Protection Plan, for the purpose of discussing the implementation of the initial plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. Maintain and keep the Environmental Protection Plan current onsite.

1.2.2. Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.2.3. Contents

The plan shall include, but shall not be limited to, the following:

1.2.3.1. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.

1.2.3.2. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable

1.2.3.3. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel

1.2.3.4. Description of the Contractor's environmental protection personnel training program

1.2.3.5. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. Include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.

1.2.3.6. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site

1.2.3.7. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

1.2.3.8. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

1.2.3.9. Drawing showing the location of on-installation borrow areas.

1.2.3.10. A spill control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The spill control plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

(a) The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Government and the local Fire Department in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

(b) The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup

(c) Training requirements for Contractor's personnel and methods of accomplishing the training

(d) A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

(e) The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency

(f) The methods and procedures to be used for expeditious contaminant cleanup

1.2.3.11. A solid waste management plan identifying waste minimization, collection, and disposals methods, waste streams (type and quantity), and locations for solid waste diversion/disposal including clearing debris and C&D waste that is diverted (salvaged, reused, or recycled). Detail the contractor's actions to comply with, and to participate in, Federal, state, regional, local government, and installation sponsored recycling programs to reduce the volume of solid waste at the source. Identify any subcontractors responsible for the transportation, salvage and disposal of solid waste. Submit licenses or permits for solid waste disposal sites that are not a commercial operating facility. Attach evidence of the facility's ability to accept the solid waste to this plan. A construction and demolition waste management plan, similar to the plan specified in the UFGS 01 74 19 (formerly 01572) may be used as the non-hazardous solid waste management plan. Provide a Non-Hazardous Solid Waste Diversion Report. Submit the report on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and each quarter thereafter (e.g. the first working day of January, April, July, and October) until the end of the project. Additionally, a summary report, with all data fields, is required at the end of the project. The report shall indicate the total type and amount of waste generated, total type and amount of waste diverted, type and amount of waste sent to waste-to-energy facility and alternative daily cover, in tons along with the percent that was diverted. Maintain, track and report construction and demolition waste data in a manner such that the installation can enter the data into the Army SWAR database, which separates data by type of material. A cumulative report in LEED Letter Template format may be used but must be modified to include the date disposed of/diverted and include the above stated diversion data. NOTE: The Solid Waste Diversion Reports are separate documentation than the LEED documentation.

1.2.3.12. DELETED.

1.2.3.13. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

1.2.3.14. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of

these materials. In accordance with EM 385-1-1, include a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time in the contaminant prevention plan. Update the plan as new hazardous materials are brought on site or removed from the site. Reference this plan in the storm water pollution prevention plan, as applicable.

1.2.3.15. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented and any required permits. If surface discharge will be the method of disposal, include a copy of the permit and associated documents as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, include documentation that the waste water treatment plant Operator has approved the flow rate, volume, and type of discharge.

1.2.3.16. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. Include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Government.

1.2.3.17. A pesticide treatment plan, updated, as information becomes available. Include: sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. The Contractor is responsible for Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation specific requirements. Follow AR 200-1, Chapter 5, Pest Management, Section 5-4, “Program Requirements” for data required to be reported to the Installation.

1.3. PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS. Prior to start of any onsite construction activities, the Contractor and the Government shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. Both the Contractor and the Government will sign this survey, upon mutual agreement as to its accuracy and completeness. The Contractor develop a plan that depicts how it will protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.4. ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Government and may require an extended review, processing, and approval time. The Government reserves the right to disapprove alternate methods, even if they are more cost effective, if the Government determines that the proposed alternate method will have an adverse environmental impact.

1.5. NOTIFICATION

The Government will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Government of the proposed corrective action and take such action when approved by the Government. The Government may issue an order stopping all or part of the

work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Government may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

2.0 PRODUCTS (NOT USED)

3.0 EXECUTION

3.1. LAND RESOURCES

Confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. Do not attach or fasten any ropes, cables, or guys to any trees for anchorage unless specifically authorized. Provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Remove all stone, soil, or other materials displaced into uncleared areas..

3.1.1. Work Area Limits

Prior to commencing construction activities, mark the areas that need not be disturbed under this contract. Mark or fence isolated areas within the general work area which are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. Personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.1.2. Landscape

Clearly identify trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved by marking, fencing, or wrapping with boards, or any other approved techniques. Restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.1.3. Erosion and Sediment Controls

Provide erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. Coordinate with approving authorities (federal, state, etc.) for specific requirements to be included in the plan. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. Keep the area of bare soil exposed at any one time by construction operations to a minimum necessary. Construct or install temporary and permanent erosion and sediment control best management practices (BMPs). BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. Remove any temporary measures after the area has been stabilized.

3.1.4. Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Government. Make only approved temporary movement or relocation of Contractor facilities. Provide erosion and sediment controls for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant and/or work areas to protect adjacent areas.

3.2. WATER RESOURCES

Monitor construction activities to prevent pollution of surface and ground waters. Do not apply toxic or hazardous chemicals to soil or vegetation unless otherwise indicated. Monitor all water areas affected by construction activities. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by state or federally issued Clean Water Act permits.

3.2.1. Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State, and local governments or impede state-designated flows.

3.2.2. Wetlands

Do not enter, disturb, destroy, or allow discharge of contaminants into any wetlands.

3.3. AIR RESOURCES

Comply with all Federal and State air emission and performance laws and standards for equipment operation, activities, or processes.

3.3.1. Particulates

Control dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants, including weekends, holidays and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods are permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with all State and local visibility regulations.

3.3.2. Odors

Control odors from construction activities at all times. Odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.3.3. Sound Intrusions

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the state and Installation rules.

3.3.4. Burning

Burning is not allowed on the project site unless specified in other sections of the specifications or by written authorization. Specific times, locations, and manners of burning shall be subject to approval.

3.4. CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.4.1. Solid Wastes

Place solid wastes (excluding clearing debris) in containers which are emptied on a regular schedule. Conduct handling, storage, and disposal to prevent contamination. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with solid waste. Transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. The minimum acceptable off-site solid waste disposal option is a Subtitle D RCRA permitted landfill. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.4.2. Chemicals and Chemical Wastes

Dispense chemicals, ensuring no spillage to the ground or water. Perform and document periodic inspections of dispensing areas to identify leakage and initiate corrective action. The Government may periodically review this documentation. Collect chemical waste in corrosion resistant, compatible containers. Monitor and remove collection drums to a staging or storage area when contents are within 6 inches of the top. Classify, manage, store, and dispose of wastes in accordance with Federal, State, and local laws and regulations.

3.4.3. Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable state and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. At a minimum, manage and store hazardous waste in compliance with 40 CFR 262. Take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. Segregate hazardous waste from other materials and wastes; protect it from the weather by placing it in a safe covered location and take precautionary measures, such as berming or other appropriate measures, against accidental spillage. Store, describe, package, label, mark, and placard hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, state, and local laws and regulations. Transport Contractor generated hazardous waste off Government property in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. Dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Immediately report spills of hazardous or toxic materials to the Government and the Facility Environmental Office. Contractor will be responsible for cleanup and cleanup costs due to spills. Contractor is responsible for the disposition of Contractor generated hazardous waste and excess hazardous materials.

3.4.4. Fuel and Lubricants

Conduct storage, fueling and lubrication of equipment and motor vehicles in a manner that affords the maximum protection against spill and evaporation. Manage and store fuel, lubricants and oil in accordance with all Federal, State, Regional, and local laws and regulations.

3.5. RECYCLING AND WASTE MINIMIZATION

Participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project. Line and berm fueling areas and establish storm water control structures at discharge points for site run-off. Keep a liquid containment clean-up kit available at the fueling area.

3.6. HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area are shown on the drawings. Protect and preserve these resources during the life of the Contract. Temporarily suspend all activities that may damage or alter such resources, if any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found during excavation or other construction activities. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, notify the Government so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.7. BIOLOGICAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitat. Protect threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.8. INTEGRATED PEST MANAGEMENT

Coordinate, through the Government, with the Installation Pest Management Coordinator (IPMC) at the earliest possible time prior to pesticide application, in order to minimize impacts to existing fauna and flora. Discuss

integrated pest management strategies with the IPMC and receive concurrence from the IPMC, through the COR, prior to the application of any pesticide associated with these specifications. Give IMPC personnel the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide. The use and management of pesticides are regulated under 40 CFR 152 - 186.

3.8.1. Pesticide Delivery and Storage

Deliver pesticides, approved for use on the Installation, to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

3.8.2. Qualifications

Use the services of a subcontractor for pesticide application whose principal business is pest control. The subcontractor shall be licensed and certified in the state where the work is to be performed.

3.8.3. Pesticide Handling Requirements

Formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions.

3.8.4. Application

A state certified pesticide applicator shall apply pesticides in accordance with EPA label restrictions and recommendations.

3.9. PREVIOUSLY USED EQUIPMENT

Clean all previously used construction equipment prior to bringing it onto the project site. Ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the USDA jurisdictional office for additional cleaning requirements.

3.10. MILITARY MUNITIONS

Immediately stop work in that area and immediately inform the Government, in the event military munitions, as defined in 40 CFR 260, are discovered or uncovered.

3.11. TRAINING OF CONTRACTOR PERSONNEL

Train personnel in all phases of environmental protection and pollution control. Conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Conduct additional meetings for new personnel and when site conditions change. The training and meeting agenda shall include methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.12. POST CONSTRUCTION CLEANUP

Clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". Unless otherwise instructed in writing , obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. Grade, fill and seed the entire disturbed area, unless otherwise indicated.

SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL
04/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 4439	(2004) Geosynthetics
ASTM D 4491	(1999a; R 2009) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2004; R 2009) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 832-R-92-005	(1992) Storm Water Management for Construction Activities Developing Pollution Preventions and Plans and Best Management Practices

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)

1.2 SYSTEM DESCRIPTION

The work consists of implementing the storm water pollution prevention measures to prevent sediment from entering streams or water bodies as specified in this Section in conformance with the requirements of Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

1.3 EROSION AND SEDIMENT CONTROLS

The controls and measures required of the Contractor are described below.

1.3.1 Stabilization Practices

The stabilization practices to be implemented include temporary seeding, mulching, sod stabilization, erosion control matts, protection of trees, preservation of mature vegetation, etc. On the daily CQC Report, record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, initiate stabilization practices as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

1.3.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases or is precluded by unsuitable conditions caused by the weather, initiate stabilization practices as soon as practicable after conditions become suitable.

1.3.1.2 Burnoff

Burnoff of the ground cover is not permitted.

1.3.1.3 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified, and protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

1.3.2 Erosion, Sediment and Stormwater Control

a. Submit a Storm Water Notice of Intent for NPDES coverage under the general permit for construction activities and a Storm Water Pollution Prevention Plan (SWPPP) for the project to the Contracting Officer prior to the commencement of work. The SWPPP shall meet the requirements of the [EPA][State of [_____]] general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate [Federal][State] agency for approval, a minimum of 14 calendar days prior to the start of any land disturbing activities. Maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, to reflect current site conditions. Include within the SWPPP:

(1) Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.

(2) Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.

(3) Ensure compliance with terms of the [EPA][State of [_____]] general permit for storm water discharge.

(4) Select applicable best management practices from EPA 832-R-92-005.

(5) Include a completed copy of the Registration Statement, BMP Inspection Report Template and Notice of Termination except for the effective date.

[(6) Storm Water Pollution Prevention Measures and Notice of Intent 40 CFR 122.26, EPA 832-R-92-005. Provide a "Storm Water Pollution Prevention Plan" (SWPPP) for the project. The SWPPP will meet the requirements of the [EPA][State of [_____]] general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate [Federal][State] agency for approval, a minimum of 14 calendar days prior to the start of construction. A copy of the approved SWPPP will be kept at the construction on-site office, and continually updated as regulations require to reflect current site conditions.]

1.3.3 Structural Practices

Implement structural practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement structural practices in a timely manner, during the construction process, to minimize erosion and sediment runoff. Include the following devices; Location and details of installation and construction are shown on the drawings.

1.3.3.1 Silt Fences

Provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Properly install silt fences to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Install silt fences in the locations indicated on the drawings. Obtain approval from the Contracting Officer prior to final removal of silt fence barriers.

1.3.4 Sediment Basins

Trap sediment in temporary sediment basins. Select a basin size to accommodate the runoff of a local 10-year storm. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs. Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare BMP Inspection Reports as required by the general permit. If required by the permit, include those inspection reports.

1.3.5 Vegetation and Mulch

a. Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

b. Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish a suitable stand of grass. The seeding operation will be as specified in Section 32 92 19 SEEDING.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Storm Water Inspection Reports for General Permit

1.5 DELIVERY, STORAGE, AND HANDLING

Identify, store and handle filter fabric in accordance with ASTM D 4873.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

Provide geotextile that complies with the requirements of ASTM D 4439, and consists of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and contains stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. Provide synthetic filter fabric that contains ultraviolet ray inhibitors and stabilizers to assure a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile	ASTM D 4632	100 lbs. min.
Elongation (percent)		30 percent max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Stakes and Posts

Use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 by 2 inches when oak is used and 4 by 4 inches when pine is used, and have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum

weight of 1.33 pounds/linear foot and a minimum length of 5 feet.

2.1.3 Mill Certificate or Affidavit

Provide a mill certificate or affidavit attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. Specify in the mill certificate or affidavit the actual Minimum Average Roll Values and identify the fabric supplied by roll identification numbers. Submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. Provide bales with a standard cross section of 14 by 18 inches. Wire-bound or string-tie all bales. Use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 by 2 inches in cross section and have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 3 feet.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Extend silt fences a minimum of 16 inches above the ground surface without exceeding 34 inches above the ground surface. Provide filter fabric from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, splice together filter fabric at a support post, with a minimum 6 inch overlap, and securely sealed. Excavate trench approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4 by 4 inch trench shall be backfilled and the soil compacted over the filter fabric. Remove silt fences upon approval by the Contracting Officer.

3.2 INSTALLATION OF STRAW BALES

Place the straw bales in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Install straw bales so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. Entrench and backfill the barrier. Excavate a trench the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), backfill the excavated soil against the barrier. Conform the backfill soil with the ground level on the downhill side and build up to 4 inches against the uphill side of the barrier. Scatter loose straw over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Securely anchor each bale by at least two stakes driven through the bale. Drive the first stake or steel post in each bale toward the previously laid bale to force the bales together. Drive stakes or steel pickets a minimum 18 inches deep into the ground to securely anchor the bales.

3.3 FIELD QUALITY CONTROL

Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

3.3.1 Silt Fence Maintenance

Inspect the silt fences in accordance with paragraph, titled "Inspections," of this section. Any required repairs shall be made promptly. Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, replace the fabric promptly. Remove sediment deposits when deposits reach one-third of the height of the barrier. Remove a silt fence when it is no longer required. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall [receive erosion control] [be seeded in accordance with Section 32 05 33 LANDSCAPE ESTABLISHMENT, except that the coverage requirements in paragraph, titled "Establishment" of this section do not apply].

3.3.2 Straw Bale Maintenance

Inspect straw bale barriers in accordance with paragraph, titled "Inspections". Pay close attention to the repair of damaged bales, end runs and undercutting beneath bales. Accomplish necessary repairs to barriers or replacement of bales in a promptly manner. Remove sediment deposits when deposits reach one-half of the height of the barrier. At the each end of each row turn bales uphill when used to retain sediment. Remove a straw bale barrier when it is no longer required. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. Seed the areas disturbed by this shaping in accordance with Section 32 92 19 SEEDING.

3.3.3 Diversion Dike Maintenance

Inspect diversion dikes in accordance with paragraph, titled "Inspections," of this section. Pay close attention to the repair of damaged diversion dikes and accomplish necessary repairs promptly. When diversion dikes are no longer required, shape to an acceptable grade. Seed the areas disturbed by this shaping in accordance with Section 32 92 19 SEEDING.

3.4 INSPECTIONS

3.4.1 General

Inspect disturbed areas of the construction site, areas that have not been finally stabilized used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Conduct inspections at least once every month where sites have been finally stabilized.

3.4.2 Inspections Details

Inspect disturbed areas and areas used for material storage that are exposed to precipitation for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan to ensure that they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

3.4.3 Inspection Reports

For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. Furnish the report to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

3.4.4 [Monthly Inspection Report and Certification Form

Complete, sign, and submit the original form, on the first working day of each month, to the State of [_____], [Office of Pollution Control (OPC)] at the following address:

Chief, [_____]

[_____]

[_____]

[_____]

A copy of the State of [_____]'s [Monthly Inspection Report and Certification Form for Erosion and Sediment Controls] is attached to the end of this section. Also furnish, on the first working day of each month, one copy of the form submitted to the [OPC] to the Contracting Officer as part of the Contractor's daily CQC Report and attach a copy of the completed form to the Plan. Unless otherwise notified by the [OPC], submit the [Monthly Inspection Report and Certification Forms] for an additional two months after the final completion of all storm water pollution prevention measures required in this contract have been implemented.]

-- End of Section --

SECTION 01 62 35
RECYCLED/RECOVERED MATERIAL

1.0 GENERAL

1.1. REFERENCES

1.2. OBJECTIVES

1.3. EPA DESIGNATED ITEMS INCORPORATED IN THE WORK

1.4. EPA PROPOSED ITEMS INCORPORATED IN THE WORK

1.5. EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

1.0 GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

- U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
- 40 CFR 247 Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2. OBJECTIVES

Government procurement policy is to acquire, in a cost effective manner, items containing the highest percentage of recycled and recovered materials practicable consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements or exposing suppliers' employees to undue hazards from the recovered materials. The Environmental Protection Agency (EPA) has designated certain items which must contain a specified percent range of recovered or recycled materials. The Contractor shall make all reasonable efforts to use recycled and recovered materials in providing the EPA designated products and in otherwise utilizing recycled and recovered materials in the execution of the work.

1.3. EPA DESIGNATED ITEMS INCORPORATED IN THE WORK

Materials that have been designated by EPA as being products which are or can be made with recovered or recycled materials, when incorporated into the work under this contract, shall contain at least the minimum percentage of recycled or recovered materials indicated by EPA unless adequate justification (non-availability) for non-use is provided. When a designated item is specified as an option to a non-designated item, the designated item requirements apply only if the designated item is used in the work.

1.4. EPA PROPOSED ITEMS INCORPORATED IN THE WORK

Products other than those designated by EPA are still being researched and are being considered for future Comprehensive Procurement Guideline (CPG) designation. It is recommended that these items, when incorporated in the work under this contract, contain the highest practicable percentage of recycled or recovered materials, provided specified requirements are also met.

1.5. EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be use by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. It is recommended that these non-construction products, when used in the conduct of the work, contain the highest practicable percentage of recycled or recovered materials and that these products be recycled when no longer needed.

End of Section 01 62 35

SECTION 01 78 02.00 10
CLOSEOUT SUBMITTALS

1.0 OVERVIEW

1.1. SUBMITTALS

1.2. PROJECT RECORD DOCUMENTS

1.3. EQUIPMENT DATA

1.4. CONSTRUCTION WARRANTY MANAGEMENT

1.5. MECHANICAL TESTING, ADJUSTING, BALANCING, AND COMMISSIONING

1.6. OPERATION AND MAINTENANCE MANUALS

1.7. FIELD TRAINING

1.8. PRICING OF CONTRACTOR-FURNISHED AND INSTALLED PROPERTY AND GOVERNMENT-FURNISHED CONTRACTOR-INSTALLED PROPERTY

1.9. LEED REVIEW MEETINGS

1.10. RED ZONE MEETING

1.11. FINAL CLEANING

1.12. INTERIM FORM DD1354 "TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

EXHIBIT 1 SAMPLE RED ZONE MEETING CHECKLIST

1.0 OVERVIEW

1.1. SUBMITTALS

Government approval is required for any submittals with a "G" designation; submittals not having a "G" designation are for Designer of Record approval or for information only. Submit the following in accordance with Section 01 33 00 submittals***:***

SD-02 Shop Drawings

– As-Built Drawings - G

▪ Drawings showing final as-built conditions of the project. Provide electronic drawing files as specified in Section 01 33 16, 3 sets of blue-line prints and one set of the approved working as-built drawings.

SD-03 Product Data

– As-Built Record of Equipment and Materials

▪ Two copies of the record listing the as-built materials and equipment incorporated into the construction of the project.

– Construction Warranty Management Plan

▪ Three sets of the construction warranty management plan containing information relevant to the warranty of materials and equipment incorporated into the construction project, including the starting date of warranty of construction. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

– Warranty Tags

▪ Two record copies of the warranty tags showing the layout and design.

– Final Cleaning

▪ Two copies of the listing of completed final clean-up items.

1.2. PROJECT RECORD DOCUMENTS

1.2.1. As-Built Drawings – G

An as-built drawing is a construction drawing revised to reflect the final as-built conditions of the project as a result of modifications and corrections to the project design required during construction. The final as-built drawings shall not have the appearance of marked up drawings, but that of professionally prepared drawings as if they were the "as designed" drawings.

1.2.2. Maintenance of As-Built Drawings

1.2.2.1. The Configuration Management Plan shall describe how the Contractor will maintain up-to-date drawings, how it will control and designate revisions to the drawings and specifications (In accordance with Special Contract Requirement: ***Deviating from the Accepted Design*** and Section 01 33 16: ***Design after Award***, the Designer of Record's approval is necessary for any revisions to the accepted design).

1.2.2.2. Make timely updates, carefully maintaining a record set of working as-built drawings at the job site, marked in red, of all changes and corrections from the construction drawings. Enter changes and corrections on drawings promptly to reflect "Current Construction". Perform this update no less frequently than weekly for the blue line drawings and update no less frequently than quarterly for the CADD/CAD and BIM files, which were prepared previously in accordance with Section 01 33 16. Include a confirmation that the as-builts are up to date with the submission of the monthly project schedule.

1.2.2.3. If the DB Contractor fails to maintain the as-built drawings as required herein, the Government will retain from the monthly progress payment, an amount representing the estimated monthly cost of maintaining the as-built drawings. Final payment with respect to separately priced facilities or the contract as a whole will be withheld until the Contractor submits acceptable as-built drawings and the Government approves them.

1.2.2.4. The marked-up set of drawings shall reflect any changes, alterations, adjustments or modifications. Changes must be reflected on all sheets affected by the change. Changes shall include marking the drawings to reflect structural details, foundation layouts, equipment sizes, and other extensions of design.

1.2.2.5. Typically, room numbers shown on the drawings are selected for design convenience and do not represent the actual numbers intended for use by the end user. Final as-built drawings shall reflect actual room numbers adopted by the end user.

1.2.2.6. If there is no separate contract line item (CLIN) for as-built drawings, the Government will withhold the amount of $35,000, or 1% of the present construction value, whichever is the greater, until the final as-built drawing submittal has been approved by the Government.

1.2.3. Underground Utilities

The drawings shall indicate, in addition to all changes and corrections, the actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Locate Valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Record average elevation of the top of each run or underground structure..

1.2.4. Partial Occupancy

For projects where portions of construction are to be occupied or activated before overall project completion, including portions of utility systems, supply as-built drawings for those portions of the facility being occupied or activated at the time the facility is occupied or activated. Show this same as-built information previously furnished on the final set of as-built drawings.

1.2.5. As-Built Conditions That are Different From the construction Drawings

Accurately reflect all as-built conditions that are different, such as dimensions, road alignments and grades, and drainage and elevations, from the construction drawings on each drawing. If the as-built condition is accurately reflected on a shop drawing, then furnish that shop drawing in CADD format. Reference the final as-built construction drawing the shop drawing file that includes the as-built information. In turn, the shop drawing shall reference the applicable construction as-built drawing. Delete any options shown on drawings and not selected clearly reflect options selected on final as-built drawings.

1.2.6. Additional As-Built Information that Exceeds the Detail Shown on the construction Drawings:

These as-built conditions include those that reflect structural details, foundation layouts, equipment, sizes, mechanical and electrical room layouts and other extensions of design, that were not shown in the project design documents because the exact details were not known until after the time of approved shop drawings. It is recognized that these shop drawing submittals (revised showing as-built conditions) will serve as the as-built record without actual incorporation into the construction drawings, piping, and equipment drawings. Include locations of all explorations, logs of all explorations, and results of all laboratory testing, including those provided by the Government. Furnish all such shop drawings in CADD /CADformat. Include fire protection details, such as wiring, performed for the design of the project.

1.2.7. Final As-Built Drawings

Submit final as-built CADD/CAD and BIM Model(s) and Facility Data files at the time of Beneficial Occupancy of the project or at a designated phase of the project. In the event the Contractor accomplishes additional work after this submittal, which changes the as-built conditions, submit a new DVD with all drawing sheets and three blue-line copies of affected sheets which depict additional changes.

1.2.8. Title Blocks

In accordance with the configuration management plan, clearly mark title blocks to indicate final as-built drawings.

1.2.9. Other As-Built Documents

Provide scans of all other documents such as design analysis, catalog cuts, certification documents that are not available in native electronic format in an organized manner in Adobe.pdf format.

1.2.9.1. LEED Documentation

Update LEED documentation on at least a monthly basis and have it available for review by the Government on the jobsite at all times during construction. Submit the final LEED Project Checklist(s), final LEED submittals checklist and complete project documentation, verifying the final LEED score and establishing the final rating. Provide full support to the validation review process, including credit audits. See also the LEED documentation requirements in Section 01 33 16, DESIGN AFTER AWARD.

1.2.9.2. GIS Documentation

Provide final geo-referenced GIS database of the new building footprint along with any changes made to exterior of the building. The intent of capturing the final building footprint and exterior modifications in a GIS database is to provide the installation with a data set of the comprehensive changes made to the landscape as a result of the construction project. The Government will incorporate this data set into the installations existing GIS MasterPlan or Enterprise GIS system. The GIS database deliverable shall follow a standard template provided to the Contractor by the Government, adhere to detailed specifications outlined in ECB No 2006-15, and be documented using the Federal Geographic Data Committee (FGDC) metadata standard.

1.3. EQUIPMENT DATA

1.3.1. Real Property Equipment

Provide an Equipment-in-Place list of all installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. Include the cost of each piece of installed property F.O.B. construction site. For each of the items which is specified herein to be guaranteed for a specified period from the date of acceptance thereof, provide the following information: The name, serial and model number address of equipment supplier, or manufacturer originating the guaranteed item. The Contractor's guarantee to the Government of these items will not be limited by the terms of any manufacturer's guarantee to the Contractor. Furnish the list as one (1) reproducible and three (3) copies thirty (30) calendar days before completion of any segment of the contract work which has an incremental completion date.

1.3.2. Maintenance and Parts Data

Furnish a brochure, catalog cut, parts list, manufacturer's data sheet or other publication showing detailed parts data on all other equipment subject to repair and maintenance procedures not otherwise required in Operations and Maintenance Manuals specified elsewhere in this contract. Distribution of directives shall follow the same requirements as listed in paragraph above.

1.3.3. Construction Specifications

Furnish permanent electronic files of final as-built construction specifications, including modifications thereto, with the as-built drawings.

1.4. CONSTRUCTION WARRANTY MANAGEMENT

1.4.1. Prior to the end of the one year warranty, the Government may conduct an infrared roof survey on any project involving a membrane roofing system. This survey will be conducted in accordance with ASTM C1153-90, "Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging". The Contractor shall replace all damaged materials and locate and repair sources of moisture penetration.

1.4.2. Management

1.4.2.1. Warranty Management Plan

Develop a warranty management plan containing information relevant to the clause ***Warranty of Construction*** in FAR 52.246-21. Submit the warranty management plan for Government approval at least 30 days before the planned pre-warranty conference. In the event of phased turn-over of the contract, update the Warranty Management Plan as necessary to include latest information required. Include all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Submit warranty information made available during the construction phase prior to each monthly pay estimate. Assemble information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. The Contractor, Government, including the Customer Representative shall jointly conduct warranty inspections, 4 months and 9 months, after acceptance. The warranty management plan shall include, but shall not be limited to, the following information:

(1) Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the contractors, subcontractors, manufacturers or suppliers involved.

(2) Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

(3) A list for each warranted equipment, item, feature of construction or system indicating:

(i) Name of item.

(ii) Model and serial numbers.

(iii) Location where installed.

(iv) Name and phone numbers of manufacturers or suppliers.

(v) Names, addresses and telephone numbers of sources of spare parts.

(vi) Warranties and terms of warranty. Include one-year overall warranty of construction. Indicate those items, which have extended warranties with separate warranty expiration dates.

(vii) Cross-reference to warranty certificates as applicable.

(viii) Starting point and duration of warranty period.

(ix) Summary of maintenance procedures required to continue the warranty in force.

(x) Cross-reference to specific pertinent Operation and Maintenance manuals.

(xi) Organization, names and phone numbers of persons to call for warranty service.

(xii) Typical response time and repair time expected for various warranted equipment.

(4) The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

(5) Procedure and status of tagging of all equipment covered by extended warranties.

(6) Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.4.3. Performance Bond

1.4.3.1. The Contractor's Performance Bond will remain effective throughout the construction warranty period.

1.4.3.2. In the event the Contractor or his designated representative(s) fails to commence and diligently pursue any work required under this clause, and in a manner pursuant to the requirements thereof, the Government shall have

a right to demand that said work be performed under the Performance Bond by making written notice on the surety. If the surety fails or refuses to perform the obligation it assumed under the Performance Bond, the Government shall have the work performed by others, and after completion of the work, may make demand for reimbursement of any or all expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

1.4.3.3. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Government will have the right to recoup expenses from the bonding company.

1.4.3.4. Following oral or written notification of required warranty repair work, the Contractor will respond as dictated by para. 1.4.5. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Government to proceed against the Contractor as outlined in the paragraph 1.4.5.5 and/or above.

1.4.4. Pre-Warranty Conference

Prior to contract completion, or completion of any phase or portion of contract to be turned over, and at a time designated by the Contracting Officer, the Contractor shall meet with the Government to develop a mutual understanding with respect to the requirements of this clause. Communication procedures for Contractor notification of warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Government for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor will furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warrantied construction, will be continuously available, and will be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of his responsibilities in connection with other portions of this provision.

1.4.5. Contractor's Response to Warranty Service Requirements.

Following Government oral or written notification, which may include authorized installation maintenance personnel, the Contractor shall respond to warranty service requirements in accordance with the "Warranty Service Priority List" and the three categories of priorities listed below. Submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframe specified, the Government will perform the work and backcharge the construction warranty payment item established.

1.4.5.1. First Priority Code 1 Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

1.4.5.2. Second Priority Code 2 Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

1.4.5.3. Third Priority Code 3 All other work to be initiated within 3 work days and work continuously to completion or relief.

1.4.5.4. The "Warranty Service Priority List" is as follows:

- Code 1 - Air Conditioning System

(a) Buildings with computer equipment.

(b) Barracks, mess halls (entire building down).

- Code 2 - Air Conditioning Systems

(a) Recreational support.

(b) Air conditioning leak in part of building, if causing damage.

(c) Air conditioning system not cooling properly

(d) Admin buildings with Automated Data Processing (ADP) equipment not on priority list.

- Code 1 - Doors

(a) Overhead doors not operational.

- Code 1 - Electrical

(a) Power failure (entire area or any building operational after 1600 hours).

(b) Traffic control devices.

(c) Security lights.

(d) Smoke detectors and fire alarm systems

(e) Power or lighting failure to an area, facility, portion of a facility, which may adversely impact health, safety, security, or the installation's mission requirement, or which may result in damage to property.

- Code 2 - Electrical

(a) Power failure (no power) for unoccupied buildings or portions thereof or branch circuits within occupied buildings, not listed as Code 1.

(a) Receptacle and lights, not listed as code 1.

- Code 3 - Electrical

(a) Street, parking area lights

- Code 1 - Gas

(a) Leaks and breaks.

(b) No gas to cantonment area.

- Code 1 - Heat

(a) Area power failure affecting heat.

(b) Heater in unit not working.

- Code 2 Heat

(a) All heating system failures not listed as Code 1.

- Code 3 - Interior

(a) Floor damage

(b) Paint chipping or peeling

- Code 1 - Intrusion Detection Systems - N/A.
- Code 2 - Intrusion Detection Systems other than those listed under Code 1
- Code 1 - Kitchen Equipment

(a) Dishwasher.

(b) All other equipment hampering preparation of a meal.

- Code 2 - Kitchen Equipment

(a) All other equipment not listed under Code 1.

- Code 2 - Plumbing

(a) Flush valves not operating properly

(b) Fixture drain, supply line commode, or water pipe leaking.

(c) Commode leaking at base.

- Code 3 - Plumbing

(a) Leaking faucets

- Code 1 - Refrigeration

(a) Mess Hall.

(b) Medical storage.

- Code 2 - Refrigeration

(a) Mess hall - other than walk-in refrigerators and freezers.

- Code 1 - Roof Leaks

(a) Temporary repairs will be made where major damage to property is occurring.

- Code 2 - Roof Leaks

(a) Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

- Code 1 - Sprinkler System

(a) All sprinkler systems, valves, manholes, deluge systems, and air systems to sprinklers.

- Code 1 - Tank Wash Racks (Bird Baths)

(a) All systems which prevent tank wash.

- Code 1 - Water (Exterior)

(a) Normal operation of water pump station.

- Code 2 - Water (Exterior)

(a) No water to facility.

- Code 1 - Water, Hot (and Steam)

(a) Barracks (entire building).

- Code 2 - Water, Hot

(a) No hot water in portion of building listed under Code 1

1.4.5.5. Should parts be required to complete the work and the parts are not immediately available, the Contractor shall have a maximum of 12 hours after arrival at the job site to provide the Government, with firm written proposals for emergency alternatives and temporary repairs for Government participation with the Contractor to provide emergency relief until the required parts are available on site for the Contractor to perform permanent warranty repair. The Contractors proposals shall include a firm date and time that the required parts shall be available on site to complete the permanent warranty repair. The Government will evaluate the proposed alternatives and negotiate the alternative considered to be in the best interest of the Government to reduce the impact of the emergency condition. Alternatives considered by the Government will include the alternative for the Contractor to "Do Nothing" while waiting until the required parts are available to perform permanent warranty repair. Negotiating a proposal which will require Government participation and the expenditure of Government funds shall constitute a separate procurement action by the using service.

1.4.6. Equipment Warranty Identification Tags

1.4.6.1. Provide warranty identification tags at the time of installation and prior to substantial completion shall provide warranty identification tags on all Contractor and Government furnished equipment which the Contractor has installed.

(a) The tags shall be suitable for interior and exterior locations, resistant to solvents, abrasion, and to fading caused by sunlight, precipitation, etc. These tags shall have a permanent pressure-sensitive adhesive back, and they shall be installed in a position that is easily (or most easily) noticeable. Tag each component of contractor furnished equipment that has differing warranties on its components.

(b) Submit sample tags, representing how the other tags will look, for Government review and approval.

(c) Tags for Warrantied Equipment: The tag for this equipment shall be similar to the following: Exact format and size will be as approved.

EQUIPMENT WARRANTY - CONTRACTOR FURNISHED EQUIPMENT

MFG NAME MODEL NO.

SERIAL NO.

CONTRACT NO.

CONTRACTOR NAME

CONTRACTOR WARRANTY EXPIRES

MFG WARRANTY(IES) EXPIRE

EQUIPMENT WARRANTY - GOVERNMENT FURNISHED EQUIPMENT

MFG NAME MODEL NO.

SERIAL NO.

CONTRACT NO.

DATE EQUIP PLACED IN SERVICE

MFG WARRANTY(IES) EXPIRE

(d) If the manufacturer's name (MFG), model number and serial number are on the manufacturer's equipment data plate and this data plate is easily found and fully legible, this information need not be duplicated on the equipment warranty tag

1.4.6.2. Execution: Complete the required information on each tag and install these tags on the equipment by the time of and as a condition of final acceptance of the equipment.

1.5. MECHANICAL TESTING, ADJUSTING, BALANCING, AND COMMISSIONING

Submit; all reports, statements, certificates, and completed checklists for testing, adjusting, balancing, and commissioning of mechanical systems prior to final inspection and transfer of the completed facility for approval, as specified in applicable technical specification sections.

1.6. OPERATION AND MAINTENANCE MANUALS

1.6.1. General Requirements

1.6.1.1. Inasmuch as the operations and maintenance manuals are required to operate and maintain the facility, the operations and maintenance (O&M) manuals will be considered a requirement prior to substantial completion of any facility to be turned over to the Government. Beneficial occupancy of all or portions of a facility prior to substantial completion will not relieve the Contractor of liquidated damages, if substantial completion exceeds the required completion date.

1.6.1.2. Provide one permanent electronic copy on CD-ROM and 2 hard copies of the Equipment Operating, Maintenance, and Repair Manuals. Provide separate manuals for each utility system as defined hereinafter. Submit Operations and Maintenance manuals for approval before field training or 90 days before substantial completion (whichever occurs earlier). If there is no separate CLIN for O&M Manuals, the Government will withhold an amount representing $20,000, as non-progressed work, until submittal and approval of all O&M manuals are complete.

1.6.2. Definitions

1.6.2.1. Equipment

A single piece of equipment operating alone or in conjunction with other equipment to accomplish a system function.

1.6.2.2. System

A combination of one or more pieces of equipment which function together to accomplish an intended purpose (i.e. HVAC system is composed of many individual pieces of equipment such as fans, motors, compressors, valves, sensors, relays, etc.)

1.6.3. Hard Cover Binders

The manuals shall be hard cover with posts, or 3-ring binders, so sheets may be easily substituted. Print the following identification on the cover: the words "EQUIPMENT OPERATING, MAINTENANCE, AND REPAIR MANUALS," the project name, building number, and an indication of utility or systems covered, the name of the Contractor, and the Contract number. Manuals shall be approximately 8-1/2 by 11-inches with large sheets folded in and capable of being easily pulled out for reference. All manuals for the project must be similar in appearance, and be of professional quality.

1.6.4. Warning Page

Provide a warning page to warn of potential dangers (if they exist, such as high voltage, toxic chemicals, flammable liquids, explosive materials, carcinogens, high pressures, etc.). Place the warning page inside the front cover and in front of the title page. Include any necessary Material Safety Data Sheets (MDSD) here.

1.6.5. Title Page

The title page shall include the same information shown on the cover and show the name of the preparing firm and the date of publication.

1.6.6. Table of Contents

Each volume of the set of manuals for this project shall include a table of contents, for the entire set, broken down by volume.

1.6.7. GENERAL

Organize manuals according to the following format, and include information for each item of equipment Submit a draft outline and table of contents for approval at 50% contract completion.

TABLE OF CONTENTS

PART I: Introduction

- Equipment Description
- Functional Description
- Installation Description

PART II: Operating Principles

PART III: Safety

PART IV: Preventive Maintenance

- Preventive Maintenance Checklist, Lubrication
- Charts and Diagrams

PART V: Spare Parts Lists

- Troubleshooting Guide
- Adjustments
- Common Repairs and Parts Replacement

PART VI: Illustrations

1.6.7.1. Part I-Introduction

Part I shall provide an introduction, equipment or system description, functional description and theory of operation, and installation instructions for each piece of equipment. Include complete instructions for uncrating, assembly, connection to the power source and pre-operating lubrication in the installation instructions as applicable. Illustrations, including wiring and cabling diagrams, are required as appropriate in this section. Include halftone pictures of the equipment in the introduction and equipment description, as well as system layout drawings with each item of equipment located and marked. Do not use copies of previously submitted shop drawings in these manuals.

1.6.7.2. Part II-Operating Principles

Part II shall provide complete instructions for operating the system, and each piece of equipment. Illustrations, halftone pictures, tables, charts, procedures, and diagrams are required when applicable. This will include step-by-step procedures for start-up and shutdown of both the system and each component piece of equipments, as well as adjustments required to obtain optimum equipment performance, and corrective actions for malfunctions. Show performance sheets and graphs showing capacity data, efficiencies, electrical characteristics, pressure drops, and flow rates here, also. Marked-up catalogs or catalog pages do not satisfy this requirement. Present performance information as concisely as possible with only data pertaining to equipment actually installed. Include actual test data collected for Contractor performance here.

1.6.7.3. Part III-Safety

Part III shall contain the general and specific safety requirements peculiar to each item of equipment. Repeat safety information as notes cautions and warnings in other sections where appropriate to operations described.

1.6.7.4. Part IV-Preventive Maintenance

Part IV shall contain a troubleshooting guide, including detailed instructions for all common adjustments and alignment procedures, including a detailed maintenance schedule. Also include a diagnostic chart showing symptoms and solutions to problems. Include test hookups to determine the cause, special tools and test equipment, and methods for returning the equipment to operating conditions. Information may be in chart form or in tabular format with appropriate headings. Include instructions for the removal, disassembly, repair, reassembly, and replacement of parts and assemblies where applicable and the task is not obvious.

1.6.7.5. Part V-Spare Parts List

Part V shall contain a tabulation of description data and parts location illustrations for all mechanical and electrical parts. The heading of the parts list shall clearly identify the supplier, purchase order number, and equipment. Include the unit price for each part. List parts by major assemblies, and arrange the listing in columnar form. Include names and addresses of the nearest manufacturer's representatives, as well as any special warranty information. Provide a list of spare parts that are recommended to be kept in stock by the Government installation.

1.6.7.6. Part VI-Illustrations

Part VI shall contain assembly drawings for the complete equipment or system and for all major components. Include complete wiring diagrams and schematics. Other illustrations, such as exploded views, block diagrams, and cutaway drawings, are required as appropriate.

1.6.8. Framed Instructions

Post framed instructions are required for substantial completion. Post framed instructions under glass or in laminated plastic, including wiring and control diagrams showing the complete layout of the entire system, including equipment, ductwork, piping valves, dampers, and control sequence at a location near the equipment described. Prepare condensed operating instructions explaining preventive maintenance procedures methods of checking the system for normal safe operation, valve schedule and procedures for safely starting and stopping the system in type form, framed as specified above for the wiring and control diagrams and posted beside the diagrams. Submit proposed diagrams, instructions, and other sheets prior to posting. Post the framed instructions before field training.

1.6.9. (Reserved. See 1.7 for Field Training)

1.6.10. System/Equipment Requirements

1.6.10.1. Facility Heating System

Provide information on the following equipment: boilers, water treatment, chemical feed pumps and tanks, converters, heat exchangers, pumps, unit heaters, fin-tube radiation, air handling units (both heating only and heating and cooling), and valves (associated with heating systems).

1.6.10.2. Air-Conditioning Systems

Provide information in chillers, packaged air-conditioning equipment, towers, water treatment, chemical feed pumps and tanks, air-cooled condensers, pumps, compressors, air handling units, and valves (associated with air-conditioning systems).

1.6.10.3. Temperature Control and HVAC Distribution Systems

Provide all information described for the following equipment: valves, fans, air handling units, pumps, boilers, converters and heat exchangers, chillers, water cooled condensers, cooling towers, and fin-tube radiation, control air compressors, control components (sensors, controllers, adapters and actuators), and flow measuring equipment.

1.6.10.4. Central Heating Plants

Provide the information described for the following equipment: boilers, converters, heat exchangers, pumps, fans, steam traps, pollution control equipment, chemical feed equipment, control systems, fuel handling equipment, de-aerators, tanks (flash, expansion, return waters, etc.), water softeners, and valves.

1.6.10.5. Heating Distribution Systems

Provide the information described for the following equipment: valves, fans, pumps, converters and heat exchangers, steam traps, tanks (expansion, flash, etc.), and piping systems.

1.6.10.6. Exterior Electrical Systems

Provide information on the following equipment: power transformers, relays, reclosers, breakers, and capacitor bank controls.

1.6.10.7. Interior Electrical Systems

Provide information on the following equipment: relays, motor control centers, switchgear, solid state circuit breakers, motor controller, EPS lighting systems, wiring diagrams and troubleshooting flow chart on control systems, and special grounding systems.

1.6.10.8. Energy Monitoring and Control Systems

The maintenance manual shall include descriptions of maintenance for all equipment, including inspection, periodic preventative maintenance, fault diagnosis, and repair or replacement of defective components.

1.6.10.9. Domestic Water Systems

Provide the identified information on the following equipment: tanks, unit process equipment, pumps, motors, control and monitoring instrumentation, laboratory test equipment, chemical feeders, valves, switching gear, and automatic controls.

1.6.10.10. Wastewater Treatment Systems

Provide the identified information on the following equipment: tanks, unit process equipment, pumps, motors, control and monitoring instrumentations, laboratory test equipment chemical feeders, valves, scrapers, skimmers, comminutors, blowers, switching gear, and automatic controls.

1.6.10.11. Fire Protection Systems

Provide information on the following equipment: alarm valves, manual valves, regulators, foam and gas storage tanks, piping materials, sprinkler heads, nozzles, pumps, and pump drivers.

1.6.10.12. Fire Alarm and Detection Systems

(1) The maintenance manual shall include description of maintenance for all equipment, including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.

(2) Provide all software; database with complete identification of programmable portions of system equipment and devices, and all other system programming data on all modes of the system; connecting cables; and proprietary equipment necessary for the operation, maintenance, testing, repair and programming, etc. of the system and that may be required for implementation of future changes to the fire system (additional and/or relocated initiating devices, notification devices, etc.

(3) Provide all system and equipment technical data and computer software with the requisite rights to Government use, in accordance with the applicable contract clauses.

(4) Training shall include software and programming required for the effective operation, maintenance, testing, diagnostics and expansion of the system.

1.6.10.13. Plumbing Systems

Provide information on the following equipment: water heaters, valves, pressure regulators backflow preventors, piping materials, and plumbing fixtures.

1.6.10.14. Liquid Fuels Systems

Provide information on the following equipment: tanks, automatic valves manual valves, filter separators, pumps, mechanical loading arms, nozzles, meters, electronic controls, electrical switch gear, and fluidic controls.

1.6.10.15. Cathodic Protection Systems

Provide information on the following material and equipment: rectifiers, meters, anodes, anode backfill, anode lead wire, insulation material and wire size, automatic controls (if any), rheostats, switches, fuses and circuit breakers, type and size of rectifying elements, type of oil in oil-immersed rectifiers, and rating of shunts.

1.6.10.16. Generator Installations

Provide information on the following equipment: generator sets, automatic transfer panels, governors, exciters, regulators starting systems, switchgear, and protective devices.

1.6.10.17. Miscellaneous Systems

Provide information on the following: communication and ADP systems, security and intrusion alarm, elevators, material handling, active solar, photovoltaic, nurse call, paging, intercom, closed circuit TV, irrigation, sound and material delivery systems, kitchen, refrigeration, disposal, ice making equipment, and other similar type special systems not otherwise specified.

1.6.10.18. Laboratory, Environmental and Pollution Control Systems

Provide information on the following equipment: wet scrubbers, quench chambers, scrub tanks, liquid oil separators, and fume hoods.

1.7. FIELD TRAINING

Field Training is a requirement for substantial completion. Conduct a training course for the operating staff for each particular system. Conduct the training is to be conducted during hours of normal working time after the system is functionally complete. The field instructions shall cover all of the items contained in the Equipment Operating, Maintenance and Repair Manuals. The training will include both classroom and "hands-on" training. Submit a lesson plan outlining the information to be discussed during training periods. Submit this lesson plan for approval 90 days before contract completion before the field training occurs. Record training on DVD and furnish to the Government within ten (10) days following training. Document all training and furnish a list of all attendees.

1.8. PRICING OF CONTRACTOR-FURNISHED AND INSTALLED PROPERTY AND GOVERNMENT-FURNISHED CONTRACTOR-INSTALLED PROPERTY

Promptly furnish and require any sub-contractor or supplier to furnish, in like manner, unit prices and descriptive data required by the Government for Property Record purposes of fixtures and equipment furnished and/or installed by the Contractor or sub-contractor, except prices do not need to be provided for Government-Furnished Property.

1.9. LEED REVIEW MEETINGS

1.9.1. Pre-Closeout Meeting. Approximately 30 days before submittal of LEED closeout documentation, the Contractor and the Government's project delivery team (including Installation representative) will meet to review the documentation, determine which, if any, credits will be audited and identify any corrections/missing items prior to the closeout LEED documentation submittal.

1.9.2. Approximately 14 days after submittal of LEED closeout documentation, the Contractor and the Government's project delivery team (including Installation representative) will meet to review the LEED closeout

documentation. The review conference will include discussion of and resolution of all review comments to ensure consensus on achievement of credits and satisfactory documentation. At the review conference a final score will be determined and endorsed in writing by all parties.

1.10. RED ZONE MEETING

At approximately 80% of contract completion or 60 days before the anticipated Beneficial Occupancy Date (BOD), whichever occurs first, the Contractor and the Government's project delivery team will conduct what is known as the Red Zone Meeting to discuss the close-out process, to schedule the events and review responsibilities for actions necessary to produce a timely physical, as well as fiscal, project close-out. The Red Zone meeting derives its name from the football term used to describe the team effort to move the ball the last 20 yards into the end zone. The close-out of a construction project sometimes can be equally as hard and most definitely requires the whole team's efforts. The ACO will chair the meeting. If not already provided, shortly before the meeting, the Contractor shall provide an electronic copy or access to the CADD as-built drawings, completed commensurate with the amount of work completed at the time of the Red Zone Meeting, as an indicator of the Contractors' understanding of and ability to meet the USACE CADD Standards and to ensure that the Contractor is making progress with CADD As-Built requirements. EXHIBIT 1 is a generic meeting checklist.

1.11. FINAL CLEANING

Clean the premises in accordance with FAR clause 52.236-12 and additional requirements stated here. Remove stains, foreign substances, and temporary labels from surfaces. Vacuum carpet and soft surfaces. Clean equipment and fixtures to a sanitary condition. Clean or replace filters of operating equipment if cleaning isn't possible or practicable. Remove debris from roofs, drainage systems, gutters, and downspouts. Sweep paved areas and rake clean landscaped areas. Remove waste, surplus materials, and rubbish from the site. Remove all temporary structures, barricades, project signs, fences and construction facilities. Submit a list of completed clean-up items on the day of final inspection.

1.12. INTERIM FORM DD1354 "TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete, update draft provided with the final design package(s) (see Section 01 33 16, paragraph 3.7.5) and submit an accounting of all installed property on Interim Form DD1354 "Transfer and Acceptance of Military Real Property." Include any additional assets/improvements/alterations and cost updates from the Draft DD Form 1354. Contact the COR for any project specific information necessary to complete the DD Form 1354. This form will be a topic for the Red Zone Meeting discussed above. For information purposes, a blank DD Form 1354 (fill-able) in ADOBE (PDF) may be obtained at the following web site: http://www.dtic.mil/whs/directives/infomgt/forms/eforms/dd1354.pdf Submit the completed Checklist for Form DD1354 of Government-Furnished and Contractor-Furnished/Contractor Installed items. Attach this list to the updated DD Form 1354. Instructions for completing the form and a blank checklist (fill-able) in ADOBE (PDF) may be obtained at the following web site:
http://www.wbdg.org/ccb/DOD/UFC/ufc_1_300_08.pdf

EXHIBIT 1

SAMPLE

Red Zone Meeting Checklist

Date:_____

Contract No.	
Description / Location	
Contractor	
Contracting Officer	

Action	**Completion Milestone**	√
Inspections		
Fire		
Safety		
Pre-final		
Mechanical Test & Balance		
Commissioning		
Landscaping Complete		
Erosion Control		
Beneficial Occupancy Date (BOD)		
Furniture Installation		
Comm Installation		
As-Built Drawings		
Provide all O&M manuals, tools, shop drawings, spare parts, etc. to customer		
Training of O&M Personnel		
Provide Warranty documents to Customer		
Contract completion		
Final Inspection		
User move-in		
DD Form 1354, Transfer of Real Property		

completed & signed		
Ribbon cutting		
Payroll Clearances		
DD Form 2626 - Construction Contractor Performance Evaluation		
DD Form 2631 – A-E Performance Rated after Construction		
Status of Pending Mods and REA's/Claims		
Final Payment Completed		
Release of Claims		
Return of Unobligated Funds		
Move Project from CIP to General Ledger		
Financial completion		

End of Section 01 78 02.00 10

APPENDIX A
Geotechnical Information

Report of Preliminary Geotechnical Exploration (Draft)

Build Addition – B273 Child Development Center (CDC)

Detroit Arsenal
Warren, Macomb County, Michigan

Prepared for:

Barge Waggoner Sumner & Cannon, Inc.

Dayton, Ohio

June 27, 2011
Project No. 175531010

Stantec Consulting Services Inc.
11687 Lebanon Road
Cincinnati OH 45241-2012
Tel: (513) 842-8200
Fax: (513) 842-8250

June 27, 2011
File: 175531010

Mr. Robert D. Baird, P.E.
Assistant Project Manager
Barge Waggoner Sumner & Cannon, Inc.
8280 Yankee Street
Dayton, Ohio 45458-1806

Reference: Report of Preliminary Geotechnical Exploration (Draft)
Build Addition – B273 Child Development Center (CDC)
Detroit Arsenal, Warren, Michigan

Dear Mr. Baird:

Stantec Consulting Services Inc. (Stantec) has performed a preliminary geotechnical exploration for the building addition to the Child Development Center at the Detroit Arsenal in Warren, Michigan. This draft provides a general overview of subsurface conditions for the proposed addition. Included in this report are discussions of site and project conditions, site geology, scope of services performed, results of exploration, and preliminary conclusions and recommendations relative to development of the site.

Please note this report is being submitted prior to completion of the standard Proctor and CBR testing and sulfide analysis. For this draft submittal, an estimate of the CBR was made based on the field exploration data to facilitate a preliminary flexible pavement design. These results will be revised for the final report.

Stantec appreciates the opportunity to provide these geotechnical engineering services for this project. If you have any questions, or if we can be of further assistance, please contact our office.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Jacqueline S. Harmon, P.E.
Senior Project Engineer
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Attachment: Report of Preliminary Geotechnical Exploration

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REPORT OF GEOTECHNICAL EXPLORATION (DRAFT)
BUILD ADDITION – B273 CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL

Executive Summary

A building addition has been proposed for construction on the east side of Building 273 at the Detroit Arsenal in Warren, Macomb County, Michigan. An expansion of Parking Lot E-1 has also been planned. The preliminary geotechnical exploration consisted of nine borings: four borings for the building addition, three borings for the parking lot expansion, and two borings for a rain garden/bioretention pond east of the proposed addition. Stantec Consulting Services Inc. (Stantec) was contracted by Barge Waggoner Sumner & Cannon, Inc. (BWSC) to provide geotechnical engineering services for the project. The geotechnical field exploration was conducted on June 7 and 8, 2011. This draft report summarizes the results of the geotechnical field and laboratory exploration with preliminary conclusions and recommendations relative to development of the site.

Soil conditions consisted primarily of lean clay or sandy lean clay with fill near the surface at select locations. Bedrock and the groundwater table were not encountered during drilling operations. A perched water table was encountered in three of the borings, observed 17 to 20 hours after drilling.

It is suggested that the proposed addition be supported on shallow foundations, the bottom of which are to be constructed below the depth of frost penetration. A recommendation on pavement thicknesses is supplied in the preliminary conclusions and recommendations section.

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REPORT OF GEOTECHNICAL EXPLORATION (DRAFT)
BUILD ADDITION – B273 CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL

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1.0 Introduction

Stantec Consulting Services Inc. (Stantec) was contracted by Barge Waggoner Sumner & Cannon, Inc. (BWSC) to perform a preliminary geotechnical exploration for a proposed addition to the Child Development Center (CDC), Building 273, at the Detroit Arsenal in Warren, Michigan. Information provided by BWSC described the existing building as modular, with a metal roof, masonry exterior, and a paved crawl space. The size of the addition is approximately 75 feet by 121 feet. The parking area will be expanded to accommodate 28 additional vehicles. A rain garden and bioretention pond will also be constructed as part of the project. The proposed addition is not expected to have a basement and is expected to be built at or near existing grade. It is assumed that the finished floor elevation of the addition will be the same as the CDC.

2.0 Site Description

The proposed building site is located within the Detroit Arsenal in Warren, Macomb County, Michigan. The Detroit Arsenal Tank Plant was established in 1940 to support the Allied war effort in the second World War. As part of the Department of Defense Base Realignment and Closure (BRAC) program, all tank manufacturing efforts ceased in 1996. Renamed TACOM, it is now home to the U.S. Army's Life Cycle Management Command (LCMC).

The general project area is an urban government facility, comprised of many existing buildings, parking lots, and underground utilities with surrounding open areas. The open areas consist primarily of landscaping, such as lawns and ornamental trees. The site is generally flat, sloping from south to north with a vertical relief of approximately 2.5 feet (from Elevation 619.7 to 616.7 feet above mean sea level). The site is drained with underground storm sewers. The general surface elevation across the project site is 617.0 feet, plus/minus 1.0 feet.

The proposed addition to the CDC will replace grass landscaping between the CDC and MacAuthur Drive, south of Bradley Drive. Active Parking Lot E-1 will be expanded as part of the project. Bradley Drive bounds the project to the north, MacAuthur Drive to the east, Active Parking Lot W-9 to the south, and Building 273 to the west.

Boring locations are shown on the Boring Layout Plan in Appendix A.

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3.0 Site Geology

Macomb County is in the Eastern Lake Section of the Central Lowland Province of the United States' Interior Plains. It is located along the southeastern edge of the Michigan Basin towards the Findlay Arch. This region is part of a nearly level glacial lake plain with a few scattered ridges of sandy soils that represent past shorelines and moraines from the Wisconsin and older glacial periods. Bedrock in the area is Mississippian- to Silurian-age shale, limestone, and dolomite (USDA, 2006a).

Located in southwestern Macomb County, Michigan's Bedrock and Quaternary Geology maps suggest that the site subgrade is lacustrine clay and silt or sand and gravel underlain by Antrim Shale of the Upper Devonian Period (MI DNR, 1999a and 1999b). Antrim Shale is a shale with concretions of pyrite and anthraconite tapped for its natural gas reservoirs in north central Michigan.

The surface soil is Lenawee clay loam (Lh). Lenawee is a clayey glaciolacustrine deposit formed in flats on till-floored lake plains. The stratum slopes 0 to 2 percent with depths greater than 80 inches. It is considered poorly drained with saturated permeability estimated as 0.20 to 0.57 inches per hour. The water table is expected near the soil's surface. The maximum calcium carbonate content is approximately 25 percent. Lenawee would typically be classified as a low-plasticity clay (CL) under the Unified Soil Classification System (USCS) or a A-6 or A-7 (clayey soil) under the American Association of State Highway and Transportation Officials (AASHTO) soil classification system (USDA, 2006b).

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4.0 Scope of Work

Stantec advanced nine borings in the field. Four borings were advanced within the footprint of the proposed building addition, three borings in the area of the proposed pavement addition and two borings in the area of the proposed rain garden/bioretention system. The structure borings were extended to a depth of 20 feet, while the pavement and rain garden/bioretention borings were advanced 5 feet.

The boring locations were staked by Stantec prior to the geotechnical fieldwork. MISS Dig System, Inc. of Michigan was contacted by Stantec to clear some of the utilities within the project area. Stantec coordinated with Detroit Arsenal personnel to clear the remaining utilities. Drilling was subcontracted to Stearns Drilling, Inc. of Grand Rapids, Michigan and performed

using a CME LC60 drill rig. A Stantec engineer provided oversight during the field exploration, conducting visual classifications of the soil samples as they were extracted.

The borings were advanced using 3¼-inch inside-diameter hollow-stem augers powered by a track-mounted drill rig from June 7 to June 8, 2011. Each boring was logged in the field by the geotechnical engineer, who also observed the auger cuttings and recovered soil samples. Soils were logged paying particular attention to the soil type, consistency, moisture content, and color. Standard penetration test (SPT) and undisturbed thin-walled (Shelby) tube samples were obtained at selected depth intervals in accordance with the appropriate ASTM guidelines. Within each sample boring, SPTs were obtained at 2.5-foot intervals at depths less than 10 feet and at 5-foot intervals at depths greater than 10 feet. Each boring was checked for groundwater upon completion of the drilling operations. Borings in the rain garden/bioinfiltration system area were filled with water and monitored for infiltration over a 24-hour period.

The SPT is performed by advancing a split-spoon sampler, 18 inches in length, with a 140-pound automatic hammer dropping 30 inches. The number of hammer blows needed to advance the sampler each 6-inch increment is recorded. The blow count from the first 6-inch increment is discarded due to ground disturbance at the bottom of the borehole. The sum of the blow counts from the last two 6-inch increments is called the N-value and is used to estimate the consistency of cohesive soils or the relative density of cohesionless soils. The locations of the SPTs with the corresponding blow counts are shown on the geotechnical boring logs in Appendix B. The borings were grouted upon completion.

Soil samples were returned to Stantec's materials testing laboratory for testing and analysis. Natural moisture content testing was performed on SPT and Shelby tube samples. Engineering classification testing was performed on samples representing the predominant soil horizons at the project site. The classification testing consisted of sieve and hydrometer analysis (particle size distribution, ASTM D 422) and Atterberg limits (ASTM D 4318). The results of these tests were used to determine the USCS and AASHTO classifications. A group name was then assigned according to ASTM D 2487 and ASTM D 2488. Selected undisturbed Shelby tube samples were extruded and subjected to unconfined compressive strength testing in accordance with ASTM D 2166. A sample of representative near-surface soil was tested for California Bearing Ratio (CBR) and Standard Proctor moisture-density compaction. Near-surface SPT samples were selected for analytical testing to support cathodic protection design. The samples were tested for chlorides, reactive sulfides, pH, and sulfates.

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5.0 Results of Exploration

A plan view of the boring locations is included as Appendix A. Table 1 summarizes the boring types, elevations, and depths. The geotechnical boring logs are included in Appendix B. These logs represent Stantec's interpretation of the subsurface conditions based on visual examination of field samples and laboratory testing. The depths of the interfaces between the soil strata on the boring logs represent approximate interface locations. The interface between strata may be gradual and occur between sampling intervals.

Table 1. Summary of Borings

Boring No.	Boring Type	Surface Elevation (feet)	Bottom of Boring Elevation (feet)	Boring Depth (feet)
1	Pavement	617.5	612.5	5.0
2	Pavement	617.2	612.2	5.0
3	Rain Garden/Bioretention	617.2	612.2	5.0
4	Pavement	617.0	612.0	5.0
5	Structure	616.8	596.8	20.0
6	Structure	616.9	596.9	20.0
7	Rain Garden/Bioretention	617.2	612.2	5.0
8	Structure	617.0	597.0	20.0
9	Structure	616.7	596.7	20.0

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A layer of topsoil was observed in each of the borings to an approximate depth of 0.5 feet (El. 616.2 to 617.0 feet). Two primary soil strata were identified across the site. Lean clay, brown and gray, firm to stiff and damp, with trace gravel (Soil 1) generally underlies the topsoil to a depth of 3.0 to 6.0 feet (El. 611.0 to 612.2 feet). Sandy lean clay, brown, gray or brown and gray, firm to very stiff and damp to moist with trace to little gravel (Soil 2) generally underlies the Soil 1 material. Soil 2 materials were encountered until the boring termination depth was reached. A fill material was encountered beneath the topsoil in three borings near the existing building and is described as lean clay, brown and gray or dark gray, firm to stiff and damp. The fill material extended to a depth of 2.5 to 5.0 feet (El. 612.5 to 614.0 feet). Geotechnical laboratory test results are included in Appendix C.

5.1 SOIL 1

Below the surface layer of topsoil in six of the borings and fill material in a seventh, soil described as lean clay, brown and gray, firm to stiff and damp, with trace gravel (Soil 1) was encountered to a depth of 3.0 to 6.0 feet (El. 611.0 to 612.2 feet). SPT N-values for Soil 1 varied from 5 to 10 blows per foot (bpf), with an average value of 7 bpf. These values are indicative of cohesive soil of firm to stiff consistency.

Laboratory testing for the moisture content of Soil 1 samples yielded values in the range of 19 to 27 percent. Atterberg Limit testing revealed a liquid limit (LL) of 45 percent and a plasticity index (PI) of 17 percent. These values indicate inorganic clays of medium plasticity.

Soil 1 was mechanically classified according to the USCS as lean clay or type “CL” soil. Using the AASHTO classification system, this soil corresponded to A-7-6 type soil or clay with a group index of 24.

5.2 SOIL 2

Below Soil 1 in three of the structure borings and fill material in the fourth was a soil described as sandy lean clay, brown, gray or brown and gray, firm to very stiff and damp to moist with trace to little gravel (Soil 2). The top portion of Soil 2 to a depth of 8.0 to 9.0 feet (El. 607.8 to 609.0 feet) had SPT N-values in the range of 4 to 15 bpf, with an average of 9 bpf. These values are indicative of cohesive soil of soft to very stiff consistency. Laboratory testing of this portion yielded moisture contents in the range of 18 to 26 percent. The bottom portion of this stratum to the boring termination depth of 20.0 feet (El. 596.7 to 597.0 feet) had SPT N-values in the range of 14 to 28 bpf, with an average of 18 bpf. These values indicate cohesive soil of stiff to very stiff consistency. Moisture contents for this portion varied from 11 to 13 percent.

Atterberg Limit testing revealed a LL in the range of 22 to 23 percent and a PI in the range of 10 to 11 percent; representative of indicative inorganic clays of low plasticity.

Soil 2 was mechanically classified according to the USCS as sandy lean clay or type “CL” soil. Using the AASHTO classification system, the upper and lower portions of this stratum corresponded to A-4 and A-6 type soils or sandy clay, respectively. The group index was three.

5.3 FILL MATERIAL

Fill material was encountered in Borings 1, 3, and 8 beneath the surface layer of topsoil. This material was described as lean clay, dark gray or brown and gray, firm or stiff and damp. Where encountered, this material extended to a depth of 2.5 to 5.0 feet (El. 612.5 to 614.0 feet). The SPT N-values of this material ranged from 6 to 12 bpf, with an average of 8 bpf. These values correspond to cohesive material of firm to stiff consistency. Moisture contents for this material varied from 22 to 29 percent.

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5.4 GROUNDWATER

Groundwater was not encountered in the borings at the time of drilling. Approximately 17 to 20 hours after drilling, water was observed in Borings B-5, B-8, and B-9 at a depth of 4.6 to 4.7 feet (El. 612.2 to 613.0 feet). This water may have entered the borings as a result of sand lenses and should not be considered the elevation of the natural groundwater table. The groundwater level may vary according to season.

6.0 Laboratory Testing

6.1 UNCONFINED COMPRESSIVE STRENGTH TESTING

Results of the unconfined compressive strength testing are provided in Appendix C. The test results are summarized in Table 2.

6.1.1 Soil 1

Unconfined compressive strength testing was performed on two samples of Soil 1. The strength values were in the range of 1.23 to 2.64 tons per square foot, indicative of stiff to very stiff cohesive soil.

6.1.2 Soil 2

Unconfined compressive strength testing was performed on two samples of Soil 2. The strength values were in the range of 0.64 to 2.98 tons per square foot, indicative of firm to very stiff cohesive soil. The decrease in strength of the first sample was the result of a sand lens within the specimen.

Table 2. Unconfined Compressive Strength Summary

Boring No.	Depth (feet)	Unconfined Compressive Strength (tsf)	Soil Description
5	8.0-10.0	2.98	Sandy Lean Clay
6	1.0-3.0	2.64	Lean Clay
8	5.0-7.0	0.64	Sandy Lean Clay
9	3.0-5.0	1.23	Lean Clay

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6.2 STANDARD PROCTOR AND CBR TESTING

The results of the Standard Proctor and CBR tests are pending. Once complete, they will be provided in Appendix C. The Standard Proctor moisture-density test was performed on a composite sample of the Shelby tubes taken from 5.0 to 7.0 feet in Boring 8 and 3.0 to 5.0 feet in Boring 9.

6.3 CORROSIVITY TESTING

Analytical testing was performed on selected SPT soil samples by Fouser Environmental Services of Versailles, Kentucky. Two samples were analyzed: one from Boring 5 at a depth of 3.5 to 5.0 feet and one from Boring 8 at a depth of 3.5 to 5.0 feet. Table 3 summarizes the results of these tests. The preliminary analytical test results are included as Appendix D. Note that the results for reactive sulfide are pending.

Table 3. Results of Corrosivity Testing

Boring No.	Depth (feet)	Sulfate (mg/kg)	Reactive Sulfide (mg/kg)	Chloride (mg/kg)	pH
5	3.5 – 5.0	76.6	*	55.2	7.62
8	3.5 – 5.0	107	*	29.3	7.85

* Results for reactive sulfide testing are pending.

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7.0 Preliminary Conclusions and Recommendations

7.1 GENERAL

7.1.1 Stantec understands that an addition to Building 273 will be constructed at Detroit Arsenal. At this time, a preliminary structure layout has been provided to Stantec. Estimates of loading have not been provided.

7.1.2 The composition of the building addition is assumed to be similar to the existing building: modular with metal roof, masonry exterior, and paved crawl space. The building addition is not anticipated to have a basement and is expected to be built at or near existing grade.

7.1.3 The subsurface conditions at the site generally consist of cohesive lacustrine soil classified as lean clay or sandy lean clay according to the USCS classification system.

7.1.4 In accordance with the International Building Code (IBC,2006), the average subsurface conditions of the top 100 feet below grade should be considered when determining seismic parameters to be used in structure design. The results of the borings advanced for this project, as well as borings advanced for a previous project at Detroit Arsenal, were used to obtain the known geologic conditions. It is recommended that Site Class D (stiff soil profile) be used for seismic design. The site location's mapped spectral response accelerations are:

- S_s=12% g and S_1=4% g for a Period of 1.0 second

These values were obtained from United States Army Corp of Engineers' (USACE) Unified Facilities Criteria (UFC) 3-301-01, Structual Engineering. They were determined utilizing the web-based United States Geological Survey Earthquake GroundMotion Parameters Calculator, Version 5.0.8, for the 2006 version of the IBC.

7.1.5 Based on the classification of soils found in this geotechnical exploration, the soils on site present low liquefaction potential.

7.1.6 All construction operations involving earthwork, including foundation excavation, should be performed in the presence of a qualified technician who is experienced in monitoring and testing earthwork construction. The technician should operate under the direct supervision of a professional engineer experienced in geotechnical engineering.

7.1.7 The conclusions and recommendations presented herein are based on information gathered from the borings advanced during this investigation using that degree of care and skill ordinarily exercised under similar circumstances by competent members of the engineering profession. No warranties can be made regarding the continuity of conditions between borings.

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7.2 SHALLOW FOUNDATIONS

7.2.1 Given the original building footprint was established on shallow foundations and the subsurface conditions encountered, recommendations for the proposed addition will focus on shallow foundations.

7.2.2 It is recommended the building be supported on a shallow foundation system consisting of isolated spread footings and continuous wall footings bearing on undisturbed, low to medium plasticity, original soil (Soil 1 or 2) or on compacted, engineered fill. The recommended allowable bearing strength values for footings bearing on undisturbed, original soil or on controlled engineered fill and placed in accordance with the recommendations outlined herein are as follows:

a. Continuous Wall Footings – 1,750 pounds per square foot

b. Isolated Spread Footings – 2,000 pounds per square foot

These allowable bearing strength values are based on correlations with SPT-N values with a factor of safety of 3.

7.2.3 Where floor slabs or pavements are to be placed on new engineered fill material, proper surface preparation, excavation, placement and compaction of the material is necessary for satisfactory results. All organic material, topsoil and existing pavements should be stripped to a depth of approximately 12 inches from areas that are to receive fill. Prior to placement of fill material, these areas should be "proof-rolled" in the presence of a qualified technician who is experienced in monitoring and testing earthwork construction. Any observed isolated "pumping" should be corrected by undercutting unstable material and then brought to subgrade elevation with approved fill material as outlined below. In areas supporting pavements and floor slabs, fill material should be compacted to at least 90 percent of the modified Proctor density, at a moisture content within +/- 2 percent of optimum.

7.2.4 Borrow material used as backfill should be approved for such use by the geotechnical engineer. Prior to its use, the contractor should identify the source and provide samples for soil classification and moisture-density tests a minimum of five working days before the beginning of construction. Borrow material should meet the following requirements:

a. Unless otherwise permitted by the geotechnical engineer, borrow material should not consist of soils represented by the following classifications, as determined in accordance with ASTM D 2487: MH, CH, OL, OH, Pt.

b. The borrow material should be free from rubbish, organic matter, frozen soil, muck or other perishable, compressible debris, which prevent compaction to a dense uniform state. Rock and other hard, durable fragments should be limited to particles displaying a maximum dimension of 6 inches, should not exceed 10 percent of the total volume and should be uniformly distributed throughout the material.

c. The maximum dry density of the borrow material should meet or exceed 98 pounds per cubic foot in accordance with ASTM D 698.

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7.2.5 The floor slab should be placed over a minimum 6-inch layer of compacted granular fill. A polyethylene liner should be installed between the slab and stone as a water-proofing membrane.

7.2.6 It is recommended that the bottoms of exterior footings extend a minimum of 61 inches below finish grade to provide frost protection.

7.2.7 Excavated footings should not be left open to allow accumulation and infiltration of rain water or groundwater seeps, as the water will tend to soften and weaken the foundation material. Concrete should be placed as soon as possible after preparation of the subgrade, or if this cannot be done, the last four to six inches of foundation materials should be removed until preparations for the placement of concrete are ready. In no case should concrete be placed in a foundation excavation which contains standing water or moisture softened material.

7.2.8 The contractor should have dewatering equipment on site in case perched groundwater is encountered during excavation.

7.2.9 The shear strength of clay soils is very dependent upon moisture content. Therefore, in order for the soils to maintain adequate bearing capacity, it is imperative that they not be allowed to become saturated. Site grading should be maintained during construction so that positive drainage from structure and pavement areas is promoted at all times. Final site grading should be accomplished in such a manner as to divert surface runoff away from the foundation elements and out-slopes immediately below any building.

7.2.10 Reinforcing steel should be placed in all footings to provide rigidity and strength to bridge over n weak or more compressible foundation materials which may be in contact with the foundation system. Although no shear failures are expected if the recommended allowable stresses are not exceeded, a small amount of settlement could occur and should be anticipated. This precaution will tend to cause any settlement which may occur to be of a more uniform nature and prevent damage to the foundation elements.

7.3 PAVEMENT

7.3.1 In pavement areas, proper preparation, excavation, placement and compaction of the material is necessary for satisfactory results. Prior to placement of fill material, the topsoil and organic material should be stripped to a minimum depth of approximately 12 inches form areas that are to receive fill. After stripping, the fill areas should be “proof-rolled” in the presence of a qualified technician who is experienced in monitoring and testing earthwork construction. Any observed pumping should be corrected by undercutting unstable material and then bringing the area up to subgrade elevation with

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approved fill material. The fill material should be compacted to at least 90 percent of modified Proctor density, at a moisture content within 2 percent of optimum.

7.3.2 The CBR test result is pending. This pavement design assumes a CBR value of 4 based on the geotechnical field investigation. The design section will be revised once the CBR test is complete.

7.3.3 Pavement sections have been designed for a 25-year design life with the assumption that the following traffic loads would occur:

- Two dumpster trucks per week
- Two delivery trucks per day
- Four passenger car passes per parking space per day
- One semi-trailer truck two days per week

7.3.4 Recommended flexible pavement sections for the parking area are provided in the table below.

Layer	Thickness (inches)	Comments
Hot Mix Asphalt (HMA) Surface Course	1.5	Michigan Department of Transportation (MDOT) Division 5
HMA Base Course	2.0	MDOT Division 5
Drainage Layer	4.0	MDOT No. 6AA Crushed Stone
Base/Separation	4.0	MDOT No. 22A Crushed Stone

These are the minimum pavement sections allowed by USACE Louisville District.

7.3.5 Flexible pavement materials and procedures should comply with the USACE UFC 3-250-01FA, Pavement Design for Roads, Streets, Walks and Open Storage Areas, for flexible and rigid pavement design and drainage. Based on the subsurface investigation, cohesive soils are anticipated under the pavement, requiring an underdrain system to be included. This underdrain system should be designed in accordance with the USACE UFC 3-250-01FA. In accordance with USACE Louisville

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District guidance, Stantec recommends using a design freezing index of 900 and frost penetration of 61 inches in the pavement design.

7.3.6 Aggregate base materials should meet the requirements of TM 5-822-5. Traffic on the completed base course should be limited. Areas subjected to traffic should be moistened to prevent the loss of fine materials. The surface should be repaired prior to the placement of the binder course. The binder course should be applied as soon as possible following placement and acceptance of the base course.

7.3.7 If the bituminous surface course is not placed immediately after the binder course, the contractor should clean the binder course surface of all dirt and debris and apply a tack coat of SS-1H at a rate of approximately 0.1 gallons per square yard.

7.3.8 Surface drainage is important for the long-term surface life of the pavement. It is recommended that a minimum slope of ¼-inch per foot (two percent) be incorporated into the final grading plan for the pavements.

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8.0 Closure

8.1.1 This study was performed to provide a general summary of the geotechnical characteristics within the project site and provide preliminary recommendations for design and site development. The information contained in this report should be viewed in the general nature in which it was intended.

8.1.2 The boring logs and related information presented in this report depict approximate subsurface conditions only at the specific boring locations noted and at the time of drilling. Conditions at other locations may differ from those occurring at the boring locations. Also the passage of time may result in a change in the subsurface conditions at the boring locations.

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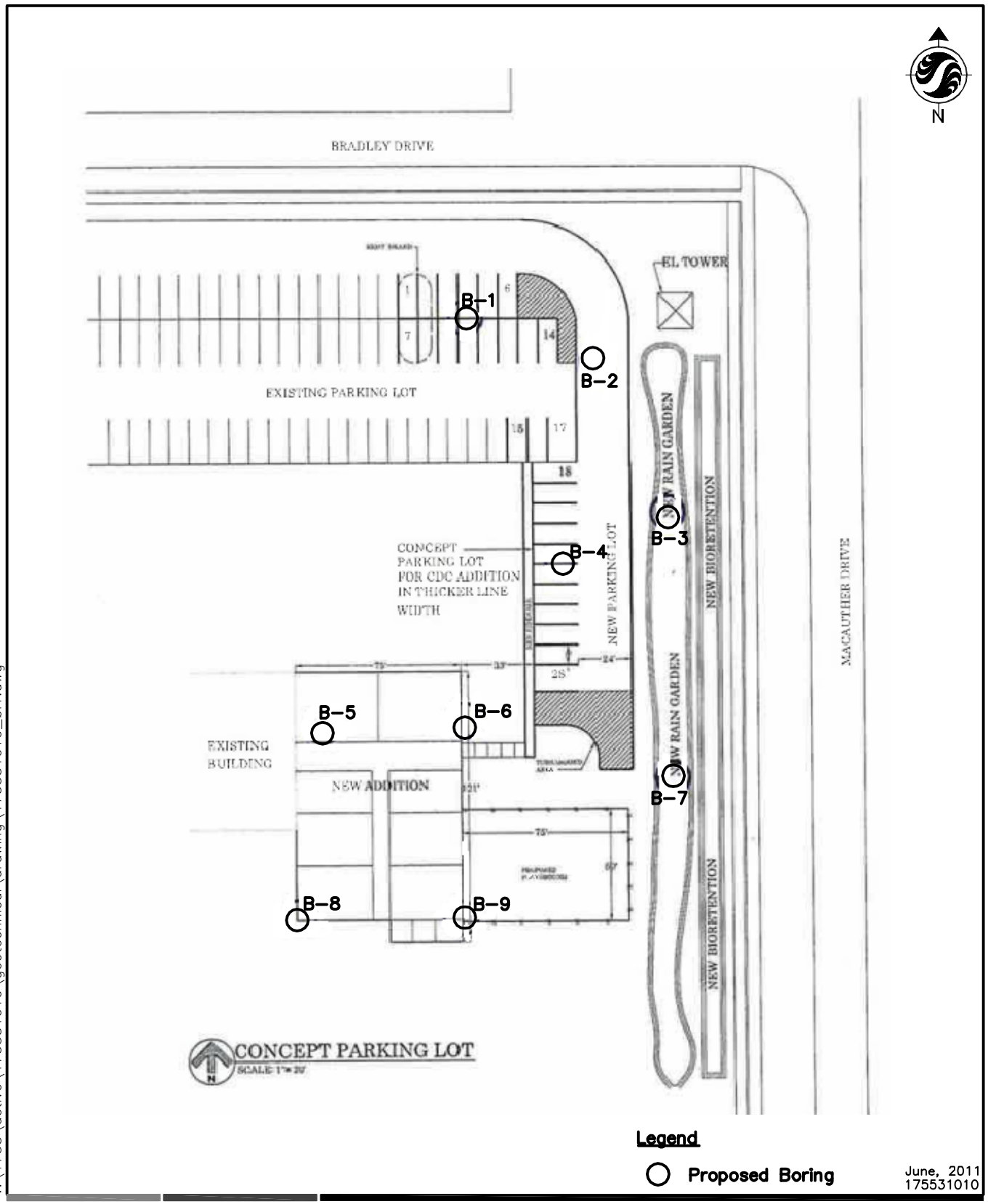
Appendix A

Boring Layout Plan



Legend

○ **Proposed Boring**

June, 2011
175531010

SaveDate: 2011/06/23 1:42 PM Login: Jennings, Matthew
v:\1755\active\175531010\geotechnical\drawing\175531010_bl1.dwg

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Client/Project
Barge Waggoner Sumner & Cannon, Inc.

Figure No.
1.0

Title
DETROIT ARSENAL CHILD CEVELOPMENT CENTER ADDITION

Appendix B

Geotechnical Boring Logs

BORING NO. 1

SHEET 1 OF 1

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 617.5
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE
8. TOTAL DEPTH OF HOLE 5.0	STARTED 6/8/2011 COMPLETED 6/8/2011
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
617.5												
617.0	Topsoil											0
	Lean Clay, brown and gray, firm, damp, (Fill)		CL	1	SPT	2 3 3	22	1.5	1.1	N/A		1 2
				2	SPT	2 3 3	29	1.5	1.2	N/A		3 4
612.5	No Refusal / Boring Terminated											5 6 7 8 9 10 11 12

Monday, September 26, 2011

BORING NO. 2

SHEET 1 OF 1

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 617.2
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE
8. TOTAL DEPTH OF HOLE 5.0	STARTED 6/8/2011 COMPLETED 6/8/2011
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
617.2												0
616.7	Topsoil											
	Lean Clay, brown and gray, firm to stiff, damp, trace gravel		CL	1	SPT	4 4 4	22	1.5	1.1	N/A		1 2 3
				2	SPT	2 2 3	27	1.5	1.4	N/A		4
612.2												5
	No Refusal / Boring Terminated											6 7 8 9 10 11 12

Monday, September 26, 2011

BORING NO. 3

SHEET 1 OF 1

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 617.2
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/7/2011 COMPLETED 6/7/2011
8. TOTAL DEPTH OF HOLE 5.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
617.2												0
616.7	Topsoil											
	Lean Clay, brown and gray, firm, damp, trace gravel		CL									1
				1	SPT	3 3 3	23	1.5	0.8	N/A		2
												3
				2	SPT	2 2 3	22	1.5	1.2	N/A		4
612.2												5
	No Refusal / Boring Terminated											6
												7
												8
												9
												10
												11
											Monday, September 26, 2011	12

BORING NO. 4

SHEET 1 OF 1

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 617.0
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/8/2011 COMPLETED 6/8/2011
8. TOTAL DEPTH OF HOLE 5.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
617.0												0
616.5	Topsoil											
	Lean Clay, brown and gray, firm to stiff, damp, trace gravel		CL	1	SPT	3 4 4	19	1.5	1.3	N/A		1 2 3
				2	SPT	2 2 3	24	1.5	1.2	N/A		4
612.0	No Refusal / Boring Terminated											5 6 7 8 9 10 11 12

Monday, September 26, 2011

BORING NO. 5

SHEET 1 OF 2

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 616.8
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER 612.2
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/7/2011 COMPLETED 6/7/2011
8. TOTAL DEPTH OF HOLE 20.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
616.8												
616.3	Topsoil											0
	Lean Clay, dark gray, firm, damp, (Fill)		CL	1	SPT	3 3 4	25	1.5	1.4	N/A		1 2
613.8												3
	Sandy Lean Clay, brown and gray, firm to stiff, damp to moist		CL	2	SPT	2 4 4	24	1.5	1.1	N/A	Groundwater encountered at 612.2 feet; recorded 17 hours after drilling completed.	4 5
				3	SPT	2 2 2	24	1.5	1.0	N/A		6 7
607.8				4	ST		13	2.0	2.0	N/A		8 9
	Sandy Lean Clay, brown and gray, very stiff, damp, little gravel											10 11 12

Monday, September 26, 2011

BORING NO. 5

SHEET 2 OF 2

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 616.8
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER 612.2
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/7/2011 COMPLETED 6/7/2011
8. TOTAL DEPTH OF HOLE 20.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
	Sandy Lean Clay, brown and gray, very stiff, damp, little gravel *(Continued)*		CL									12
												13
				5	SPT	5 9 11	11	1.5	1.5	N/A		14
												15
600.8												16
	Sandy Lean Clay, gray, very stiff, damp, trace gravel		CL									17
												18
				6	SPT	5 6 9	12	1.5	1.5	N/A		19
596.8												20
	No Refusal / Boring Terminated											21
												22
												23
												24

Monday, September 26, 2011

BORING NO. 6

SHEET 1 OF 2

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 616.9
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/8/2011 COMPLETED 6/8/2011
8. TOTAL DEPTH OF HOLE 20.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
616.9												0
616.4	Topsoil											
	Lean Clay, brown and gray, firm, damp											1
				1	ST		20	2.0	1.1	N/A		2
			CL									3
				2	SPT	3 2 4	21	1.5	1.4	N/A		4
611.4												5
	Sandy Lean Clay, brown, very stiff, damp to moist, little gravel											6
				3	SPT	2 6 9	21	1.5	1.5	N/A		7
												8
			CL	4	SPT	6 12 16	11	1.5	1.5	N/A		9
												10
												11
604.9												12

Monday, September 26, 2011

BORING NO. 6

SHEET 2 OF 2

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 616.9
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE
8. TOTAL DEPTH OF HOLE 20.0	STARTED 6/8/2011 COMPLETED 6/8/2011
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
	Sandy Lean Clay, gray, stiff to very stiff, damp, trace gravel											12
												13
				5	SPT	5 9 11	12	1.5	1.5	N/A		14
			CL									15
												16
												17
												18
				6	SPT	4 6 8	12	1.5	1.5	N/A		19
596.9												20
	No Refusal / Boring Terminated											21
												22
												23
												24

Monday, September 26, 2011

BORING NO. 7

SHEET 1 OF 1

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 617.2
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE
8. TOTAL DEPTH OF HOLE 5.0	STARTED 6/7/2011 COMPLETED 6/7/2011
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
617.2												
616.7	Topsoil											0
	Lean Clay, brown and gray, firm, damp		CL									1
				1	SPT	3 3 4	24	1.5	1.1	N/A		2
												3
				2	SPT	2 2 3	27	1.5	1.4	N/A		4
612.2												5
	No Refusal / Boring Terminated											6
												7
												8
												9
												10
												11
											Monday, September 26, 2011	12

BORING NO. 8

SHEET 1 OF 2

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 617.0
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER 612.2
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/7/2011 COMPLETED 6/7/2011
8. TOTAL DEPTH OF HOLE 20.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
617.0												0
616.5	Topsoil											
	Lean Clay, dark gray, stiff, damp, (Fill)		CL	1	SPT	4 5 7	25	1.5	1.1	N/A		1, 2
614.0												3
	Lean Clay, brown and gray, stiff, damp, trace gravel		CL	2	SPT	3 4 5	22	1.5	0.9	N/A	Groundwater encountered at 612.2 feet; recorded 18 hours after drilling completed.	4
611.0				3	ST		26	2.0	2.0	N/A		5, 6
	Sandy Lean Clay, brown and gray, stiff, damp, trace gravel		CL									7, 8
				4	SPT	4 4 8	12	1.5	1.5	N/A		9
606.5												10
	Sandy Lean Clay, gray, very stiff, damp, trace gravel											11, 12

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BORING NO. 8

SHEET 2 OF 2

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 617.0
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER 612.2
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/7/2011 COMPLETED 6/7/2011
8. TOTAL DEPTH OF HOLE 20.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
	Sandy Lean Clay, gray, very stiff, damp, trace gravel *(Continued)*											12
												13
				5	SPT	4 7 10	11	1.5	1.5	N/A		14
			CL									15
												16
												17
												18
				6	SPT	4 7 10	12	1.5	1.5	N/A		19
597.0												20
	No Refusal / Boring Terminated											21
												22
												23
												24

Monday, September 26, 2011

BORING NO. 9

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 616.7
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER 613.0
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/7/2011 COMPLETED 6/7/2011
8. TOTAL DEPTH OF HOLE 20.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
616.7												
616.2	Topsoil											0
	Lean Clay, brown and gray, stiff, damp											1
				1	SPT	5 5 5	23	1.5	1.5	N/A		2
			CL									3
				2	ST		24	1.5	2.0	N/A		4
611.7											Groundwater encountered at 613.0 feet; recorded 20 hours after drilling completed.	5
	Sandy Lean Clay, brown and gray, stiff to very stiff, damp											6
				3	SPT	3 4 5	18	1.5	1.5	N/A		7
			CL									8
				4	SPT	4 9 14	11	1.5	1.5	N/A		9
												10
605.7												11
	Sandy Lean Clay, gray, very stiff, damp											12

BORING NO. 9

SHEET 2 OF 2

1. PROJECT Detroit Arsenal Child Development Center Addition	11. DATUM FOR ELEVATION *SHOWN (TBM or MSL)*
2. LOCATION Warren, Michigan	
3. DRILLING AGENCY Stearns Drilling, Inc.	12. DRILL METHOD 3 1/4" ID HSA
4. NAME OF DRILLER Stearns Drilling, Inc.	13. ELEVATION TOP OF HOLE 616.7
5. DRILL TYPE CME LC60	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN N/A	15. ELEVATION OF GROUND WATER 613.0
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/7/2011 COMPLETED 6/7/2011
8. TOTAL DEPTH OF HOLE 20.0	
9. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT	17. INSPECTOR James Swindler

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY	RQD	REMARKS	DEPTH SCALE (FT)
	Sandy Lean Clay, gray, very stiff, damp *(Continued)*		CL									12
												13
				5	SPT	4 7 9	12	1.5	1.5	N/A		14
												15
												16
												17
												18
				6	SPT	4 7 10	12	1.5	1.5	N/A		19
596.7												20
	No Refusal / Boring Terminated											21
												22
												23
												24

Monday, September 26, 2011

Appendix C

Geotechnical Laboratory Testing

(preliminary)

Soil Classification Testing

Stantec

Summary of Soil Tests

Project Name	Detroit Arsenal CDC Addition	Project Number	175531010
Source	B-5, 8.0'-10.0'	Lab ID	12
County	Macomb, MI	Date Received	6-16-11
Sample Type	ST	Date Reported	6-24-11

Test Results

Natural Moisture Content

ASTM D 2216

Moisture Content (%): 13.2

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
	N/A	
1"	25	100.0
3/4"	19	99.2
3/8"	9.5	97.4
No. 4	4.75	94.5
No. 10	2	89.5
No. 40	0.425	83.2
No. 200	0.075	58.9
	0.02	41.8
	0.005	27.4
	0.002	20.4
estimated	0.001	15.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	5.5	10.5
Coarse Sand	5.0	6.3
Medium Sand	6.3	---
Fine Sand	24.3	24.3
Silt	31.5	38.5
Clay	27.4	20.4

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	23
Plastic Limit:	13
Plasticity Index:	10
Activity Index:	0.50

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.71

Classification

Unified Group Symbol:	CL
Group Name:	Sandy lean clay
AASHTO Classification:	A-4 (3)

Comments:

Stantec

Summary of Soil Tests

Project Name	Detroit Arsenal CDC Addition	Project Number	175531010
Source	B-9, 8.5'-10.0'	Lab ID	33
County	Macomb, MI	Date Received	6-16-11
Sample Type	SPT	Date Reported	6-24-11

Test Results

Natural Moisture Content

ASTM D 2216

Moisture Content (%): 10.9

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
	N/A	
	N/A	
3/4"	19	100.0
3/8"	9.5	98.6
No. 4	4.75	96.2
No. 10	2	93.7
No. 40	0.425	86.8
No. 200	0.075	61.3
	0.02	42.7
	0.005	28.7
	0.002	22.0
estimated	0.001	16.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	3.8	6.3
Coarse Sand	2.5	6.9
Medium Sand	6.9	---
Fine Sand	25.5	25.5
Silt	32.6	39.3
Clay	28.7	22.0

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	22
Plastic Limit:	12
Plasticity Index:	10
Activity Index:	0.45

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.68

Classification

Unified Group Symbol:	CL
Group Name:	Sandy lean clay
AASHTO Classification:	A-4 (3)

Comments:

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name	Detroit Arsenal CDC Addition	Project Number	175531010
Source	B-9, 8.5'-10.0'	Lab ID	33

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: KAF
Test Date: 06-21-2011
Date Received 06-16-2011

Maximum Particle size: 3/4" Sieve

Sieve Size	% Passing
3/4"	100.0
3/8"	98.6
No. 4	96.2
No. 10	93.7

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: -3 inch fraction only

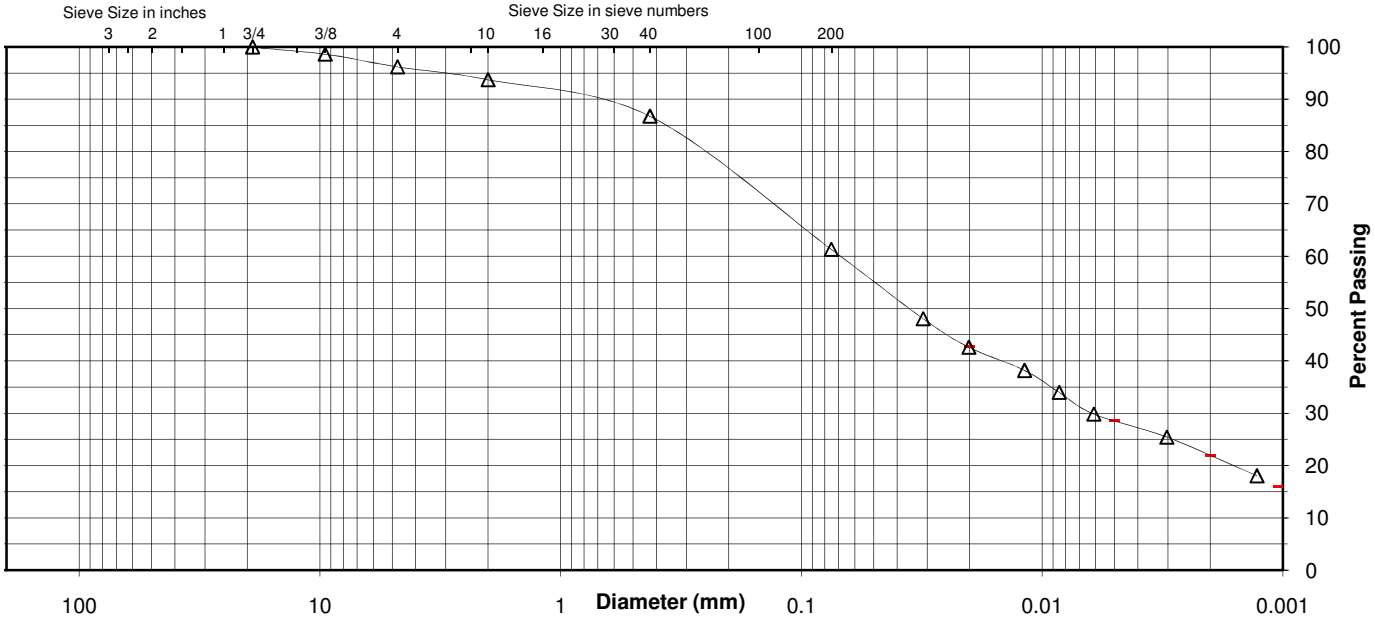
Specific Gravity 2.68

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	86.8
No. 200	61.3
0.02 mm	42.7
0.005 mm	28.7
0.002 mm	22.0
0.001 mm	16.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	0.0	3.8	2.5	6.9	25.5	32.6	28.7
AASHTO	Gravel			Coarse Sand	Fine Sand	Silt	Clay
	6.3			6.9	25.5	39.3	22.0



Comments

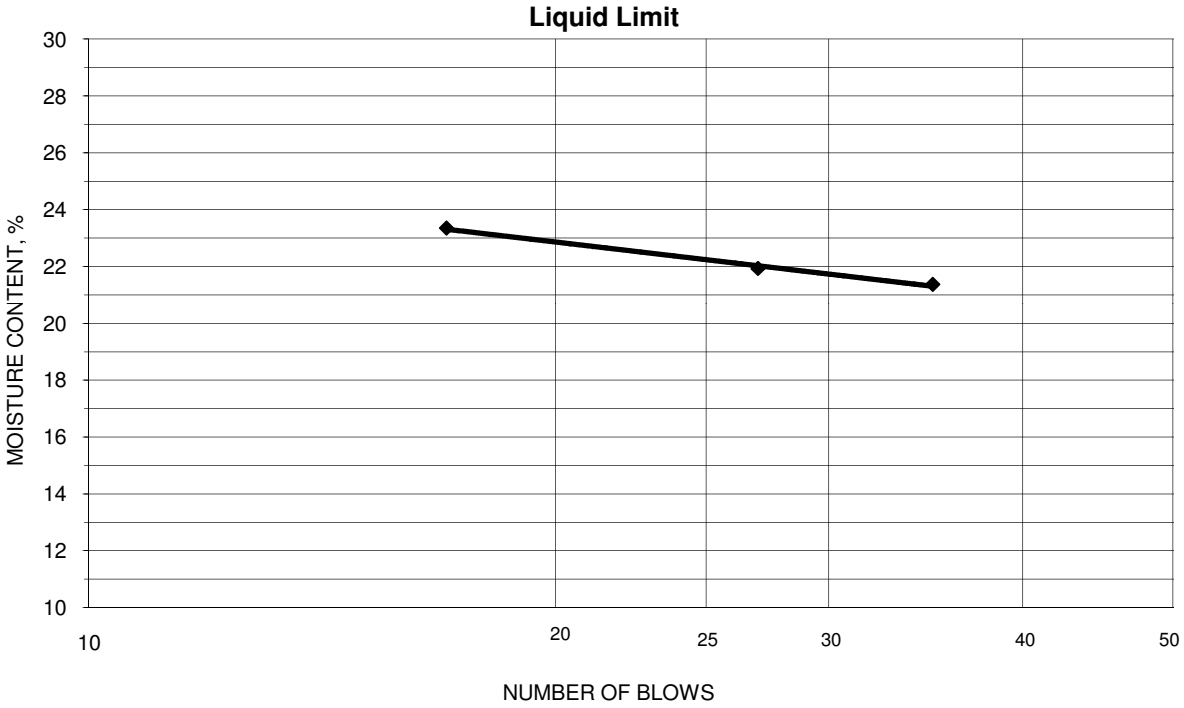
Reviewed By

Stantec

ATTERBERG LIMITS

Project	Detroit Arsenal CDC Addition			Project No.	175531010
Source	B-9, 8.5'-10.0'			Lab ID	33
				% + No. 40	13
Tested By	KR	Test Method	ASTM D 4318 Method A	Date Received	06-16-2011
Test Date	06-23-2011	Prepared	Dry		

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
30.31	26.60	10.71	17	23.3	
32.13	28.35	11.11	27	21.9	
29.58	26.33	11.12	35	21.4	22



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
29.06	27.11	10.53	11.8	12	10
27.94	26.14	11.03	11.9		

Remarks: _____

Reviewed By _____

Stantec

Summary of Soil Tests

Project Name	Detroit Arsenal CDC Addition	Project Number	175531010
Source	B-6, 3.5'-5.0'	Lab ID	16
County	Macomb, MI	Date Received	6-16-11
Sample Type	SPT	Date Reported	6-24-11

Test Results

Natural Moisture Content

ASTM D 2216

Moisture Content (%): 21.0

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
	N/A	
	N/A	
	N/A	
	N/A	
No. 4	4.75	100.0
No. 10	2	99.4
No. 40	0.425	97.9
No. 200	0.075	85.5
	0.02	60.8
	0.005	41.9
	0.002	34.6
estimated	0.001	29.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	0.0	0.6
Coarse Sand	0.6	1.5
Medium Sand	1.5	---
Fine Sand	12.4	12.4
Silt	43.6	50.9
Clay	41.9	34.6

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	45
Plastic Limit:	17
Plasticity Index:	28
Activity Index:	0.80

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.69

Classification

Unified Group Symbol:	CL
Group Name:	Lean clay
AASHTO Classification:	A-7-6 (24)

Comments:

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name	Detroit Arsenal CDC Addition	Project Number	175531010
Source	B-6, 3.5'-5.0'	Lab ID	16

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: KAF
Test Date: 06-21-2011
Date Received 06-16-2011

Maximum Particle size: No. 4 Sieve

Sieve Size	% Passing
No. 4	100.0
No. 10	99.4

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: -3 inch fraction only

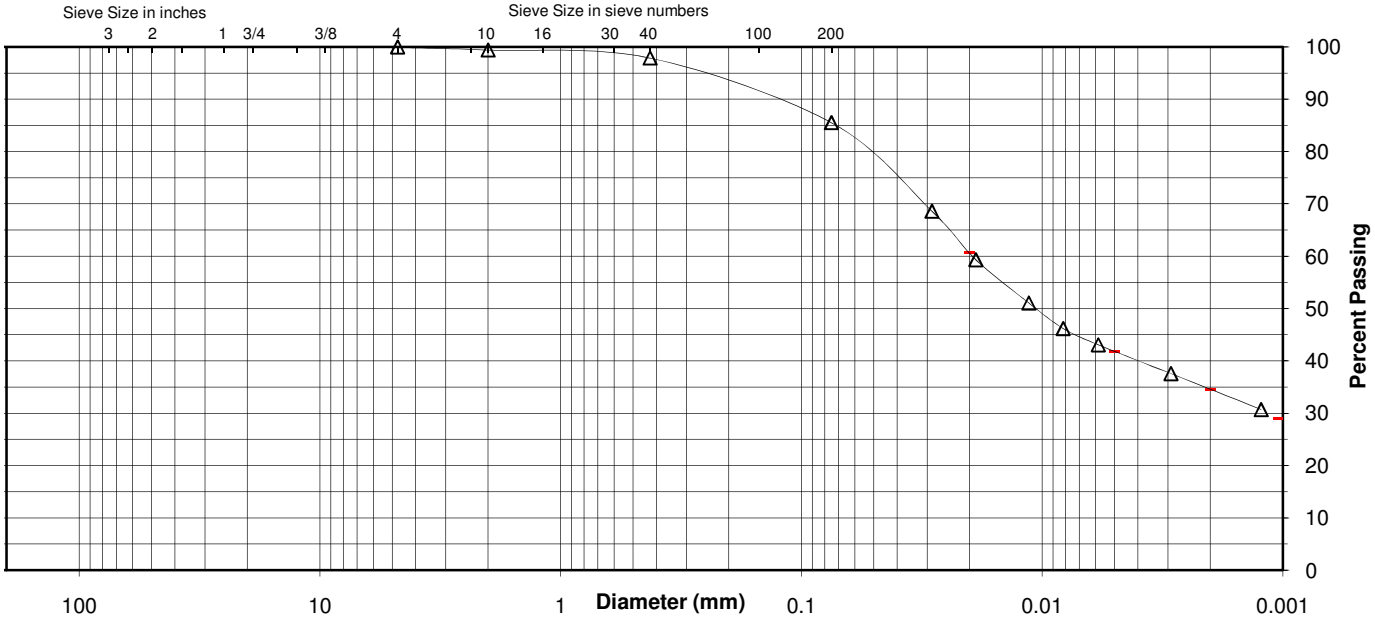
Specific Gravity 2.69

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	97.9
No. 200	85.5
0.02 mm	60.8
0.005 mm	41.9
0.002 mm	34.6
0.001 mm	29.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	0.0	0.0	0.6	1.5	12.4	43.6	41.9
AASHTO	Gravel			Coarse Sand	Fine Sand	Silt	Clay
	0.6			1.5	12.4	50.9	34.6



Comments

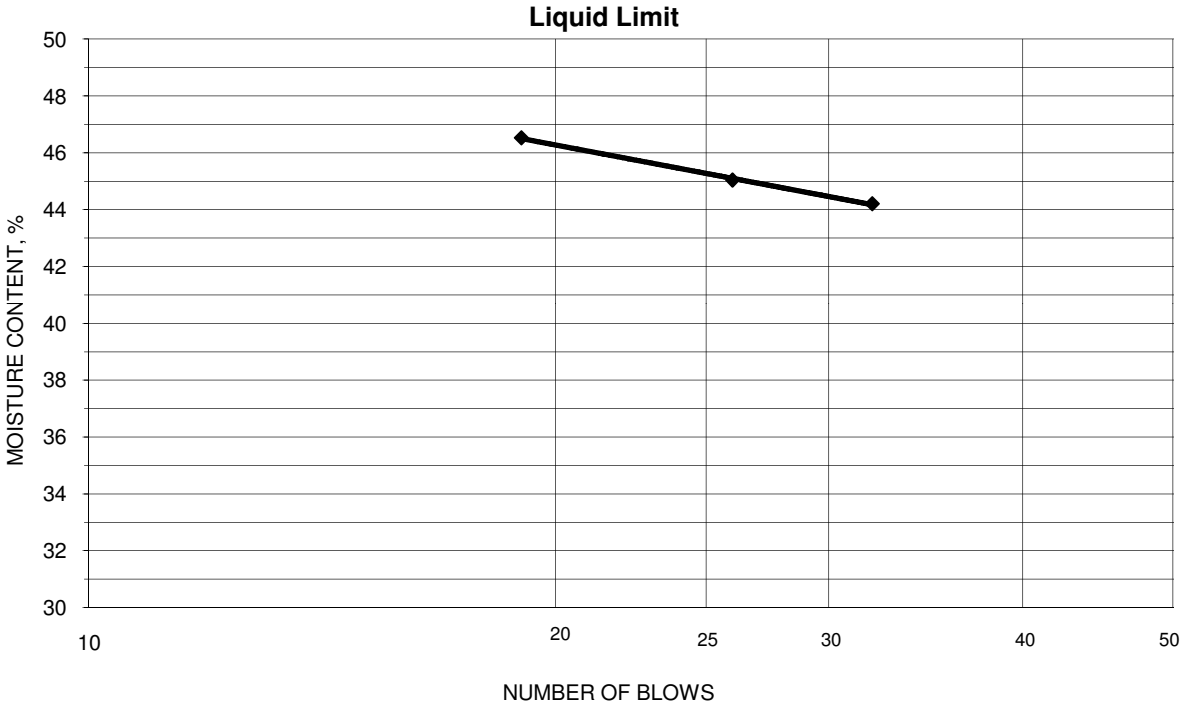
Reviewed By

Stantec

ATTERBERG LIMITS

Project	Detroit Arsenal CDC Addition			Project No.	175531010
Source	B-6, 3.5'-5.0'			Lab ID	16
				% + No. 40	2
Tested By	KR	Test Method	ASTM D 4318 Method A	Date Received	06-16-2011
Test Date	06-22-2011	Prepared	Dry		

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
31.33	24.77	10.67	19	46.5	45
30.43	24.30	10.69	26	45.0	
30.67	24.68	11.13	32	44.2	



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
21.26	19.77	11.07	17.1	17	28
22.04	20.40	11.08	17.6		

Remarks: _____

Reviewed By _____

Stantec

Summary of Soil Tests

Project Name	Detroit Arsenal CDC Addition	Project Number	175531010
Source	B-8, 13.5'-15.0'	Lab ID	28
County	Macomb, MI	Date Received	6-16-11
Sample Type	SPT	Date Reported	6-24-11

Test Results

Natural Moisture Content

ASTM D 2216

Moisture Content (%): 10.7

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
	N/A	
	N/A	
	N/A	
	N/A	
3/4"	19	100.0
3/8"	9.5	98.4
No. 4	4.75	96.2
No. 10	2	93.9
No. 40	0.425	84.7
No. 200	0.075	57.6
	0.02	38.7
	0.005	26.0
	0.002	20.4
estimated	0.001	14.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	3.8	6.1
Coarse Sand	2.4	9.2
Medium Sand	9.2	---
Fine Sand	27.1	27.1
Silt	31.6	37.2
Clay	26.0	20.4

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	23
Plastic Limit:	12
Plasticity Index:	11
Activity Index:	0.55

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.71

Classification

Unified Group Symbol:	CL
Group Name:	Sandy lean clay
AASHTO Classification:	A-6 (3)

Comments:

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Detroit Arsenal CDC Addition
Source: B-8, 13.5'-15.0'
Project Number: 175531010
Lab ID: 28

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: KAF
Test Date: 06-21-2011
Date Received: 06-16-2011

Maximum Particle size: 3/4" Sieve

Sieve Size	% Passing
3/4"	100.0
3/8"	98.4
No. 4	96.2
No. 10	93.9

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: -3 inch fraction only

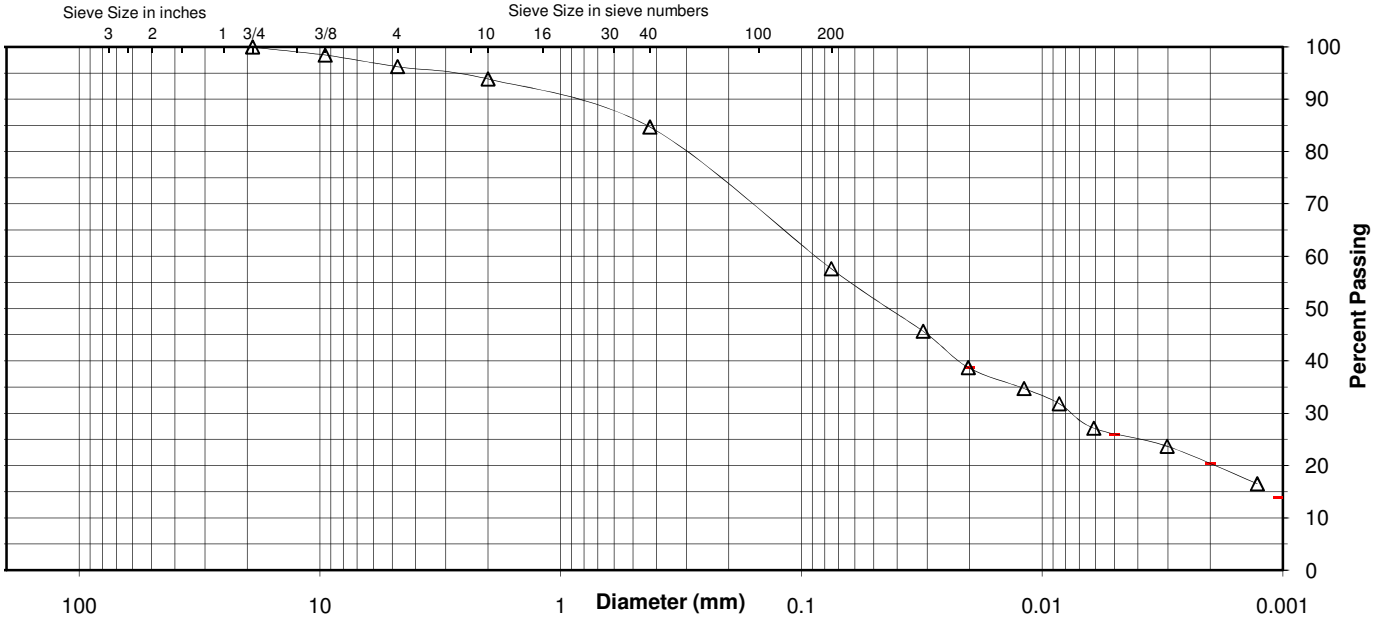
Specific Gravity: 2.71

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	84.7
No. 200	57.6
0.02 mm	38.7
0.005 mm	26.0
0.002 mm	20.4
0.001 mm	14.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	0.0	3.8	2.3	9.2	27.1	31.6	26.0
AASHTO	Gravel			Coarse Sand	Fine Sand	Silt	Clay
	6.1			9.2	27.1	37.2	20.4



Comments

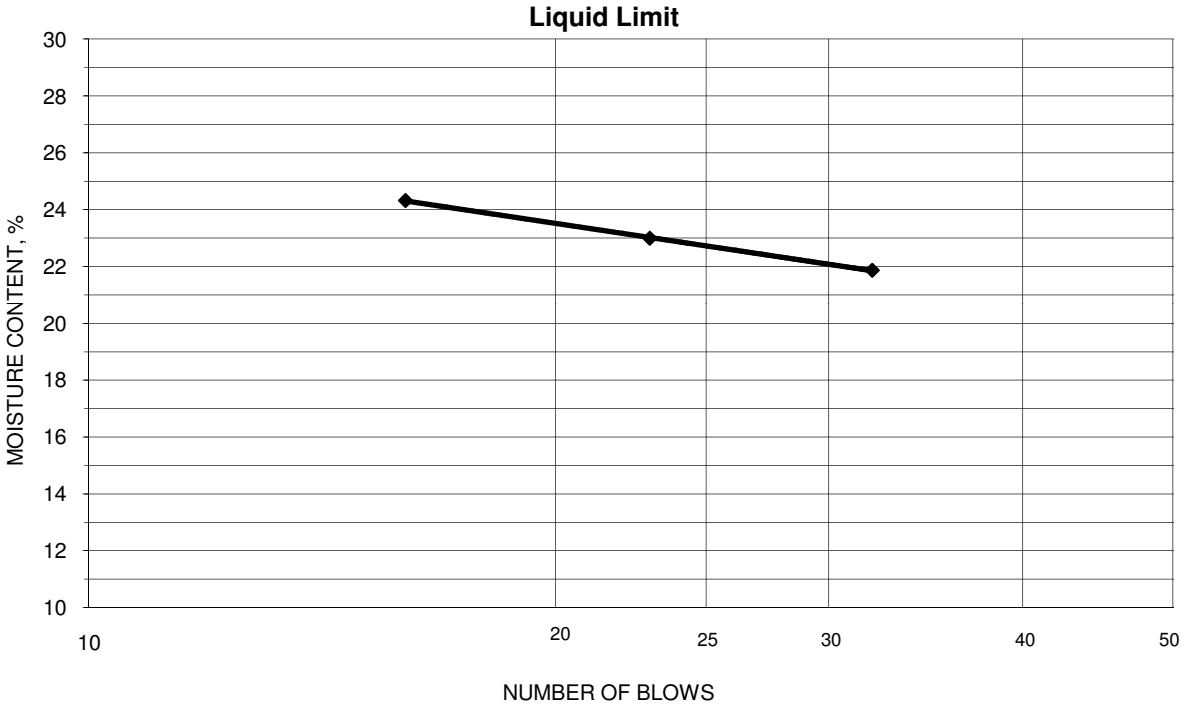
Reviewed By

Stantec

ATTERBERG LIMITS

Project	Detroit Arsenal CDC Addition	Project No.	175531010
Source	B-8, 13.5'-15.0'	Lab ID	28
		% + No. 40	15
Tested By	KR	Test Method	ASTM D 4318 Method A
Test Date	06-23-2011	Prepared	Dry
Date Received	06-16-2011		

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
31.30	27.28	10.75	16	24.3	23
25.30	22.58	10.75	23	23.0	
27.66	24.68	11.05	32	21.9	



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
26.74	24.95	10.62	12.5	12	11
23.58	22.17	10.60	12.2		

Remarks:

Reviewed By

Stantec

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Detroit Arsenal CDC Addition
Source: B-5, 8.0'-10.0'

Project Number: 175531010
Lab ID: 12

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: KAF
Test Date: 06-21-2011
Date Received: 06-16-2011

Maximum Particle size: 1" Sieve

Sieve Size	% Passing
1"	100.0
3/4"	99.2
3/8"	97.4
No. 4	94.5
No. 10	89.5

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: -3 inch fraction only

Specific Gravity: 2.71

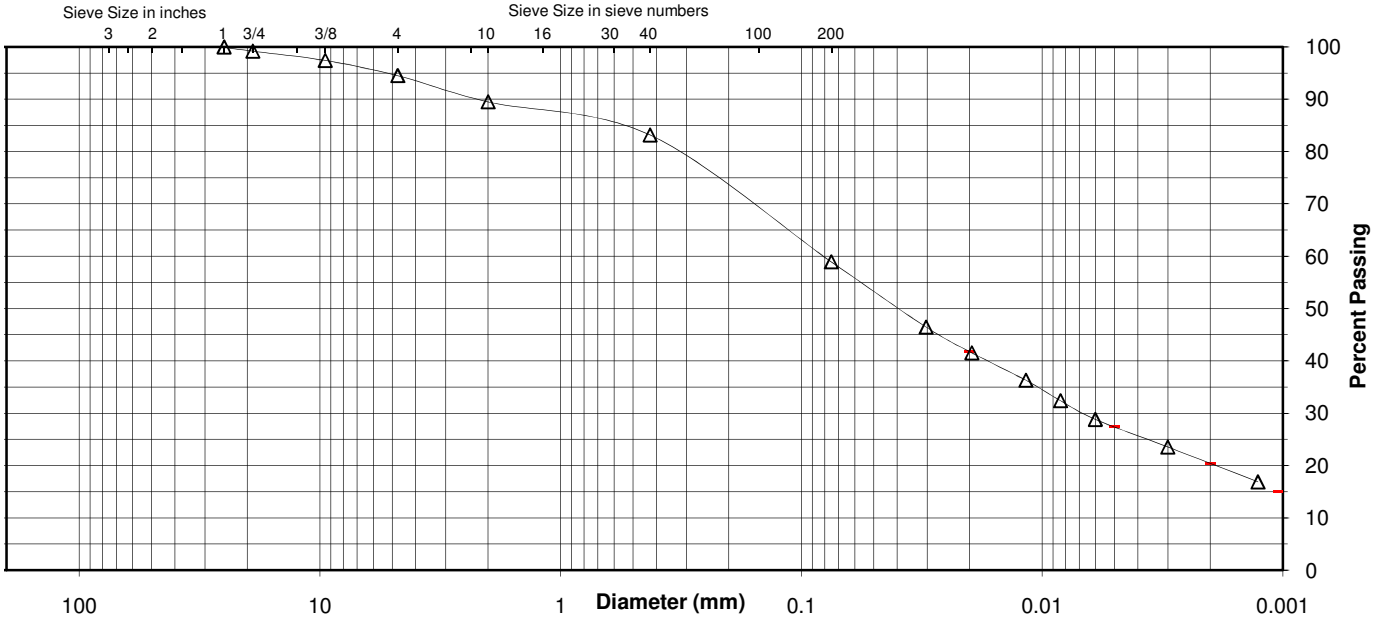
Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	83.2
No. 200	58.9
0.02 mm	41.8
0.005 mm	27.4
0.002 mm	20.4
0.001 mm	15.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	0.8	4.7	5.0	6.3	24.3	31.5	27.4

AASHTO	Gravel	Coarse Sand	Fine Sand	Silt	Clay
	10.5	6.3	24.3	38.5	20.4



Comments

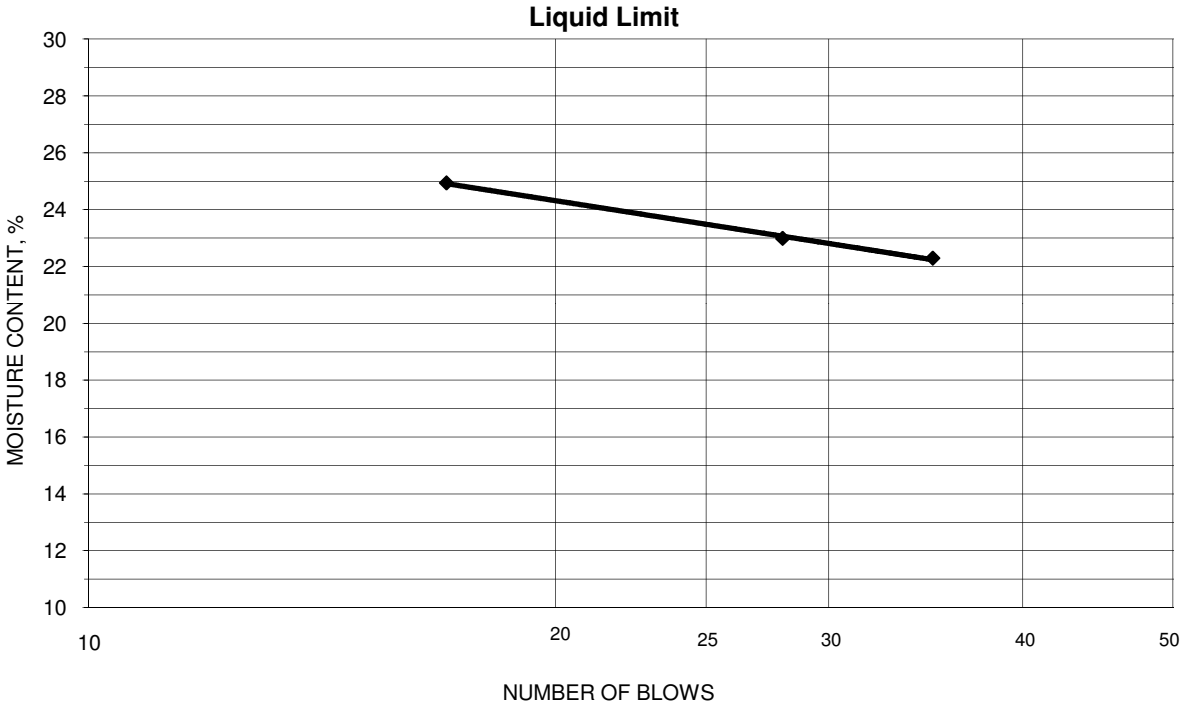
Reviewed By

Stantec

ATTERBERG LIMITS

Project	Detroit Arsenal CDC Addition	Project No.	175531010
Source	B-5, 8.0'-10.0'	Lab ID	12
		% + No. 40	17
Tested By	KR	Test Method	ASTM D 4318 Method A
Test Date	06-22-2011	Prepared	Dry
Date Received	06-16-2011		

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
31.88	27.70	10.94	17	24.9	23
32.01	28.10	11.09	28	23.0	
30.56	27.02	11.14	35	22.3	



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
25.15	23.55	11.07	12.8	13	10
23.96	22.51	10.97	12.6		

Remarks: _____

Reviewed By _____

Specific Gravity

Stantec

Specific Gravity of Soils

ASTM D 854 - 98

Project Name Detroit Arsenal CDC Addition

Project Number 175531010

Test Method [X] A (Dry)

[ ] B (Wet)

Set-Up By BB Date 6/22/2011

Tested By BB Date 6/23/2011

Input By BB Date 6/23/2011

Sample ID	12	16	28	33				
Associated Testing	PSA	PSA	PSA	PSA	PSA	PSA	PSA	PSA
Maximum Particle Size	No. 10	No. 10	No. 10	No. 10	No. 10	No. 10	No. 10	No. 10
Oven Dry Soil and Tare (g)	34.35	32.97	32.25	32.82				
Flask ID	7	70	11	52				
Flask Weight (g)	108.38	116.52	110.69	113.8				
Flask and Soil Weight (g)	131.7	138.88	132.35	135.56				
Flask, Soil and Water Weight (g)	372.12	379.85	373.54	376.65				
Temperature (°C)	21.8	21.5	21.8	21.9				
Flask Calibration Weight (g)	108.38	116.54	110.70	113.80				
Flask Calibration Volume (ml)	249.58	249.79	249.72	249.77				
Test Temperature (°C)	21.8	21.5	21.8	21.9				
Water Density @ Test Temperature (g/ml)	0.99782	0.99789	0.99782	0.99780				
Mass of Flask and Water @ Test Temp. (g)	357.41	365.78	359.87	363.02				
Mass of Oven Dried Sample (g)	23.32	22.36	21.66	21.76				
Specific Gravity of Soil @ Test Temp. (g/ml)	2.71	2.70	2.71	2.68				
Temperature Coefficient, K	0.99961	0.99968	0.99961	0.99959				
Specific Gravity of Soil @ 20°C	2.71	2.69	2.71	2.68				

Checked By EMR Reviewed By EMR

Comments

File: frm_175531010_gs.xlsm Sheet: Input
Preparation Date: 12-2002
Revision Date: 1-2008

Stantec Consulting Services Inc.

Laboratory Document
Prepared By: JW
Approved By: TLK

Unconfined Compression

Stantec

Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

Project Name: Detroit Arsenal CDC Addition
Project Number: 175531010
Source: B-5, 8.0'-10.0'
Lab ID: 12
Visual Description: brown silty clay, firm, moist
Recovered: 1.9'
Test Interval: 9.4' - 9.9'

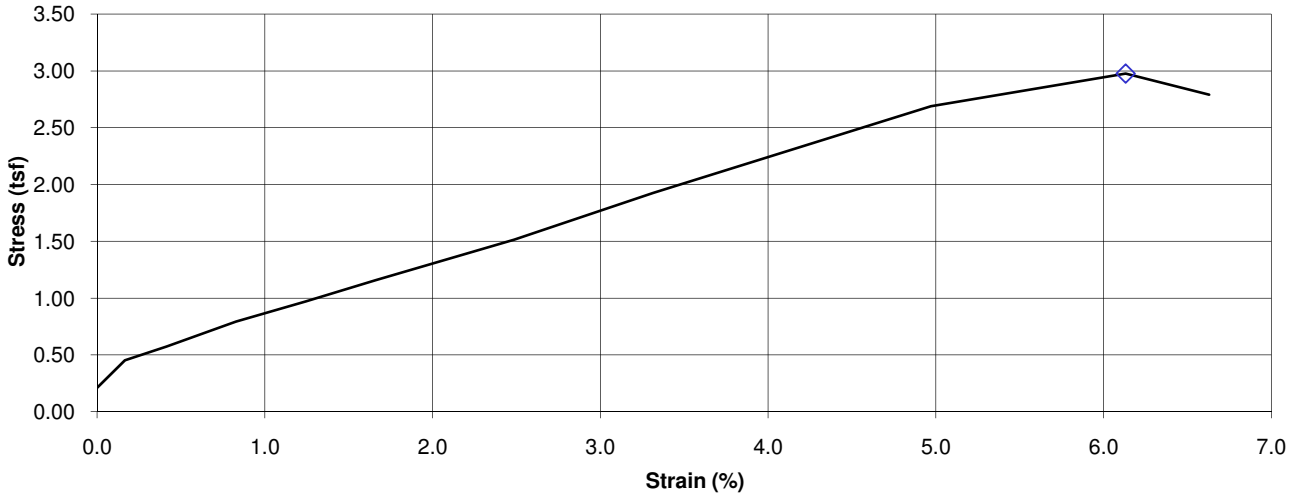
Specimen Type: Undisturbed
LL: N/A
PL: N/A
PI: N/A
Date Extruded: 06/17/2011
Date Tested: 06/17/2011

Initial Wet Density (pcf)	130.8
Initial Moisture Content (%)	13.2
Initial Dry Density (pcf)	115.6
At Test Moisture Content (%)	13.2
At Test Dry Density (pcf)	115.6
Specific Gravity	N/A
Degree of Saturation (%)	N/A
Average Height (in)	6.033
Average Diameter (in)	2.877
Height to Diameter Ratio	2.1

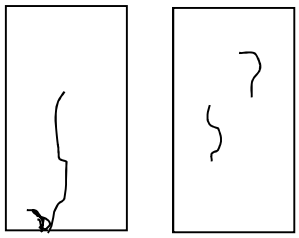
Initial MC Taken: Before Test, From Trimmings
At Test MC Taken: Before Test, From Trimmings

Unconfined Compressive Strength (tsf)	2.98
Undrained Shear Strength (tsf)	1.49
Strain at Maximum Stress (%)	6.1
Strain rate to failure (% / min.)	0.89

Stress vs. Strain



Failure Sketch



Pocket Penetrometer Reading (tsf): N/A
Torvane Reading (kg/cm^2): N/A

Comments

Reviewed By _____

Stantec

Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

Project Name: Detroit Arsenal CDC Addition
Project Number: 175531010
Source: B-9, 3.0'-5.0'
Lab ID: 31
Visual Description: brown silty clay, firm, moist
Recovered: 2'
Test Interval: 4.4' - 4.9'

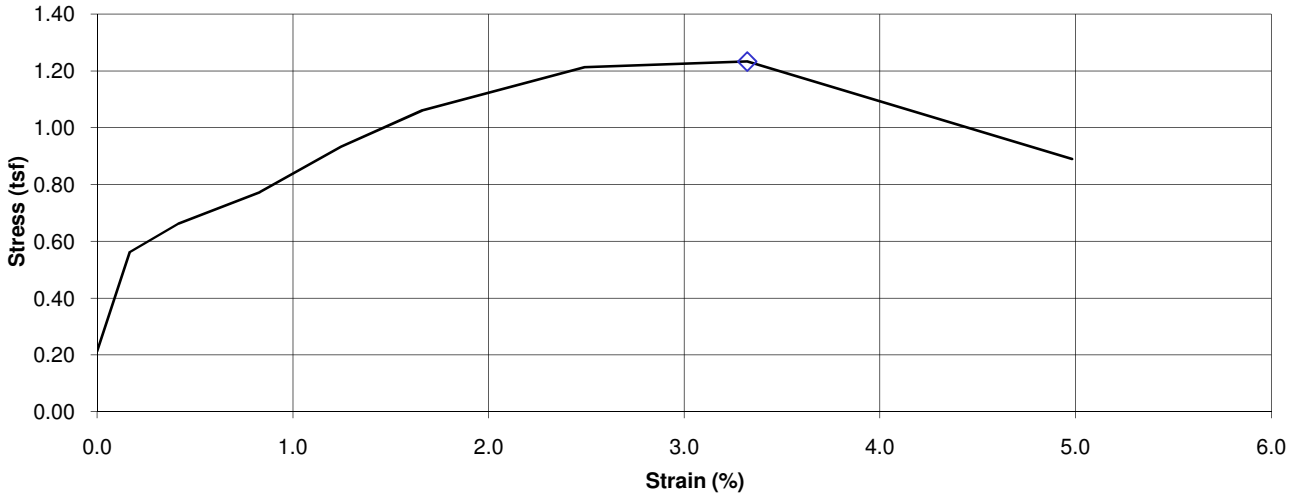
Specimen Type: Undisturbed
LL: N/A
PL: N/A
PI: N/A
Date Extruded: 06/17/2011
Date Tested: 06/17/2011

Initial Wet Density (pcf)	127.7
Initial Moisture Content (%)	24.1
Initial Dry Density (pcf)	102.9
At Test Moisture Content (%)	24.1
At Test Dry Density (pcf)	102.9
Specific Gravity	N/A
Degree of Saturation (%)	N/A
Average Height (in)	6.020
Average Diameter (in)	2.857
Height to Diameter Ratio	2.1

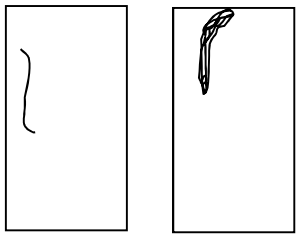
Initial MC Taken: Before Test, From Trimmings
At Test MC Taken: Before Test, From Trimmings

Unconfined Compressive Strength (tsf)	1.23
Undrained Shear Strength (tsf)	0.62
Strain at Maximum Stress (%)	3.3
Strain rate to failure (% / min.)	0.60

Stress vs. Strain



Failure Sketch



Pocket Penetrometer Reading (tsf): N/A
Torvane Reading (kg/cm^2): N/A

Comments

Reviewed By _____

Stantec

Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

Project Name: Detroit Arsenal CDC Addition
Project Number: 175531010
Source: B-6, 1.0'-3.0'
Lab ID: 15
Visual Description: gray silty clay, firm, moist
Recovered: 1'
Test Interval: 2.4' - 2.9'

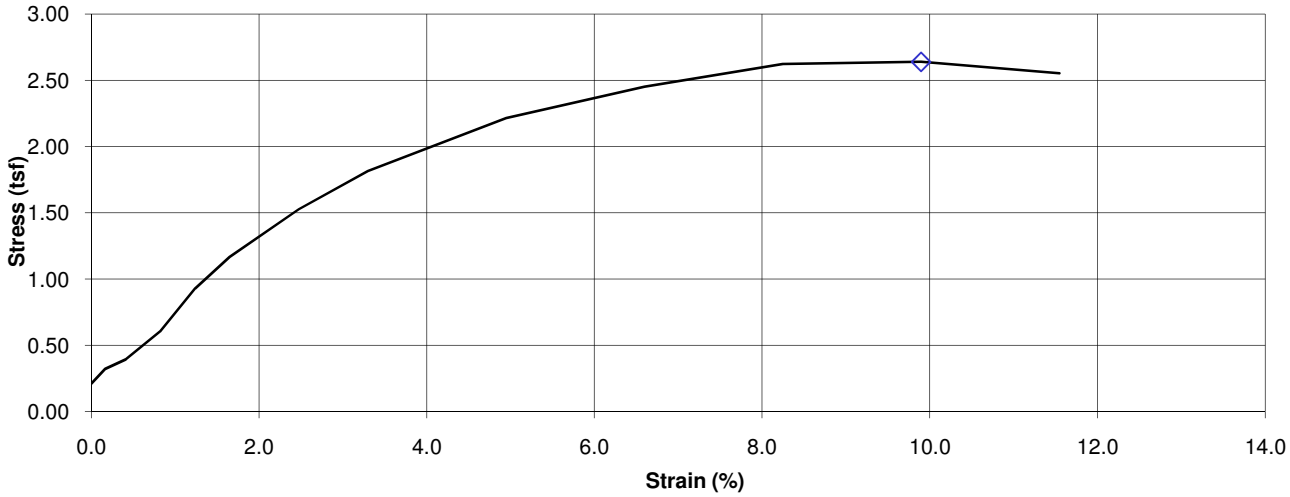
Specimen Type: Undisturbed
LL: N/A
PL: N/A
PI: N/A
Date Extruded: 06/17/2011
Date Tested: 06/17/2011

Initial Wet Density (pcf)	122.7
Initial Moisture Content (%)	20.0
Initial Dry Density (pcf)	102.2
At Test Moisture Content (%)	20.0
At Test Dry Density (pcf)	102.2
Specific Gravity	N/A
Degree of Saturation (%)	N/A
Average Height (in)	6.063
Average Diameter (in)	2.863
Height to Diameter Ratio	2.1

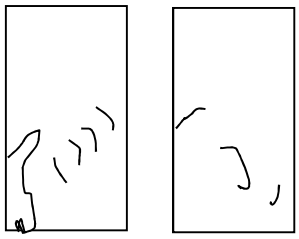
Initial MC Taken: Before Test, From Trimmings
At Test MC Taken: Before Test, From Trimmings

Unconfined Compressive Strength (tsf)	2.64
Undrained Shear Strength (tsf)	1.32
Strain at Maximum Stress (%)	9.9
Strain rate to failure (% / min.)	0.89

Stress vs. Strain



Failure Sketch



Pocket Penetrometer Reading (tsf): N/A
Torvane Reading (kg/cm^2): N/A

Comments

Reviewed By _____

Stantec

Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

Project Name	Detroit Arsenal CDC Addition	Project Number	175531010
Source	B-8, 5.0'-7.0'	Lab ID	26
Visual Description	brown silty clay, stiff, moist		
		Recovered	2'
		Test Interval	5.5' - 6'

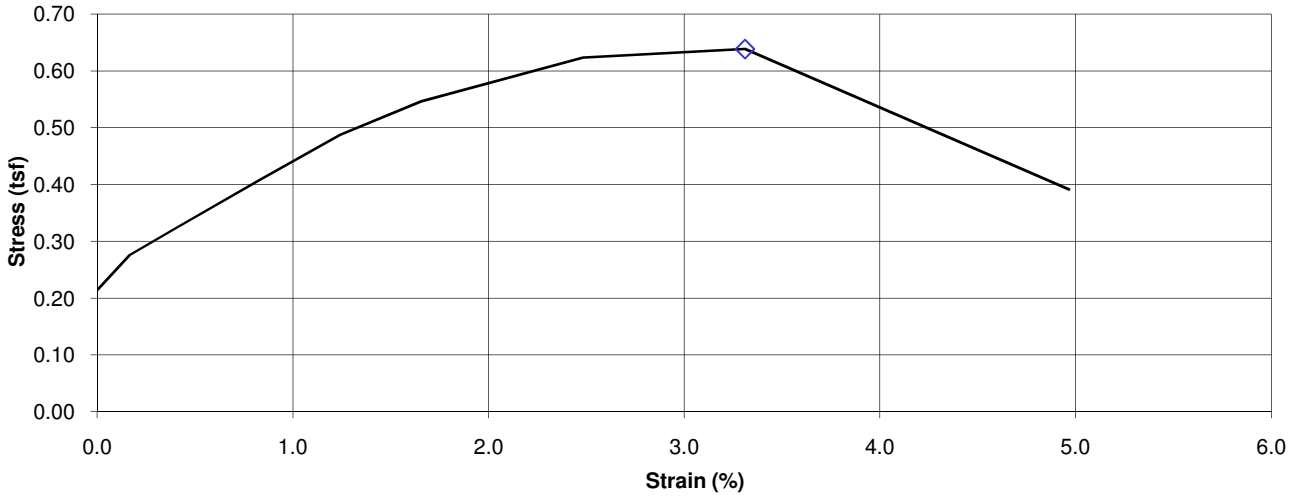
Specimen Type: Undisturbed LL N/A PL N/A PI N/A

Date Extruded 06/17/2011

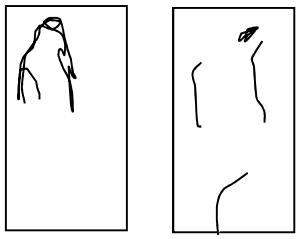
Date Tested 06/17/2011

Initial Wet Density (pcf)	122.2		
Initial Moisture Content (%)	26.0	Initial MC Taken	Before Test, From Trimmings
Initial Dry Density (pcf)	96.9		
At Test Moisture Content (%)	26.0	At Test MC Taken	Before Test, From Trimmings
At Test Dry Density (pcf)	96.9		
Specific Gravity	N/A		
Degree of Saturation (%)	N/A	Unconfined Compressive Strength (tsf)	0.64
Average Height (in)	6.040	Undrained Shear Strength (tsf)	0.32
Average Diameter (in)	2.847	Strain at Maximum Stress (%)	3.3
Height to Diameter Ratio	2.1	Strain rate to failure (% / min.)	0.75

Stress vs. Strain



Failure Sketch



Pocket Penetrometer Reading (tsf) N/A

Torvane Reading (kg/cm^2) N/A

Comments

Reviewed By

Standard Proctor and CBR Results

(pending)

Appendix D

Soil Corrosivity

(preliminary)

FES FOUSER ENVIRONMENTAL SERVICES
165 Camden Avenue, Versailles, Ky. 40383 Phone: 859-873-6211 Fax: 859-873-3715 e-mail: lab@fouser.com
LABORATORY/CONSULTING

Certificate of Analysis

Ms. Jacquelin Harmon
Stantec
11687 Lebanon Road
Cincinnati, Ohio 45241

Project:
Entered By: Ellen Fouser
Date Reported: 6/27/2011
Date Received: 6/23/2011
Date Complete:

Test	Method	Result	Units	PQL	Date	Analyst
916120-01	**Boring 5**	**6/6/11**				
Soil Analysis						
pH	SW-9040C	7.62	S.U.		6/23/2011	KM
Chloride	SW-9056A	55.2	mg/kg		6/24/2011	EW
Sulfate	SW-9056A	76.6	mg/kg		6/24/2011	EW
Sulfide	SW-9056A		mg/kg			KM
916120-02	**Boring 8**	**6/6/11**				
Soil Analysis						
pH	SW-9040C	7.85	S.U.		6/23/2011	KM
Chloride	SW-9056A	29.3	mg/kg		6/24/2011	EW
Sulfate	SW-9056A	107	mg/kg		6/24/2011	EW
Sulfide	SW-9056A		mg/kg			KM

Approved By: _____

Appendix E

Flexible Pavement Design

(preliminary)

Stantec

CALCULATION COVER SHEET

Project Name:	Detroit Arsenal CDC
Project Number:	175531010
Date:	25 June 2011

Description of Calculation

Flexible Pavement Design

Assumptions

1) Traffic Loads based on facility type (confirm with user)
2) Subgrade preparation in accordance with geotechnical report recommendations

References/Data Used

1) UFC-3-250-01FA "Pavement Design for Roads, Streets, Walks, and Open Storage Areas"
2) PCASE Version 2.09
3) USACE Louisville District "Geotechnical Requirements for the Preparation of Full Plans and Specs Solicitation Packages"
4) Michigan DOT specifications
5) Available laboratory tests (moisture content, classification)

Calculations By: R. J. MAZZONI, PE

Checked By:

Stantec

DETROIT ARSENAL CDC
65% DESIGN

FLEXIBLE PAVEMENT DESIGN

1) TRAFFIC ESTIMATE
- APPROXIMATELY 81 POV PARKING SPACES
- ASSUME 2 DUMPSTER TRUCKS PER WEEK
- ASSUME 2 DELIVERY TRUCKS / DAY
- ASSUME 2 PASSES / POV A.M. PER PARKING SPACE
  2 PASSES / POV P.M. PER PARKING SPACE
  SAY 350 PASSES / DAY
- ASSUME 1 SEMI TRAILER TRUCK 2 DAYS PER WEEK

2) SUBGRADE
a.) CONSISTS OF LEAN CLAY (USCS CLASSIFICATION: CL)

PRELIMINARY ESTIMATE OF CALIFORNIA BEARING RATIO: 4

b.) FINES CONTENT (SILT AND CLAY SIZED) RANGES FROM 57% to 86% IN SAMPLES TESTED.

3) USE PCASE 2.09 FOR DESIGN
(SEE UFC 3-250-01FA "PAVEMENT DESIGN FOR ROADS, STREETS, WALKS, AND OPEN STORAGE AREAS.")

a) 25-YEAR DESIGN LIFE
b) FROST SUSCEPTIBLE SUBGRADE: SELECT DETROIT METRO WEATHER STATION FOR DEPTH OF FROST CALC.
c) SEE LAB DATA FOR MOISTURE CONTENT AND UNIT WEIGHT DATA (REVISE AS NECESSARY BASED ON PROCTOR TESTING)

Designed by: MAZZOM Checked by:

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USE γ_{DRY} = 100

W = 23% (SUBGRADE)

d) SELECT SOIL SUPPORT INDEX FOR F3/F4 SUBGRADE AS CBR VALUE = 3.5 (SEE 18-14 OF UFC 3-250-01FA)

SUMMARY

(SEE ATTACHED PCASE OUTPUT)

MATERIAL	THICKNESS (INCHES)	COMMENTS
HMA SURFACE	1.5	MICHIGAN DOT SPEC SECTION DIV 5
HMA BASE	2.0	MDOT DIV 5
DRAINAGE LAYER	4.0	MDOT No. 6AA CRUSHED STONE *
BASE/SEPARATION	4.0	MDOT No. 22A CRUSHED STONE

* MAY BE "CHOKED OFF WITH MDOT No. 34R OR 34G CRUSHED STONE

NOTE: 1) THIS IS MINIMUM PAVEMENT SECTION ALLOWED BY USACE LOUISVILLE DISTRICT

2) UNDERDRAIN SYSTEM IS REQUIRED PER USACE GUIDANCE

3) SUBGRADE PREPARATION SHALL CONSIST OF

Designed by: MAZZOM Checked by:

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SCARIFYING AND RECOMPACTING UPPER 4 INCHES (MINIMUM) OF SUBGRADE SOILS TO AT LEAST 90% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY.

Designed by: MATRONI

Checked by:

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Pavement Design Report
U.S. Army Corps of Engineers
PCASE Version 2.09.01
Date : 6/26/2011

Design Name :	CDC LIGHT DUTY						
Design Type :	Roads						
Pavement Type :	Flexible						
Road Type :	Parking Area						
Terrain Type :	Flat						
Analysis Type :	CBR						
Depth of Frost (in) :	31						
Wander Width (in) :	33.35						
Layer Information							
Layer Type	Material Type	Frost Code	Analysis	Non frost Design Thickness (in)	Reduced Subgrade Strength (in)	Limited Subgrade Penetration (in)	CBR Strength
Asphalt	Asphalt	NFS	Manual	3.5	3.5	3.5	0
Base	Unbound Crushed Stone	NFS	Compute	4	4	14.29	80
Drainage	N/A	NFS	Manual	4	4	4	50
Geotextile	N/A	NFS	Compute	0	0	0	0
Natural Subgrade	Cohesive Cut	F3/F4	Manual	0	0	0	3.5
Traffic Information							
Pattern Name :	CDC VEHICLES						
Vehicles	Weight (lb)	Passes per Life Span	Equivalent Passes				
CAR - PASSENGER	4000	2730000	1				
TRUCK, 2 AXLE 6 TIRE	18000	13000	2				
TRUCK, 3 AXLE	55000	2600	2600				
TRUCK, 5 AXLE	80000	2600	1236				
TRUCK, LARGE PICKUP OR SUV	6000	455000	1				
Equivalent Single Axle Loads			24850				

Se

Design Name :	CDC LIGHT DUTY
Design Type :	Roads
Pavement Type :	Flexible
Traffic Area :	N/A
Road Type :	Parking Area
Terrain Type :	Flat
Analysis Type :	CBR
Depth of Frost (in) :	31
SCI :	0
Wander Width (in) :	33.35
% Load Transfer :	0
Effective K (pci) :	0
Reduced Sub Effective K (pci) :	0
Layers Count :	5
Seasons Count :	1
Joint Spacing :	0
Dowel Spacing :	0
Dowel Length :	0
Dowel Diameter:	0

Layer Type	Material Type	Frost Code	Moisture Content	Dry Weight (lb/cu ft)	Density (lb/cu ft)	Flexural Strength (psi)	CrCb	% Steel	Analysis	Minimum Thickness (in)	Required Thickness (in) Above Layer	Non frost Design Thickness (in)	Equivalent Thickness (in)	Reduced Subgrade Strength (in)	Limited Subgrade Penetration (in)	Calculate at this Depth	Base Equivalency factor	Subbase Equivalency Factor	CBR Strength	Modulus (psi)	Pr	Slip
Asphalt	Asphalt	NFS	0	145	0	0	0	0	Manual	2	0	3.5	5.46	3.5	3.5	No	1.15	2.3	0	350000	0.35	0
Base	Unbound Crushed Stone	NFS	5	135	0	0	0	0	Compute	4	0	4	9.46	4	14.29	N\A	1	1	80	30000	0.35	0
Drainage	N/A	NFS	5	130	0	0	0	0	Manual	4	0	4	13.46	4	4	N\A	1	1	50	30000	0.35	0
Geotextile	N/A	NFS	0	0	0	0	0	0	Compute	0	0	0	0	0	0	N\A	0	0	0	0	0	0
Natural Subgrade	Cohesive Cut	F3/F4	23	100	0	0	0	0	Manual	0	12.48	0	0	0	0	No	1	1	3.5	15000	0.4	0

Pattern Name :	CDC VEHICLES
AnalysisType :	Mixed
Pavement Type :	Flexible
Subgrade Category :	Cat D
Traffic Area :	Area A
Traffic Count :	5

Vehicles	Weight (lb)	Passes per Life Span	Equivalent Passes
CAR - PASSENGER	4000	2730000	1
TRUCK, 2 AXLE 6 TIRE	18000	13000	2
TRUCK, 3 AXLE	55000	2600	2600
TRUCK, 5 AXLE	80000	2600	1236
TRUCK, LARGE PICKUP OR SUV	6000	455000	1
Equivalent Single Axle Loads			24850

Se

AASHTO 1993 ESAL Calculator for Flexible Pavements

Project Name:	Detroit Arsenal CDC		
Project Number:	175531010		
Description:	Light Duty Pavement		
Prepared By:	Mazzoni	Date:	06/24/11
Checked By:		Date:	
Reference:	AASHTO Guide for Design of Pavement Structures 1993		

Vehicle Description	Traffic Volume: Quantity in the Design Lane	Traffic Volume: Days per Week	Traffic Volume: Weeks per Year	Analysis Period (years)	Axle Load and Type: Axle 1 (kips)		Axle 2 (kips)		Axle 3 (kips)		Gross Weight (pounds)	Equivalency Factors: Axle 1	Equivalency Factors: Axle 2	Equivalency Factors: Axle 3	Passes per Design Life	ESAL's
Passenger car	300	7	52	25	2	S	2	S			4,000	0.0004	0.0004		2,730,000	1,980
Pick-up truck or van	50	7	52	25	2	S	4	S			6,000	0.0004	0.0040		455,000	1,980
Recreational vehicle					4	S	4	S			8,000	0.0040	0.0040			0
School bus					2	S	4	S			6,000	0.0004	0.0040			0
TARC bus					8	S	14	S			22,000	0.0518	0.3822			0
Greyhound MC-12 bus					13.4	S	18.4	S	6	S	37,800	0.3255	1.0918	0.0180		0
Package delivery truck	2	5	52	25	4	S	14	S			18,000	0.0040	0.3822		13,000	5,020
Beverage delivery truck					6	S	12	S	12	S	30,000	0.0180	0.2188	0.2188		0
Garbage/dumpster truck	1	2	52	25	20	S	35	T			55,000	1.5314	1.2302		2,600	7,180
Concrete truck (full)					20	S	48	R			68,000	1.5314	1.0463			0
Dump truck (full)					20	S	48	R			68,000	1.5314	1.0463			0
Semi-tractor (no trailer)					8	S	2	T			10,000	0.0518	0.0001			0
Semi-tractor trailer (empty)					8	S	8	T	6	T	22,000	0.0518	0.0055	0.0019		0
Semi-tractor trailer/M-1 tank	1	2	52	25	12	S	34	T	34	T	80,000	0.2188	1.0979	1.0979	2,600	6,280
Vehicle type H10					4	S	16	S			20,000	0.0040	0.6312			0
Vehicle type H15					6	S	24	S			30,000	0.0180	3.2985			0
Vehicle type H20					8	S	32	S			40,000	0.0518	11.7433			0
Airport fuel truck					36	S	84	T			120,000	20.0380	55.9407			0
Vehicle type HS15					6	S	24	S	24	S	54,000	0.0180	3.2985	3.2985		0
Vehicle type HS20					8	S	32	S	32	S	72,000	0.0518	11.7433	11.7433		0
Vehicle type 3S2					10	S	31	T	31	T	72,000	0.1147	0.7692	0.7692		0

Terminal Serviceability, ρ_t	2.5
Assumed Structural Number, SN	2.50

Summary:		
	Total AASHTO ESAL's	22,440
	Suggested Mixture Class	ESAL Class 1
	Suggested Binder Grade	PG 64-22

UFC 3-250-01FA
16 January 2004

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UNIFIED FACILITIES CRITERIA (UFC)

PAVEMENT DESIGN FOR ROADS, STREETS, WALKS, AND OPEN STORAGE AREAS

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materials with fines within the stated limits. Occasionally, GC or SC materials may occur within the F. group, although they will normally fall into the F3 category. The basis for division be- tween the Fl and F. groups is that Fl materials may he expected to show higher hearing capacity than F. materials during thaw, even though both may have experienced equal ice segregation.

c. Varved clays. Valved clays consisting of alternating layers of silts and clays are likely to combine the undesirable properties of both silts and clays. These and other stratified fine-grained sediments may be hard to classify for frost design. Since such soils are likely to heave and soften more readily than homogeneous soils with equal average water contents, the classification of the material of highest frost susceptibility should be adopted for design. Usually, this will place the overall deposit in the F4 category.

d. Special conditions. Under special conditions the frost group classification adopted for design may be permitted to differ from that obtained by application of the above frost group definitions. This will, however, he subject to the specific approval of HQUSACE (CEMP-ET) or the appropriate Air Force Major Command if the difference is not greater than one frost group number and if complete justification for the variation is presented. Such justification may take into account special conditions of subgrade moisture or soil uniformity, in addition to soil gradation and plasticity, and should include data on performance of existing pavements near those proposed to be constructed.

18-4. Alternative Methods of Thickness Design.

The thickness design process is the determination of the required thickness for each layer of a pavement system and of the combined thickness of all layers above the subgrade. Its objective is determining the lowest-cost pavement system whose rate of deterioration under traffic loads and environmental conditions will be acceptably low. In seasonal frost areas the thickness design process must include the effects of frost action. Two methods are prescribed for determining the thickness design of a pavement that will have adequate resistance to distortion by frost heave and cracking and distortion under traffic loads as affected by seasonal variation of supporting capacity, including possible severe weakening during frost-melting periods.

a. Limited subgrade frost penetration method. The first method is directed specifically to the control of pavement distortion caused by frost heave. It requires a sufficient thickness of pavement, base, and subbase to limit the penetration of frost into the frost-susceptible subgrade to an acceptable amount. Included also in this method is a design approach which determines the thickness of pavement, base, and subbase necessary to prevent the penetration of frost into the subgrade. Prevention of frost penetration into the subgrade is nearly always uneconomical and unnecessary, and will not he used to design pavements to serve conventional traffic, except when approved by HQUSACE (CEMP-ET) or the appropriate Air Force Major Command.

b. Reduced subgrade strength method. The second method does not seek to limit the penetration of frost into the subgrade, but it determines the thickness of pavement, base, and subbase that will adequately carry traffic loads over the design period of years, each of which includes one or more periods during which the subgrade supporting capacity is sharply reduced by frost melting. This approach relies on uniform subgrade conditions, adequate subgrade preparation techniques, and transitions for adequate control of pavement roughness resulting from differential frost heave.

18-5. Selection of Design Method.

In most cases the choice of the pavement design method will he made in favor of the one that gives the lower cost. Exceptions dictating the choice of the limited subgrade frost penetration method, even at higher cost, include pavements in locations where subgrade soils are so extremely variable (as, for example, in some glaciated areas) that the required subgrade preparation techniques could not be expected to provide sufficient protection against differential frost heave. In other cases special operational demands on the pavement might dictate unusually severe restrictions on tolerable pavement roughness, requiring that subgrade frost penetration he strictly limited or even prevented. If the use of limited subgrade frost penetration method is not required, tentative designs must be prepared by both methods for comparison of costs. Also, a tentative design must he prepared following the nonfrost-design criteria, since the thickness requirements under nonfrost-criteria must be met in addition to the frost design requirements.

18-6. Limited Subgrade Frost Penetration.

This method of design for seasonal frost conditions should he used where it requires less thickness than the reduced subgrade strength method. Its use is likely to he economical only in regions of low design freezing index.

a. Air freezing index. Air freezing index values

Se

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should he based on actual air temperatures obtained from the meteorological station closest to the construction site. This is desirable because differences in elevation or topographical position, or nearness to bodies of water, cities, or other sources of heat may cause considerable variation in air freezing indexes over short distances. These variations are of greater relative importance in areas of design freezing index of less than 1,000 degree Fahrenheit days (i.e. mean air freezing index of less than about 500 degree Fahrenheit days) than they are in colder climates. The daily maximum and minimum and mean monthly air temperature records for all stations that report to the U.S. National Weather Service are available from Weather Service Centers. One of these centers is generally located in each state. The mean air freezing index may be based on mean monthly air temperatures, but computation of values for the design freezing index may he limited to only the coldest years in the desired cycle. These years may be selected from the tabulation of average monthly temperatures for the nearest first-order weather station. (A local climatological data summary containing this tabulation for the period of record is published annually by the National Weather Service for each of the approximately 350 U.S. first-order stations.) If the temperature record of the station closest to the construction site is not long enough to determine the mean or design freezing index values, the available data should be related, for the same period, to that of the nearest station or stations of adequate record. Site air freezing index values can then be computed based on this established relation and the indexes for the more distant station or stations.

b. Design freezing index. The design freezing index should he used in determining the combined thickness of pavement, base, and subbase required to limit subgrade frost penetration. As with any natural climatic phenomenon, winters that are colder than average occur with a frequency that decreases as the degree of departure from average becomes greater. A mean freezing index cannot be computed where temperatures in some of the winters do not fall below freezing. A design method has been adopted that uses the average air freezing index for the three coldest years in a 30-year period (or for the coldest winter in 10 years of record) as the design freezing index to determine the thickness of protection that will he provided. A distribution of design freezing index for North America is shown in figure 18-2 and is to be used as a guide only.

uniform by the required techniques of subgrade preparation. This will prevent or minimize significant or objectionable differential heaving and resultant cracking of pavements. When the reduced subgrade strength method is used for F4 subgrade soils, unusually rigorous control of subgrade preparation must be required. When a thickness determined by the reduced subgrade strength procedure exceeds that determined for limited subgrade frost penetration, the latter smaller value shall be used, provided it is at least equal to the thickness required for nonfrost conditions. In situations where use of the reduced subgrade strength procedure might result in objectionable frost heave, but use of the greater thickness of base course indicated by the limited subgrade frost penetration design procedure is not considered necessary, intermediate design thickness may be used. However, these must be justified on the basis of frost heaving experience developed from existing pavements where climatic and soil conditions are comparable.

a. Thickness of flexible pavements. In the reduced subgrade strength procedure for design, the design curves herein (fig 8-1) should be used for road, street, and parking area design. The curves should not be entered with subgrade CBR values determined by tests or estimates, but instead with the applicable frost-area soil support index from table 18-3. Frost-area soil support indexes are used as if they were CBR values; the term CBR is not applied to them, however, because being weighted average values for an annual cycle, their value cannot be determined by CBR tests. The soil support index for Si or S2 material meeting current specifications for base or subbase will be determined by conventional CBR tests in the unfrozen state.

Table 18-3. Frost-Area Soil Support Indexes for Subgrade Soils for Flexible Pavement Design.

Frost group of subgrade soil	Frost-area soil support index
F1 and S1	9.0
F2 and S2	6.5
F3 and F4	3.5

(1) General field data and experience indicate that on the relatively narrow embankiments of roads and streets, reduction in strength of subgrades during frost melting may be less in substantial fills than in cuts because of better drainage conditions and less intense ice segregation. If local field data and experience show this to be the case, then a reduction in combined thickness of pavement and base for frost conditions of up to 10 percent may be permitted for substantial fills.

(2) Flexible pavement criteria for nonfrost design should also be used to determine the thickness of individual layers in the pavement system, and to ascertain whether it will be advantageous to include one or more layers of bound base in the system. The base course composition requirements set forth must be followed rigorously.

b. Thickness of rigid pavements. Where frost is expected to penetrate into a frost-susceptible subgrade beneath a rigid pavement, it is good practice to use a nonfrost-susceptible base course at least equal in thickness to the slab. Experience has shown, however, that rigid pavements with only a 4-inch base have performed well in cold environments with relatively uniform subgrade conditions. Accordingly, where subgrade soils can be made reasonably uniform by the required procedures of subgrade preparation, the minimum thickness of granular unbound base may be reduced to a minimum of 4 inches. The material shall meet the requirements set forth below for free-draining material as well as the criteria for filter under pavement slab. If it does not also meet the criteria for filter over subgrade, a second 4-inch layer meeting that criteria shall be provided.

(1) Additional granular unbound base course, giving a thickness greater than the minimum specified above, will improve pavement performance, giving a higher frost-area index of reaction on the surface of the unbound base (fig. 18-5) and permitting a pavement slab of less thickness. Bound base also has significant structural value, and may be used to effect a further reduction in the required thickness of rigid pavement slab. Criteria for determining the required thickness of rigid pavement slabs in combination with a bound base course are contained in chapter 12. The requirements for granular unbound base as drainage and filter layers will still be applicable.

(2) The thickness of concrete pavement will be determined in accordance with chapter 12, using the frost-area index of reaction determined from figure 18-5. This figure shows the equivalent weighted average index of reaction values for an annual cycle that includes a period of thaw-weakening in relation to the thickness base. Frost-area indexes of reaction are used as if they were moduli of reaction, k, and have the same units. The term modulus of reaction is not applied to them because being weighted average values for an annual cycle,

Subgrade Preparation for roads

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CDC

FROM PCASE 2.09

It is a basic requirement for all pavements constructed in frost areas that subgrades in which freezing will occur be as uniform as possible. The depth of subgrade preparation is applicable for limited subgrade penetration and reduced subgrade strength design. The depth of subgrade preparation measured downward from the top of the subgrade shall be lesser of:

(0.6 meter) 24"

OR

2/3 of Frost Penetration FOR CLASS A, B, C ROADS, STREETS, AND OPEN STORAGE AREAS

minus the total thickness of pavement, base course, and subbase

OR

*

1/2 of Frost Penetration FOR CLASS D, E, F ROADS, STREETS, AND OPEN STORAGE AREAS

minus the total thickness of pavement, base course, and subbase

DEPTH OF FROST = 31 INCHES

CLASS D, E, OR F ROAD

∴ ½ (31 INCHES) − 3.5 IN ASPHALT − 8 IN CRUSHED STONE

= 4 INCHES

SCARIFY AND RECOMPACT TO AT LEAST
90% OF MODIFIED PROCTOR MAX DRY DENSITY
THE UPPER 4 INCHES OF MORE OF SUBGRADE SOILS
(SAY +/- 2% OF OPTIMUM MOISTURE)

Detroit Arsenal
CDC

GEOTECHNICAL REQUIREMENTS to
AE firms for the preparation of
Full Plans and Specs Solicitation Packages for the
Louisville District COE
04-07

Purpose: The purpose of this document is to outline the geotechnical requirements for the Louisville District's military construction projects (using Full Plans and Specs RFPs) in order to assist the AE in providing direction to the geotechnical subcontractor(s) and prepare the Earthwork specifications 31 00 00.00 06 (formerly 02300L) and the plans.

1.0 GEOTECHNICAL INVESTIGATIONS

1.1 **General**: A geotechnical exploration is performed to obtain specific subsurface data at the site and to provide foundation and earthwork requirements for all projects. The geotechnical exploration shall be performed under the direction of a professional engineer specializing in geotechnical engineering with a minimum of 10 years experience. In addition, a geotechnical ITR member is required to perform Quality Control. The data shall include the depth, thickness, extent, and composition of each stratum and the groundwater conditions. Geotechnical Report shall be submitted at the 30% design stage of design. The purpose of completing the Geotechnical Report at the 30% design stage is to assist in locating structures, to identify potential site development problems, and to determine the foundation system before the design proceeds too far, or down the wrong path.

1.1.1 Submission of Drilling Program. The AE shall complete the "Proposed Geotechnical Exploration Data" sheet (see Exhibit 44 of this document) outlining the proposed scope of exploration and return it as an attachment to the fee proposal before negotiation of the original contract. The character and extent of the exploration shall be designed in consideration of the importance of the structure to be constructed. The "Proposed Geotechnical Exploration Data" sheet is merely a guide for the exploration and is flexible; the final program should develop as information accumulates in order to obtain the greatest amount of useful information in the most cost-effective manner.

1.2 **Method of Exploration**

(a) The field investigation shall consist of a series of soil test borings. The number and spacing of the borings depend upon the type of structure as well as the uniformity of the soil formations. The spacing shall be smaller in those areas subjected to heavy loads and greater in less critical areas. Generally, a minimum of four soil test borings is required for building structures. The borings shall penetrate all soil strata that could shear or consolidate materially under the proposed structural loads. For very heavy or sensitive structures, the borings shall extend to refusal or to bedrock. If design or subsurface conditions warrant, core samples shall be obtained to verify the character and continuity of the refusal material.

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(b) a review of the area geologic conditions and site topographic features;

(c) a review of the subsurface stratigraphy with the results of all testing conducted;

(d) a general evaluation of the site considering the proposed project and the estimated subsurface conditions;

(e) comprehensive foundation and earthwork recommendations including bearing capacity and settlement calculations and discussions to support the recommended foundation system; and will

(f) Provide backup for any design parameters such as shear strength, earth pressure coefficients, friction factors, subgrade modulus, CBR, etc.

(g) Provide Seismic design criteria (Ss, S1, and site class).

(h) Include Pavement Design Calculations. Pavement designs shall be in accordance with appropriate Army Technical Manuals. Specifically: TM 5-809-12 (slab on grade), TM 5-822-2 (general Provisions) and TM 5-822-5 (flexible and rigid pavement designs and drainage). TM 5-822-12 (Design of Aggregate Surfaced Roads, Airfield Areas, etc) and ETL 1110-1-189 (Geogrids). See attached important notes for Use of TM 5-822-5. PCASE software is also an acceptable method. For Projects in the LRL District boundaries, regardless of the pavement design, a minimum flexible pavement section shall consist of 3.5 inches of asphalt (1.5 inches of surface course and 2 inches of base course) and 8 inches of aggregate subbase and/or base. Regardless of the pavement design, a minimum rigid pavement section shall consist of 6 inches of concrete and 8 inches of aggregate subbase and/or base. Pavement minimums for projects outside the LRL district boundaries will be obtained from the Servicing Corps Geographic-District. The minimum subbase/base can be neglected if the subgrade has a CBR greater than 30. Here is a hot link to Corps Guidance Documents: http://www.usace.army.mil/inet/usace-docs/.

* (i) Pavement designs over specific cohesive soil subgrades (CL, CH or ML in accordance with the Unified Soil Classification System (USCS) and soils with 15% or more passing the #200 sieve) require underdrain systems and the pavement sections shall consist of an open graded free draining aggregate that serves as a drainage layer directly below the asphalt or concrete underlain by a densely graded aggregate. The densely graded aggregate must also act as a separation layer such that subgrade soils do not migrate into it. An evaluation of the grain size of the subgrade soils and the proposed aggregate that interfaces with it shall be performed to verify migration will not occur. Alternatively, a geotextile can be used for separation. The drainage layer shall be choked off (if necessary to accommodate paving equipment). Underdrains shall be provided as necessary to collect and remove infiltration from beneath the pavement (typical details shown in Exhibit 44.5 of this document).

SITE SOILS HAVE >15% PASSING No. 200 SIEVE: UNDERDRAIN SYSTEM REQUIRED

DETROIT ARSENAL
CDC

(j) Pavement designs over granular soils (less that 15% passing the #200 sieve) shall generally have a single aggregate base consisting of an open graded free draining aggregate. This aggregate must also act as a separation layer such that subgrade soils do not migrate into it. An evaluation of the grain size of the subgrade soils and the proposed aggregate that interfaces with it shall be performed to verify migration will not occur. Alternatively, a geotextile can be used for separation. This aggregate shall be choked off, if necessary, to accommodate paving equipment.

(k) Plans and specifications shall detail all of the specific aggregates proposed in the pavement design per state DOT designations and gradations including the aggregate used to choke off drainage layer aggregates to accommodate paving equipment.

(l) Important Note Regarding Use of TM 5-822-5 for Flexible Pavement Frost Design for the Louisville District Corps of Engineers: When the "Design Index" from Table 3-1 (TM 5-822-5) is less than 4 and an underdrain system is provided for cohesive soils, the applicable "Support Index" from Table 18-3 (TM5-822-5) can be raised to the next highest Support Index (from Table 18-3) to determine the Frost Design Thickness of the pavement. For example, if the "Design Index" (Table 3-1) is less than 4 and an underdrain system is provided because the subgrade is Silty Clay soil (CL in accordance with the Unified Soil Classification System (USCS)) the "Frost Group" from Table 18-2 would be F4. The corresponding Soil Support Index to a Frost Group of F4 is 3.5 (Table 18-3). Because the underdrain system is provided, the next highest Support Index (6.5) can be used to determine the Frost Design Thickness of the pavement.

(m) Important Note Regarding use of TM5-822-5 for Rigid Pavement Frost Designs for the Louisville District Corps of Engineers: When the "Design Index" from Table 3-1 (TM 5-822-5) is less than 4 and an underdrain system is provided for cohesive soils, the applicable Frost Group from Table 18-2 can be modified for use in Figure 18-5 as follows. Frost Groups F3 and F4 can be changed to Frost Groups F2 and S2 and Frost Groups F2 and S2 can be changed to F1 and S1.

(n) If requested, the Geotechnical Report will also include percolation rates, resistively readings, corrosion potential, and shear wave velocities of the subsurface materials.

(o) Soils information obtained from field logs, laboratory tests and geologists' logs shall be presented on the contract drawings in the form of boring plans, final boring logs and explanatory notes. See Exhibit 45 attached to this document for example of boring logs. It is particularly important that complete subsurface information such as dates, elevations, depths to rock, depths to groundwater drilling equipment used, and the presence of unsatisfactory materials, etc. be presented to the Contractor for bidding purposes.

3.0 SOIL COMPACTION AND FOUNDATION EXCAVATIONS (Verify this info gets into the plans and specs)

DETROIT ARSENAL CDC

Soil Compaction shall be achieved by equipment approved by a professional geotechnical engineer. Material shall be moistened or aerated as necessary to provide the moisture content that shall readily facilitate obtaining the compaction specified with the equipment used. Each layer of fill placement shall be no greater than **[usually 8]** inches thick. Compact each layer to not less than the percent of maximum density specified in Table 4-1, determined in accordance with ASTM D-1557}.

Table 4-1 Soil Compaction	
Foundations	**[95%]**
Concrete Work and Pavements	**[90%]**
Landscaping	**[85%]**
Retaining Wall Backfill	**[85 – 90%]**

The requirements shall be verified or modifications recommended by the consulting professional geotechnical engineer in the report whenever engineering, soils or climatic factors indicate the necessity. Any modifications to the stated compaction requirements shall require approval from the COR.

Subgrade suitability (via proof rolling), fill placement and compaction operations shall be observed and tested on a full time basis by a qualified independent testing agency as directed by the contractor's project geotechnical engineer.

During construction, all foundation excavations shall be inspected and approved by the project professional geotechnical engineer prior to placing concrete.

3.0 GUIDE SPECIFICATIONS

3.1 Please modify the Louisville District version of the Earthwork Guide Specifications 31 00 00.00 06 (formerly 02300L)

3.2 For Satisfactory/Unsatisfactory Material in Earthwork Specifications: The AE shall review all subsurface information and make determination of which soil types are satisfactory and which are unsatisfactory with respect to the project requirements.

4.0 PLANS/DRAWINGS

4.1 Data. Where applicable, the allowable soil or rock bearing pressure shall be shown on the plans. This pressure shall be indicated in such a manner that it is understood that the pressure is the design (allowable) pressure used in sizing the foundations and that this pressure is not the ultimate pressure which the soil or rock can withstand.

4.2 Verify that the plans require that "all open foundation excavations be inspected and approved by a licensed geotechnical engineer prior to pouring concrete." We generally see this statement on the "Structural Notes" Plan Sheet under "Foundation Notes."

RIGID AND FLEXIBLE PAVEMENT DESIGN

FROM USACE LOUISVILLE DISTRICT DESIGN GUIDE

Pavements that have a design index of less than 4 can use State Highway Departments Standard Specifications for the asphalt and concrete surfaces. Specifications for the base and subbase shall follow the Corps guide specs (Base: 02233, Subbase: 02234) with the exception that state highway standard aggregate gradations shall be inserted where appropriate.

The state of Ohio standard gradations have not worked well in the past for providing sufficient stability to place the surface course. A special modification to 02233 has been made to provide the required drainage in the pavement sections. Point of contact for pavement designs is the Geotechnical Branch at 502-582-5712.

SUGGESTED MATERIALS FOR STATES

	KY	IND	ILL	OHIO	MICH
Concrete	501	501	408	452	4.50
* → Asphalt Surface	402	403	406	404	4.00
* → Asphalt Base	402/403	403	406	402	4.00
* → Base course	# 57	# 5	CA-7	?	# 6AA
* → Subbase course	DGA	# 53	CA-6	304	# 22A
* → Choker course	#9 or 11	# 12	CA-16	NA	# 34

	Design Freezing Index	Frost Penetration
Illinois		
Chicago area	1000	56
Scott AFB	750	46
Chanute AFB	750	46
Rock Island	1100	58
Savanna	1200	60
Ohio		
Youngstown	750	46
Lima	750	46
Columbus	650	42
Dayton	600	40
Cincinnati	500	36
Camp Perry	750	46
Michigan		
Detroit	900	52
Escanaba	1700	70
Indiana		
Grissom AFB	750	46
Ben-Harrison	650	42
INAAP	400	31
Kentucky		
Knox	400	31
Campbell	250	24
Lexington	400	31

FROM MICHIGAN DOT SPECIFICATIONS

Table 902-1 Grading Requirements for Coarse Aggregates, Dense-Graded Aggregates, and Open-Graded Aggregates

Material Type	Class	Item of Work by Section Number (Sequential) (a)	Sieve Analysis (MTM 109) Total Percent Passing (b)										Loss by Washing (MTM 108) % Passing No. 200 (b)
			2.5 in	2 in	1.5 in	1 in	¾ in	½ in	⅜ in	No. 4	No. 8	No. 30	
Coarse Aggregates	4 AA (c)	602	100	90—100	40—60		0-12						2.0 max.
	6 AAA (c)	602			100	90-100	60-85	30-60		0-8			1.0 max.(d)
	6 AA (c)	601,602, 706,708,806			100	95-100		30-60		0-8			1.0 max.(d)
	6 A	205,401,402, 601, 602, 603,706,806			100	95-100		30-60		0-8			1.0 max.(d)
	17 A					100	90-100	50-75		0-8			1.0 max.(d)
	25 A	508					100	95-100	60-90	5-30	0-12		3.0 max.
	26 A	706,712					100	95-100	60-90	5-30	0-12		3.0 max.
	29 A	508						100	90-100	10-30	0-10		3.0 max.
Dense-Graded Aggregates	21 AA	302,304,503			100	85-100		50-75			20-45		4-8 (e)(f)
	21 A	302,503											
	22 A	302,306,307,503				100	90-100		65-85		30-50		4-8 (e)(f)(g)
	23 A	306,307				100			60-85		25-60		9-16 (f)
Open-Graded Aggregates	2 G	303(h)			100	85-100		40-70			0-10	0-8	5.0 max.
	3 G				100	85-100		40-70			0-30	0-13	5.0 max.
	4 G (i)	303			100		60-80	35-65			10-25	5-18	6.0 max.
	34 R	404						100	90-100		0-5		3.0 max.
	34 G	404						100	95-100		0-5		3.0 max.

DRAINAGE

BASE

CHOKER COURSE

DETROIT ARSENAL CDC

Detroit Arsenal CDC

Michigan DOT Specifications

DIVISION 5

HOT MIX ASPHALT PAVEMENTS AND SURFACE TREATMENTS

Section 501. PLANT MIXED HOT MIX ASPHALT

501.01 Description. Plant mixed hot mix asphalt (HMA) consists of asphalt binder, aggregates, mineral filler, and other additives. Refer to contract documents for additional requirements for producing and furnishing HMA.

501.02 Materials. Use materials meeting the following.

Aggregates	902
Mineral Filler, 3MF	902
Anti-Foaming Agent	904
Asphalt Binders	904

The contract will specify the HMA mixture type and the grade of asphalt binder.

Use anti foaming agents according to Section 904. No additional compensation will be made for anti foaming agents.

Use blended aggregates for HMA top course mixtures, except top courses for shoulders and temporary roads, that meet the Aggregate Wear Index (AWI) specified in the contract.

A. **Composition of HMA Mixtures.** Use aggregates conforming to requirements in the contract.

1. **Mix Design.** Follow the *Procedures Manual for Mix Design Processing* for all mixture designs. Provide written certification that the materials used in the project mixture are from the same source as those used in developing the mix design or the approved job mix formula (JMF). Mix designs approved by the Department for use on other projects may be used if approved by the Engineer.

2. **Recycled Mixtures.** Substitution of reclaimed asphalt pavement (RAP) for part of the new materials required to produce the HMA is acceptable. Produce the mixture according to subsection 501.02.C. Inclusion of RAP in the mixture will not change the contract unit price.

APPENDIX B
List of Drawings

(Refer to Appendix J – Drawings, Title Sheet)

APPENDIX C
Utility Connections

(Refer to Appendix J – Drawings, Utility Site Plan)

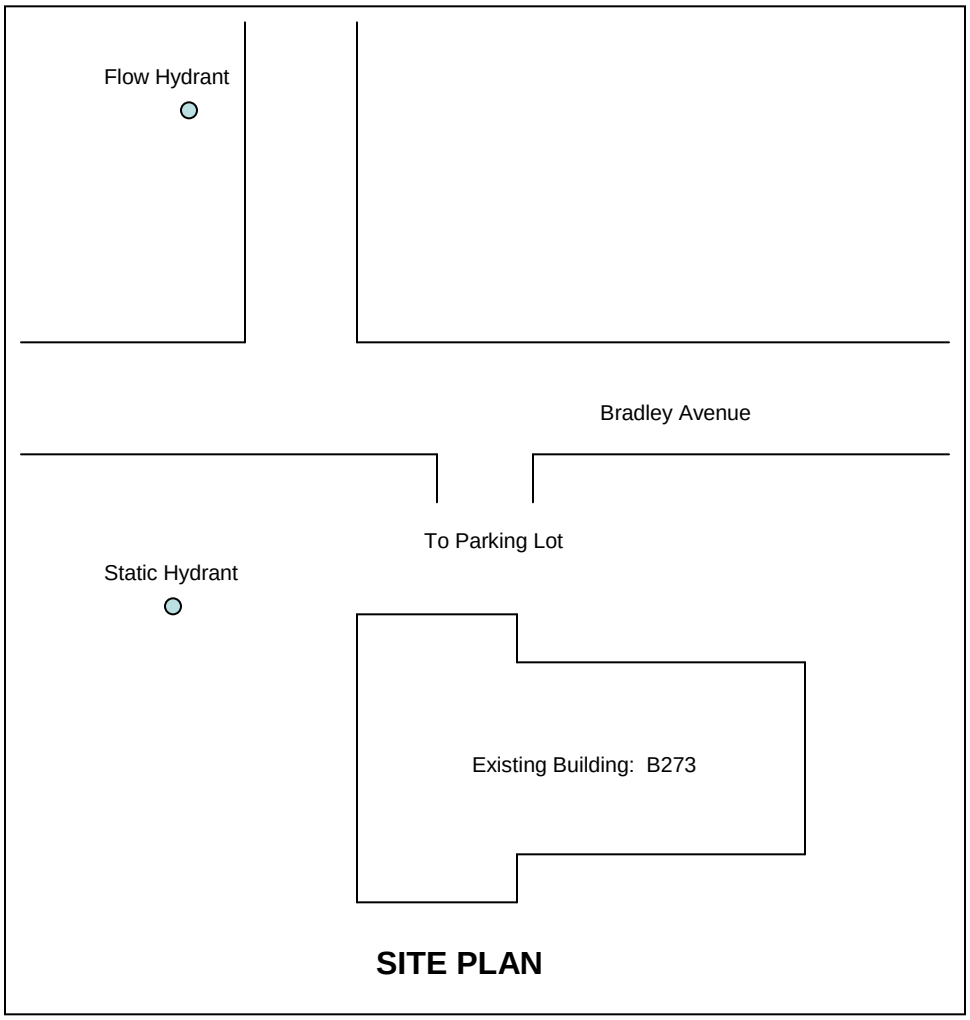
APPENDIX D
Fire Flow Tests

PROJECT: DETROIT CDC BUILDING B273 FLOW TEST RESULTS

Location: Building B273, Child Development Center
Date of Test: June 2, 2011
Time of Test: Approximately 8:15 am
Test Performed by: Kevin L. Biando, P.E.

Static Hydrant: Diameter = 2.5-inch
Pressure (Static) = 60 psi
Pressure (Flow) = 50 psi

Flow Hydrant: Diameter = 2.5-inch
C-factor = 0.9
Pressure (Pitot) = 25 psi
Calculated Flow = 672 gpm



SITE PLAN

342 COLUMBUS AVE CINCINNATI, OH 45036 (513) 206-9651 (513) 206-9652 FAX WWW.FIRELOGIX.COM

APPENDIX E
Environmental Information

ENVIRONMENTAL REVIEW CHECKLIST (ERC)

U.S. Army Garrison - Detroit Arsenal (USAG-DTA)
Warren, MI

****All hardcopy attachments are placed behind the sheets where noted**

A. PROJECT or Operation (Activity) DETAILS

1. **Agency Requiring Checklist:**

   Environment, & Sustainability Division (E&S):
   IMNE-MIG-PWE,
   James Knowles, james.r.knowles@us.army.mil, 586-282-5124

2. **Work Order Form/ Other Authorization:**

   IMA325181J 4283 .pdf
   Adobe Acrobat Document
   286 KB
   **

3. **Name of Proposed Project:**
   Building addition to 273

4. **Proposed Project Location (e.g. BLDG, Floor, etc.) with attached Site Map:**
   Building 273

   File Attachment **

5. **Proposed Project Description:**
   Expand B273 to accommodate addition children of DTA employees.

6. **Purpose of Proposed Project:**
   B273, while relatively new, is too small to accommodate the need for more children to be cared for at the CDC.

7. **Need of Proposed Project:**
   B273 is too small for the growing need to provide childhood daycare for DTA employees. Expansion of the CDC by constructing a mirror east wing to the west wing of the current facility would serve to fulfill that need.

8. **PROJECTED SCHEDULE (Approx. Project or Equip. Delivery Dates or Fiscal Year Period that the work would occur):**

   START DATE: 27-Apr-11 **COMPLETION DATE: 30-Sep-12**

9. **ATTACHMENTS:**

   Drawing
   _CDC_Addition2.pdf
   Adobe Acrobat Document
   1.44 MB
   **

10. **REQUIRED. Point of Contact (POC) information, and Project Proponent (PP) digital signature.**

    POINT OF CONTACT (Design Engineer, Project Manager, Scoping / Estimator, Subject Matter Expert, etc.):

FIRST NAME:	LAST NAME:	
EMAIL:		PHONE NUMBER:
ADDRESS: USAG-DTA, 6501 E. 11 Mile Rd		OFFICE SYMBOL: AMSRD-TAR-R
CITY: Warren	STATE: MI / ZIP CODE: 48397-5000	MAIL STOP:

Monday, September 26, 2011

Click here to sign this section

PROJECT PROPONENT (Funding Source or Funds Manager):

FIRST NAME:	LAST NAME:	
James	Knowles	

EMAIL:	PHONE NUMBER:

ADDRESS:	OFFICE SYMBOL:
USAG-DTA, 6501 E. 11 Mile Rd	

CITY:	STATE:	ZIP CODE:	MAIL STOP:
Warren	MI	48397-5000	

6/30/2011

X James R. Knowles

Signed by KNOWLES.JAMES.RUSSELL.1231204578 View details
on Thursday, June 30, 2011 12:46 PM (Eastern Daylight Time)

ENVIRONMENTAL REVIEW MANAGER (ERM) COMMENT SECTION:

File Attachment **

B. ENVIRONMENTAL IMPACT ANALYSIS (EIA)

Explanations and / or mitigation of all "Yes" or "Unknown" responses are required in the comment box with each question. Section comments can be found in the corresponding Environmental Protection Specification (EPS) area.

1.1. ENVIRONMENTAL RESOURCE MANAGEMENT - Asbestos — **Yes/No/Unknown**

a. Is there Asbestos present? — Unknown

The renovation area should be tested for the presence of ACBM. A mini inspection is required.

☐ **There is no asbestos in this subject project area or adjacent areas.**

STATUS: Unknown Effect

Media Manager:

Gary Voss, gary.m.voss@us.army.mil, 586-282-5154

Gary M. Voss 09-May-11

1.2. ENVIRONMENTAL RESOURCE MANAGEMENT - Cultural Resources — **Yes/No/Unknown**

a. Disturbing our historically eligible buildings? *If YES / UNKNOWN please define as construction, demo, rehab, and/or renovation, land transfers in the comment box below.* — No

The following buildings, structures or monuments are historically eligible or have met the 50 year age limit: 7, 8, 201, 203, 208, 212-214,218-219,222-223,226,252 and T202, T209,T216,T224, T225.

If YES, contact the Cultural Resources Manager:

James Knowles, james.r.knowles@us.army.mil, 586-282-5124

STATUS: No Effect

Media Manager:

James Knowles, james.r.knowles@us.army.mil, 586-282-5124

James R. Knowles ***29-Jun-11***

1.3. ENVIRONMENTAL RESOURCE MANAGEMENT - Natural Resources — **Yes/No/Unknown**

a. Change in the diversity of species, or numbers of any species of plants, including trees, shrubs, grass, crops, micro flora or aquatic plants? — No

b. Changes in the diversity of species or number of any species of mammals, birds, reptiles, amphibians or fish? — No

c. Reduction of the number of any threatened or endangered species? (plants or animals) — No

d. Introduction of new species of animals into an area or a barrier to the migration or movement of animals? — No

e. Deterioration, alteration or destruction to existing fish or wildlife habitat? — No

f. Increase in the rate of consumption of any natural resource? — No

g. Depletion of any non-renewable natural resource? — No

h. Alteration, destruction or significant impact on environmentally sensitive areas, i.e., wetlands, flood plains, critical habitat, prime farmland, shorelines? — No

STATUS: No Effect

Media Manager:

James Knowles, james.r.knowles@us.army.mil, 586-282-5124

29-Jun-11

1.4. ENVIRONMENTAL RESOURCE MANAGEMENT - Lead Base Paint — **Yes/No/Unknown**

a. Is there Lead present? (Refer to Lead Library in Building 205) — Unknown

If disturbing paint "wet methods" should be implemented if sanding/grinding to ensure no LBP dust and/or chips enter the environment.

STATUS: Unknown Effect

Media Manager:

Gary Voss, gary.m.voss@us.army.mil, 586-282-5154

09-May-11

1.5. ENVIRONMENTAL RESOURCE MANAGEMENT - Soil Management — **Yes/No/Unknown**

a. Disruption, displacement, compaction, or over covering the soil? — Yes

Project will disturb soil

b. Permanent change in the topography or ground surface relief features? — Yes

Project will change topography.

c. Increase in wind or water erosion of soils, either on or off-site? — Unknown

Impact can be mitigated. Depending upon the timing of the project, construction runoff water quality discharge limits may be enforced. Runoff from construction site may require pretreatment prior to discharge.

d. Disturbance of greater than 1 acre of soil? — Yes

Project will disturb more than 1 acre of soil. Disturbed area calculations must include contractor staging and lay down areas and well as office trailer parking. At this stage, the project has not identified any increase in parking or drop off areas. Will the project include additional paving?

e. Disturbance of potentially contaminated soils? — Unknown

The DTA is a class II site. No known contamination but may be encountered. A Phase I and II site assessment will be conducted during May/June 2011. The site assessment should identify if there is a need for special project landscape considerations. The DTA is known to have soil with naturally occurring metals above state background limits. These soils do not constitute contamination but may require special handling or disposal at a Class II landfill. Project must pay costs of handling & disposal of soil. Need to identify area for spoils storage during construction or if soils must be removed from site with no storage allowed.

f. Presence of hazardous chemicals or physical agents during the action? — Unknown

Contractor will likely require portable fuel tanks.

g. Will soil disturbance be within 500 ft of Bear Creek? — No

h. Will soil disturbance - as a result of this project - be equal to or greater than 5,000 square feet? — Yes

Impact must be mitigate to predevelopment hydrology. The total disturbance has not yet been identified but will be greater than 5,000 sq feet.

i. Will cumulative soil disturbance - as a result of this project - within Garrison property be equal to or exceed 20.0 acres? — Unknown

Unknown, but not likely. Depends upon timing of project. As of May 2011 the construction runoff water quality standard is enforced at 20.0 acres. This project may occur when the legal enforcement is enacted to the 10 acre standard. It is more probable this project may fall under the runoff standard for total installation disturbance of 10 acres.

j. Does this work require a soil erosion control permit? — Yes

Macom County SESC permit is required. As well as a state construction NPDES.

k. Will the project result in or contribute to cumulative impacts to the resource? Yes

See EPS for mitigation statement(s) to off-set or minimize the cumulative impact(s).

STATUS: Adverse Effect

Media Manager:

Cheryl Neades, cheryl.l.neades@us.army.mil, 586-282-8344

Cheryl L. Neades 09-May-11

1.6. ENVIRONMENTAL RESOURCE MANAGEMENT - Water (Storm Water / Water Quality / Waste Water (Sanitary) / Permits) — **Yes/No/Unknown**

a. Changes to currents or course of direction of water movements in fresh water? (i.e. reservoir construction, paving, site clearing) No

b. Will the project result in loss of green space (i.e. storm water retention area)? Yes

Project must mitigate to predevelopment hydrology.

c. Discharge (liquid or solid waste) into surface waters or any alteration of surface water quality? No

d. Reduction in the amount of water available for public supply? No

e. Is there a potential for accidental spills of hazardous materials near or in a body of water or a storm sewer? Unknown

Unknown potential for spills during construction process.

f. Is there a need for spill prevention and contingency measures to be developed? Yes

Contractor must adhere to DTA spill response plan. Contractor must also prepare their own spill prevention & response plan with details of how it integrates the DTA plan.

g. The construction of facilities or actions within flood plains or wetlands? No

h. Installation of aboveground or underground storage tanks? (UST's) No

i. Is there a need for storm water management controls and/or treatment? Yes

SESC controls required during construction. Storm water management controls of some type are required to mitigate to predevelopment hydrology.

j. Discharges into the municipal sewer (storm water or sanitary) systems? Yes

Construction and use of facility will result in minimal increase of sanitary sewage with no adverse impact. Stormwater discharges during construction will be mitigated by adhering to permit requirements. Post-construction discharges must be mitigated to predevelopment hydrology.

k. Any increase or change in sanitary discharge other than restroom waste? (i.e. sink, drain, kitchenette, or industrial waste) Unknown

Project has not identified additional kitchenette or potential laundry facility.

l. Will the proposal result in water connections requiring a backflow prevention device? Yes

Facility must be constructed with backflow prevention.

m. Will the work result in a discharge or potential discharge into waters of the United States? Unknown

Potential exists for accidental discharges during construction. Contractor must provide standard pollution prevention and spill response plans and obtain a state construction NPDES. However, the use of the facility will not require a NPDES permit.

n. If the above question is Yes / Unknown, will the work require a NPDES permit from the Michigan Department of Natural Resources? No

o. Will the project result in or contribute to cumulative impacts to the resource? Yes

See EPS for mitigation statement(s) to off-set or minimize the cumulative impact(s).

STATUS: Adverse Effect

Media Manager:

Cheryl Neades, cheryl.l.neades@us.army.mil, 586-282-8344

09-May-11

1.7. ENVIRONMENTAL RESOURCE MANAGEMENT - Land Use — **Yes/No/Unknown**

a. Alteration of the present land use of an area? — Yes

Site is currently unused vegetated space.

b. Will the proposed facility or activity take place on:

(1) State Owned Land (DOD owned)? — No

(2) Federal Land (DOD owned)? — Yes

Land owned by USAG-DTA

(3) Privately owned land? — No

(4) Other? — No

c. Are any of the following statements applicable to this proposal?

(1) An increase in (#) acres is required. — No

(2) Select **funds will be used to purchase (#) acres.** — No

(3) Require Select Select **permit for (#) acres.** — No

d. Has the real estate action been addressed in a separate environmental document? — No

(if the file below is available attach it to the back of this sheet.)

Document Date:

Document Title:

e. The demolition, disposal or replacement of existing facilities? — No

STATUS: Adverse Effect

Media Manager:

Cheryl Neades, cheryl.l.neades@us.army.mil, 586-282-8344

09-May-11

1.8. ENVIRONMENTAL RESOURCE MANAGEMENT - Storage Tank Management — **Yes/No/Unknown**

a. The replacement/ removal of either above or underground storage tanks? — No

b. Chemical surety agent solutions or decontamination solutions? — No

STATUS: No Effect

Media Manager:

Gary Voss, gary.m.voss@us.army.mil, 586-282-5154

Media Manager Alternate: Environmental Review Manager

James Knowles, james.r.knowles@us.army.mil, 586-282-5124

29-Jun-11

1.9. ENVIRONMENTAL RESOURCE MANAGEMENT - Other Considerations — **Yes/No/Unknown**

TRAFFIC:

a. Increase of ground or air traffic?	No
b. Generate a new activity?	No
c. Use of unimproved roads?	No
d. Use of tracked vehicles?	No

SAFETY:

a. Treatment, storage or disposal of biohazards? (biological agents/toxics)	No

HUMAN HEALTH:

a. Will result in the creation of any health hazard or potential health hazard, excluding mental health?	No

HUMAN POPULATION:

a. Will the proposal alter the location, distribution, density or growth rate of the local human population?	No

ENVIROMENTAL JUSTICE:

a. Will impacts from this project affect Low Income Housing and / or economically depressed areas?	No

RADIATION:

Ionizing and/or Non-Ionizing radiation is involved with this proposal:	No
a. The use or involvement of radioactive material, e.g. curies and amount?	No
b. The use or involvement of non-ionizing radiation (RF, Electromagnetic, Laser or Microwave)?	No
c. Will radioactive waste be generated?	No
d. Treatment, storage and/or disposal of radiological waste? *(List type and estimated quantity)*	No
e. A risk of explosion or the release of radiation?	No

STATUS: No Effect

Environmental Review Manager:

James Knowles, james.r.knowles@us.army.mil, 586-282-5124

James R. Knowles 29-Jun-11

2.1. SUSTAINABILITY - Air Emissions	**Yes/No/Unknown**
a. An action to install, construct, reconstruct, relocate, alter or modify a process or process equipment that may emit an air contaminant?	No
b. Does this action involve:	
(1) Any construction?	No
(2) Once operational, produce air emissions?	No

(3) Result in an increase in personnel?	No
c. Will an increase in outdoor air emissions or deterioration of indoor air quality result from this project?	No
d. Will the creation of objectionable odors?	No
e. Is portable power necessary to complete the job?	No
f. Will the job introduce smoke, dust, suspended particles, noxious gases or toxic air pollutants into the air?	No
g. Will this action take place in an area where Asbestos is known to be present? (*A Yes or Unknown response to Asbestos will require an Asbestos Entry Control Form.)*	No
h. Will particulates or dust migrate beyond the installation boundaries?	No
i. Will the job use or remove CFCs/Halons or other ozone depleting chemicals?	No
j. Is a General Conformity Rule analysis required? (Air Manager decision ONLY)	No
k. Will the project result in or contribute to cumulative impacts to the resource?	No

STATUS: Minimal Adverse Effect

Media Manager:

Printes Parker, printes.parker@us.army.mil, 586-282-8345

Media Manager Alternate: Environmental Review Manager
James Knowles, james.r.knowles@us.army.mil, 586-282-5124

James R. Knowles 29-Jun-11

2.2. SUSTAINABILITY - Hazardous Materials	**Yes/No/Unknown**
a. Will hazardous materials be generated as part of this project, excluding Asbestos and Lead Based Paint which are regulated waste reviewed separately?	No
b. Are MSDS available for each material?	No
c. A need for trained personnel to be available for handling and disposing of HazMat?	No
d. A need for procedures to be specified for proper handling, storage, use and disposal of hazardous materials?	No
e. The generation of hazardous materials that requires special disposal?	No
f Is there Mercury present?	No
g. Is there PCB's present?	No
h. Will removal of fluorescent lights take place?	No

STATUS: No Effect

Media Manager:

Paul Cyman paul.l.cyman@us.army.mil, 586-282-8261

Click here to sign this section

Monday, September 26, 2011

2.3. SUSTAINABILITY - Hazardous Waste	Yes/No/Unknown
a. Generation of hazardous waste?	No
b. Treatment, storage and/or disposal of hazardous or mixed waste?	No
c. A risk of explosion or the release of hazardous substance including, but not limited to oil, pesticides or chemicals?	No
d. A need for trained personnel to be available for handling and disposing of hazardous waste?	No
e. A need for procedures to be specified for proper handling, storage, use and disposal of hazardous waste?	No
f. The generation of solid waste that requires special disposal?	No

STATUS: No Effect

Media Manager:
Florence Trevino, florence.trevino@us.army.mil, 586-282-6615

Media Manager Alternate: Environmental Review Manager
James Knowles, james.r.knowles@us.army.mil, 586-282-5124

James R. Knowles 06-May-11

2.4. SUSTAINABILITY - Energy Conservation (Usage)	Increased Usage/ Alteration/ Both	Yes/No/Unknown
a. Electrical power, fossil fuel or other(specify)? New wing to facility will require more use of electricity	Increased Usage	Yes
b. Drinking water? New occupants will use more water than current uses.	Increased Usage	Yes
c. Waste water treatment?		No
d. Sanitary sewer collection system?		No
e. Storm sewer collection system?		No

STATUS: No Effect

Media Manager:
Mohammed Ikram, mohammed.ikram@us.army.mil, 586-282-9369

Media Manager Alternate: Environmental Review Manager
James Knowles, james.r.knowles@us.army.mil, 586-282-5124

James R. Knowles 29-Jun-11

2.5. SUSTAINABILITY - Energy Awareness	Increased Usage/ Alteration/ Both	Yes/No/Unknown
a. Electrical power, fossil fuel or other(specify)? Minor increase in electrical power usage and alteration to existing power distribution system.	Both	Yes
b. Drinking water?		

There could be increased drinking water usage and alteration to existing drinking water distribution system. — Both — Unknown

c. Waste water treatment? — No

d. Sanitary sewer collection system? — Both — Unknown

There could be increased sanitary waste and alteration to existing sanitary sewer collection system.

e. Storm sewer collection system? — Both — Unknown

There could be increased storm water runoff and alteration to existing storm sewer collection system.

STATUS: Minimal Adverse Effect

Media Manager (Utilities-Sustainability):

Bernie Teshich, florence.trevino@us.army.mil. 586-282-6615

23-May-11

2.6. ENVIRONMENTAL RESOURCE MANAGEMENT - Pollution Prevention (P2) — **Yes/No/Unknown**

a. Generation of waste that can be recycled, e.g. carpet, carpet tile, ceiling tile, concrete, metal, oil, paper, etc — Yes

Required to recycle carpet, metals, and any other designated material that can be diverted through recycling.

b. Generation of construction or demolition debris required minimum 50% diversion from landfill. — Yes

Mandated to divert 50% C&D material.

c. Materials that may be used in this action that are on the list of preference items issued by EPA (see www.epa.gov/cpg/products.htm), e.g. concrete, ceiling and floor tiles, carpeting, structural fiberboard, paint? — Yes

Review CPG for requirements.

STATUS: Unknown Effect

Media Manager:

Florence Trevino, florence.trevino@us.army.mil, 586-282-6615

07-May-11

2.7 SUSTAINABILITY - Comprehensive Procurement Guidelines for Resource Conservation — **Yes/No/Unknown**

a. Will the project require new construction that is has a cost equal to or greater than 7.5 million dollars? — No

b. Will the project result in demolition debris? — Yes

Derived from renovation.

c. If demolition debris will result from the project, will 50% or more of the debris be recycled? — Yes

Contractor will be required to divert C&D waste.

d. Will the project require completion of a "Green Procurement" form? — Yes

Waiver will be required for paint and other material not purchased using the CPG.

e. Will the project qualify for a "Green Procurement" waiver? — Yes

Yes if material used is not meeting the CPG

STATUS: Unknown Effect

Media Manager:

Bernie Teshich, bernie.teshich@us.army.mil, 586-282-4908

Media Manager Alternate: Environmental Review Manager
James Knowles, james.r.knowles@us.army.mil, 586-282-5124

17-May-11

2.8. SUSTAINABILITY - Pest Management — **Yes/No/Unknown**

a. Exposing the interior of the building to the elements? — No

b. Penetration of either the ceiling, walls or floor? — Yes

At some time during the construction a connection must be made to existing bldg. Protection required.

c. Eating and drinking coffee or soda pop on site? — No

d. Planting of vegetation? — Yes

Landscaping is anticipated.

STATUS: No Effect

Media Manager (Conservation: Pest Management):

Stan Grumeretz, stanley.g.grumeretz@us.army.mil, 586-282-0817

10-May-11

2.9. SUSTAINABILITY - Noise — **Yes/No/Unknown**

a. Increased noise levels (vehicles, aircraft, weapons, machinery). — Yes

Heavy machinery will be used next to CDC during construction.

b. Locations close to civilian population? — No

c. Use between 2100 and 0700? — No

STATUS: Minimal Adverse Effect

Media Manager:

Printes Parker, printes.parker@us.army.mil, 586-282-8345

Media Manager Alternate: Environmental Review Manager

James Knowles, james.r.knowles@us.army.mil, 586-282-5124

29-Jun-11

C-1. CATEGORICAL EXCLUSION (CX) QUALIFICATION: ERM fills out this section.

Project Type: CD

1. The action is not segmented (piece-meal effort).	No
2. No Exceptional (Extraordinary) Circumstance Exists.	No
2.1. Reasonable likelihood of significant [i] effects on public health?	No
2.2. Reasonable likelihood of significant [i] environmental effects (direct, indirect and cumulative)?	No
2.3. Imposition of uncertain or unique environmental risks?	No
2.4. Greater scope or size than is normal for this category of action?	No
2.5. Reportable releases of hazardous or toxic substances as specified in 40 CFR part 302: Designation, Reportable Quantities and Notifications?	No
2.6. Will there be:	
2.6.1. Releases of petroleum, oils and lubricants (POL) except from a properly functioning engine or vehicle;	No
2.6.2 Application of pesticides and herbicides;	No
2.6.3 Where the proposed action results in the requirement to develop or amend a Spill Prevention, Control or Countermeasure Plan.	No
2.7. When a review of an action that might otherwise qualify for a Record of Non-applicability (RONA) reveals that air emissions exceed di`minimis levels or otherwise that a formal Clean Air Act conformity determination is required?	No
2.8. Reasonable likelihood of violating any federal, state or local law or requirements imposed [by those agencies] for the protection of the environment.	No
2.9. Unresolved effect on environmentally sensitive resources:	No
2.9.1. Proposed federally listed, threatened or endangered species or their critical designated habitat.	No
2.9.2. Properties listed or eligible for listing on the National Register of Historic Places.	No
2.9.3. Areas having special designation or recognition, such as:	No
2.9.3.1. Prime or unique agricultural lands;	No
2.9.3.2. Coastal zones;	No
2.9.3.3. Designated wilderness or wilderness study areas;	No
2.9.3.4. Wild and Scenic Rivers;	No
2.9.3.5. National Historic Landmarks;	No
2.9.3.6. 100 year floodplains;	No
2.9.3.7. Wetlands;	No
2.9.3.8. Sole source aquifers; (potential sources of drinking water);	No
2.9.3.9. National Wildlife Refuges;	No
2.9.3.10. National Parks;	No
2.9.3.11. Areas of critical environmental concern;	No
2.9.3.12. Other areas of high environmental sensitivity.	No
2.9.4. Cultural resources as defined in the National Historic Preservation Act.	No
2.10. Involving effects on the quality of the environmental likely to be highly controversial?	No
2.11. Involving effects on the environment that are highly uncertain, involve unique or unknown risks, or are scientifically controversial?	No
2.12. Establishes a precedent {or makes decisions in principle} for future or subsequent actions that are reasonably likely to have a future significant [iii] effect?	No
2.13. Potential for degradation of already existing poor environmental conditions.	No
2.14. Initiation of a degrading influence, activity or effect in areas not already significantly modified from their natural condition.	No
2.15. Introduction/employment of unproven technology.	No
3. One or more CX Screening Criteria Encompasses the project [iv] :	No

Monday, September 26, 2011

3.1.	**Administration/Operation Activities.**	No
3.2.	**Construction and Demolition Activities.**	No
3.3.	**Cultural and Natural Resource Management Activities.**	No
3.4.	**Procurement and Contract Activities.**	No
3.5.	**Real Estate Activities.**	No
3.6.	**Repair and Maintenance Activities.**	No
3.7.	**Hazardous Materials/Hazardous Waste Management and Operations.**	No
3.8.	**Training and Testing Activities.**	No
3.9.	**Aircraft and Airfield Activities.**	No

[i] Significant under NEPA is defined as:
[ii] See end note [i].
[iii] See end note [i].
[iv] See Appendix E for a complete list for each activity group.

C-2. DETERMINATION:

Environmental Review Manager fills out this section.

On the basis of this evaluation, the following environmental document(s) will be prepared.

Document to be prepared: *Place hard copies behind this sheet.*	**Categorical Exclusion (CX)**	**Prepared Document**
a. This action is covered by the listed **Categorical Exclusion**. A ***Record of Environmental Consideration (REC)*** is not required. This evaluation will become part of the action file.		File Attachment
b. This action is covered by the listed **Categorical Exclusion.** A ***Record of Environmental Consideration (REC)*** will be prepared in accordance with 32 CFR 651 Subpart C.	C-1	***See Appendix A: Record of Environmental Consideration (REC)***
c. An ***Environmental Assessment (EA)*** with the attached ***Finding of No Significant Impact (FONSI)*** or ***Notice of Intent (NOI),*** as appropriate, in accordance with 32 CFR 651 Subpart E.	**N/A**	File Attachment
d. ***No Environmental Impact (NEI): reason(s) listed below.***	☐	*Reason(s) for NEI is **REQUIRED** if box is checked*

e. Environmental Review Manager Comment Section:

Monday, September 26, 2011

RECORD OF ENVIRONMENTAL CONSIDERATION (REC)

Office Symbol: **AMSRD-TAR-R**

MEMORANDUM FOR:

Installation Management Agency, Detroit Arsenal Environmental Coordinator, IMNE-MIG-PWE

SUBJECT: ***Record of Environmental Consideration (REC)***

1. **Name of Proposed Project:** *(same as Environmental Review:* ***11-023)***

   Building addition to 273

2. **Project Description:** (same as Environmental Review: ***11-023***)

   Expand B273 to accommodate addition children of DTA employees.

3. **Anticipated date and duration (in days) of the proposed action:** **30-Sep-12** _____Days. ☐ *Check if date is unknown.*

4. **Reason for using Record of Environmental Consideration:**

   This action is categorically excluded under the provisions of **C-1** 32 CFR 651 - Appendix B because:

   There are no existing environmentally sensitive areas or aspects that would disqualify this project from a categorical exclusion determination provided the work is done according to plans provided as part of this review, and the following Special Environmental Requirements are applied to the project:

   1. All excavated soils must be disposed at a Class II landfill.
   2. The entire project work area must be encompassed with Silt Fencing.
   3. All storm sewer inlets must be protected according to best management practices.
   4. All permit development packages must be submitted to the Environmental Division for review.
   5. A Pollution Prevention Plan and Waste Management Plan must be submitted to and by approved by the Environmental Division prior to construction.
   6. Dust must be controlled to prevent impacting the adjacent day care area according to the following:
      a. Cover the soil stock pile with geo-tech fabric; or
      b. Wet down the soil pile on a daily basis, or sooner if needed; or
      c. Haul the soil away as it is being excavated; or
      d. Hydro-seed the soil pile as soon as its use has ceased: no later than seven days.
   7. The soil pile cannot be located west of the of the east end of the current building.
   8. The soil pile cannot be located within 25 feet of the adjacent parking lot to the south of the project site.
   9. The soil pile cannot be located within 25 feet of any storm sewer inlets or if within 25 feet the inlet must be protected from sediment.

See attached USAG-DTA Environmental Protection Specification (EPS). It must be included in the contract.

NAME: ***(Digital Signature Required for Approval)***

PROJECT PROPONENT: , , James Knowles, ,

6/30/2011

X James R. Knowles

Signed by KNOWLES.JAMES.RUSSELL.1231204578 View details
on Thursday, June 30, 2011 12:46 PM (Eastern Daylight Time)

APPROVED: Terry Tighe, terry.tighe@us.army.mil, 586-282-5824
Environmental Coordinator

6/30/2011

X Cheryl L. Neades, for Terr...

Signed by NEADES.CHERYL.L.1147693458 View details
on Thursday, June 30, 2011 3:30 PM (Eastern Daylight Time)

USAG-DTA

ENVIRONMENTAL PROTECTION SPECIFICATIONS

ENVIRONMENTAL RESOURCE MANAGEMENT & SUSTAINABILITY - General

The contractor is expected to be knowledgeable with all Federal, State and local environmental laws[1]and the impact of these laws on their work procedures. The Contractor shall minimize environmental pollution and damage or potential damage that may result from their operations. Environmental resources within the project boundaries and those affected outside the limits of work shall be protected for the duration of the contract. The Contractor will be responsible for work delay resulting from failure to comply with environmental laws and regulations. Failure to comply with environmental requirements is not grounds for an equitable adjustment. The Contractor shall confine all activities to areas defined by the design drawings and specifications. The Contractor shall be responsible for the actions of all subcontractors to ensure they adhere to all environmental requirements. The Army's goal is to have no enforcement actions at any installation. The contractor's actions and support are absolutely essential to achieve this goal at on the United States Army Garrison-Michigan (USAG-DTA). In the event the USAG-DTA is issued an enforcement action, the Contractor shall be liable for the cost of all fines and penalties resulting from the violation of any laws due to their actions or failure to perform In Accordance With (IAW) Federal, State or local environmental requirements. Also the contractor shall be responsible to reimburse the Government for all expenses incurred because of the receipt of any enforcement actions. The contractor is responsible to insure that all subcontractors adhere to all environmental requirements. The contractor shall notify the Contracting Officer or Contracting Officer's Representative (COR) if any actual environmental issues are encountered or potential environmental issues may be encountered.

The contractor shall write an Environmental Protection Plan and Waste Management Plan that will outline the procedures and controls, to include who is responsible for compliance. The contractor will establish and maintain procedures to assure all workers and subcontractors protect the environment. These plans must be submitted and approved by the USAG-DTA Environmental Management Division prior to the start of work.

[1] Local Laws include Macomb County and the City of Warren.

ENVIRONMENTAL RESURCE MANAGEMENT:

1. ASBESTOS

1.1 Asbestos is present on the USAG-DTA facilities.

1.1.1 Contact the USAG-DTA Work Control Desk (operated by the Base Operations Contractor) for assistance in determining if asbestos is present in the work site. Asbestos Inspections are located in the Base Operations area at the Detroit Arsenal.

1.1.1.1 Detroit Arsenal: (586) 282-5326

1.1.1.2 N/A

1.1.2 Renovation/ construction/ demolition projects, requiring workers walking through buildings/ structures that may contain asbestos must provide verification of asbestos "awareness" training prior to accessing these buildings/structures.

1.1.2.1 Renovation/ construction/ demolition projects, requiring workers walking through buildings/ structures that may contain asbestos must provide verification of asbestos "awareness" training prior to accessing these buildings/structures.

1.1.3 In the event there is an accidental disturbance of asbestos, the contractor must have a competent person, as defined by the EPA, on site at all times work is being done in areas with Asbestos Containing Material (ACM) or Presumed Asbestos Containing Material (PACM).

1.1.3.1 If during the execution of any work order asbestos containing material is disturbed or dislodged the contractor shall take the following actions:

1.1.3.2 Restrict entry into the area and post signs to prevent entry into the area by persons other than those necessary to perform the response action.

1.1.3.3 Contact the USAG-DTA work control desk (Detroit Arsenal: (586) 282-5326) to have the air handling system shut off in the release area to prevent the distribution of fibers to other areas in the building.

1.1.3.4 Conduct clean-up IAW all Federal and State laws.

1.1.4 The contractor may encounter asbestos that has not been previously identified on inspections. If the contractor encounters asbestos or encounters a suspected asbestos containing material, immediately stop work and contact the Contracting Officer, construction inspector and the USAG-DTA asbestos program manager. See para. 4.1.3 for clean up procedures.

1.1.5 It is DoD and Army policy to manage asbestos in place and only remove it if it is failing or it interferes with another action such as construction or maintenance and repair. Asbestos that is not failing is the reasonability of the contractor to remove. If there is a reason or need to remove ACM in order to complete their work, the contractor is responsible to properly remove it.

1.1.5.1 All asbestos abatement projects must be conducted IAW with the State of Michigan requirements

1.1.5.2 All asbestos abatement designs must be submitted to the USAG-DTA Environmental Management

Division for review and approval 5 work days prior to starting any abatement work.

1.1.5.3 All State of NESHAP notifications must be submitted to the USAG-DTA Environmental Management Division for review and approval prior to send it to the State of Michigan for approval.

1.1.5.4 The contractor must maintain a Log for all abatement projects. A copy of the log must be turned into the Government after completion of the abatement project.

1.1.5.5 The Government will arrange for a third party neutral consultant to perform a final clearance for Class I and I1 asbestos abatement projects. If deficiencies are found, the contractor must correct all deficiencies. The contractor shall reimburse the Government for all third party neutral final clearance inspection required after the initial final clearance.

1.1.5.6 All removed asbestos shall be properly packaged, labeled and turned into the HAZMART for disposal IAW with the HAZMART Users Pamphlet.

1.1.5.7 The contractor must submit an as-built drawing within 10 days of completion of the work. The drawing shall identify the following:

1.1.5.7.1 Type of ACM removed.

1.1.5.7.2 Location of where the ACM was removed.

1.1.5.7.3 Date of Abatement.

1.1.5.8 If the contractor removes asbestos insulation, they must replace the asbestos with non-asbestos insulation and label the insulation as non-asbestos.

1.2 The Contractor is responsible to assure all their personnel, and/or their subcontractor's personnel, performing asbestos abatement have the proper State of Michigan Certification/License and that the company performing the abatement is licensed by the State of Michigan:

1.2.1 All abatement workers must be properly trained and licensed by the State of Michigan. Provide copies of all licenses and certifications prior to the start of work. Each worker shall have their asbestos license with them at all times. A copy of the contractor's license must be on site at all times. The Government has the right to review all licenses and training documentation. Failure to have the proper documentation will result in stoppage of the project. Any cost for failure to have the proper documentation will be the responsibility of the contractor.

1.2.2 Prior to the start of any abatement work, the contractor must provide copies of all workers licenses to the USAG-DTA Environmental Management Division.

1.2.3 Prior to the start of any abatement work, provide a copy of the companies State of Michigan license to the USAG-DTA Environmental Management Division.

1.3 Types of training that may be required:

1.3.1 Project designer

1.3.2 Management planner

1.3.3 Building inspector

1.3.4 Contractor/Supervisor

1.3.5 Abatement Worker

1.3.6 Awareness

1.4 The use of ACM is not permitted without written approval of the DPW through the Contracting officer. If ACM has been used, provide, within 10 days of the project completion and before the final inspection, an as built drawing with the following information:

1.4.1 Location.

1.4.2 Type of asbestos.

1.4.3 Percentage of asbestos in the material.

1.4.4 Date installed.

1.4.5 If the contractor does not use ACM, the contactor shall provide written certification that they have not used any ACM during performance of the contract, project or task order. This shall be a letter from a company representative that has the authority to sign a contract or modification.

2. CULTURAL RESOURCES

2.1 The USAG-DTA has an Integrated Cultural Resource Management Plan for the Detroit Arsenal. The contractor must understand the requirements of this plan and the impact on their operations for both sites. The USAG-DTA Environmental Management Division has an electronic copy of the plans.

2.2 HISTORICAL PROPERTIES:

2.2.1 All actions that impact the historical nature of any historical structure must have the modification approved by

the Michigan State Historical Preservation Office (SHPO). This includes such things as penetrating the wall structure, modifying the original use of the structure, modifying its appearance, etc.

2.2.2 Once the design for the historical structures has been approved by the SHPO no modifications can be made to the design without further consultation with the SHPO.

2.2.3 DETROIT ARSENAL ELIGIBLE HISTORICAL STRUCTURES:

2.2.3.1 The following buildings, structures or monuments are historically eligible or have met the 50 year age limit: 7, 8, 201, 203, 208, 212-214,218-219,222-223,226,252 and T202, T209,T216,T224, T225.

2.3 There have been no archeological finds on the USAG-DTA or in the surrounding area. However, if any archeological items or evidence of human culture (pottery, arrowheads, etc) are discovered during the course of the contractor's performance, immediately stop work and contact the USAG-DTA Environmental Management Division. No work will be allowed until a determination can made concerning the discovered items.

2.4 Upon discovery of human remains, all work must stop. Allow no further disturbance of the discovery site and immediately notify both the Environment & Sustainability Division and the Federal Police Desk, (586) 282-5564. Work is not allowed to proceed until cleared by both the Environmental Management Division and the Police.

2.5 HISTORICAL PRESERVATION REQUIREMENTS:

2.5.1 If the undertaking is determined by the Environmental Division to result in adverse effects to Building 7, services to be performed by the contractor under this contract shall conform to all applicable requirements and criteria indicated in the following handbooks and publications:

2.5.1.1 The Secretary of the Interior's Standards for the Treatment of Historic Properties, 1992.

2.5.1.2 Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, 1995.

2.5.1.3 The National Historic Preservation Act of 1966, as amended, and Executive Order 11593.

2.5.1.4 Integrated Cultural Resource Management Plan, US Army Garrison - Michigan Detroit Arsenal, 2006-2010.

2.5.2 Contractor shall retain the services of the following individuals to complete the project: Historic Architect or Preservation Architect.

2.5.2.1 Preservation Architect must be involved in analysis and design of all alternatives leading up to decisions affecting the treatment of the historic property.

2.5.2.2 The Preservation Architect must review all submissions in their entirety for impacts on restoration and rehabilitation zones. Incorporate the Preservation Architect's comments into the submission to the Garrison. The Preservation Architect must certify in writing that the final submission meets the Secretary of the Interior's Standards. If the submission does not meet the Secretary of the Interior's Standards, the Preservation Architect must provide an explanation.

2.5.3 Submit three sets of information necessary to achieve design concurrence by the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP). This should include by may not be limited to the following information:

2.5.3.1 A project description, explaining the project's preservation issues and how they were resolved in design. Follow the format shown in Attachment A. This shall be provided with each submission required by the contract.

2.5.3.2 Provide special graphics as necessary to illustrate preservation issues.

2.5.3.3 Photographic documentation of locations to be affected by the project by submitting 4"x6" color prints (with original negatives) to document the existing conditions related to this project. Provide at least one photograph of each different type of space or façade, each historic finish material or assembly, and each different condition to be treated which are potentially affected by this project. Photographs should have numbered labels, applied to the back of each print, indicating location and content of each photograph.

2.5.3.4 Provide annotated floor or site plans with numbers corresponding to photo label numbers and arrows showing the photographer's location and the orientation of each photograph.

3. NATURAL RESOURCES

3.1 When replanting grass or trees contractor shall use only species native to the State of Michigan. Contact the USAG-DTA Environmental Management Division for assistance.

3.2 Migratory birds are protected. If any migratory birds become a nuisance, contact the work order desk for assistance. (586) 282-5326.

4. LEAD BASED PAINT

4.1 LBP is present on the USAG-DTA.

4.1.1 Contact the USAG-DTA Work Control Desk for assistance in determining if LBP is present in the work site. LBP Inspections are located in the Base Operations area at the Detroit Arsenal.

4.1.2 All contractor employees working in areas that may contain LBP shall be properly trained to assure neither their employees nor anyone on the USAG-DTA is exposed to LBP during contract operations. The contractor must insure that all subcontractors are properly trained and they have records of the training.

4.1.3 If during the execution of any work order LBP containing material is disturbed or dislodged the contractor shall take the following actions:

4.1.3.1 Restrict entry into the area and post signs to prevent entry into the area by persons other than those necessary to perform the response action.

4.1.3.2 Conduct clean up IAW all Federal and State laws.

4.1.4 If it is necessary to abate LBP in order to complete the project, it is the responsibility of the contractor to remove it.

4.1.4.1 All LBP removal must be conducted IAW with the Federal and State of Michigan requirements.

4.1.4.2 The contractor must maintain a Log for all abatement projects. A copy of the must be turned into the Government after completion of the abatement project.

4.1.4.3 All abated LBP shall be properly packaged, labeled and turned into the HAZMART for disposal IAW with the HAZMART Users Pamphlet.

4.1.4.4 The contractor must submit an as built drawing identifying the LBP removed and date of removal within 10 days of completion of the work.

4.1.5 If LBP is removed and the action is not considered abatement:

4.1.5.1 The contractor shall dispose of the debris as solid waste.

4.1.5.2 The contractor must submit an as built drawing identifying the LBP removed and date of removal within 10 days of completion of the work.

4.1.6 If any work is being conducted at facilities where children may be present, clearance testing must be completed.

4.1.6.1 The contractor must clean the facility to meet HUD standards.

4.1.6.2 The Government will conduct the clearance testing. Notify the government 10 work days prior to needing the test.

4.1.6.3 If the clearance test does not meet clearance standards, the contractor must clean the facility until it passes the clearance test. The contractor must reimburse the Government for all clearance tests after the initial test.

4.1.7 The Contractor is responsible to make sure all employees and subcontractors are properly trained. The Government has the right to review all licenses and training documentation. Failure to have the proper documentation will result in stoppage of the project.

4.2 The Contractor is responsible to assure that they have the proper State Certifications for their company and all subcontractors have their state licenses for all LBP work. Provide a copy of all licenses and certificates prior to the start of work. Copies of licenses and certificates shall be on site at all times. The Government has the right to review all licenses and training documentation. Failure to have the proper documentation will result in stoppage of the project.

4.3 The contactor shall certify that they have not used any LBP during performance of the contract, delivery order or project. This shall be a letter from a company representative that has the authority to sign a contract or modification.

5. SOIL MANAGEMENT

5.1 The disturbance of soils on the USAG-DTA can affect a number of different environmental areas. Depending on the circumstances, disturbed soil can impact Air, Water Quality, Hazardous Waste, Natural Resources, Pest Management, Solid Waste, and Storm Water. It can also affect non environmental areas, e.g. underground utilities, landscaping, storm drain maintenance.

5.2 Under certain conditions soil disturbance may require a state or county permit. Before any soil is disturbed, contact the USAG-DTA Environmental Management Division to discuss specific operations.

5.3 In general soil shall not be used at other locations on the USAG-DTA and will be disposed of by the contractor off site. This may require testing for contamination before it will be accepted by a landfill.

5.4 If testing confirms the soil is contaminated, contact the HAZMART for coordination of disposal. See SUSTAINABILITY - Hazardous Materials. .

5.5 If there is a reason to leave soil on site the DPW and the contracting officer must approved the storage.

5.5.1 All soil must be tested and free from any contamination.

5.5.2 Soil must be free of construction debris.

5.5.3 Soil must be managed and stabilized prior to completion of the contract.

5.6 Air. Fugitive dust must not migrate off the construction site. See SUSTAINABILITY - Air Emissions.

5.7 WATER QUALITY

5.7.1 While not directly impacting the drinking water system, water used to control dust or clean vehicles must be

obtained from a source with a backflow preventer.

5.7.2 Contact the DPW Project Engineer for assistance securing a location to obtain water.

5.7.3 Also see ENVIRONMENTAL RESOURCE MANAGEMENT - Water (Storm Water).

5.8 HAZARDOUS WASTE

5.8.1 Detroit Arsenal.

5.8.1.1 The arsenal has been tested for contamination. All samples were below levels for clean up action.

5.8.1.2 Even though the soil has been tested, all soil leaving the post must be tested to assure proper disposal.

5.8.1.2.1 If the soil is free of contamination, it can be disposed of as solid waste.

5.8.1.2.2 If it is contaminated, it must be processed through the HAZMART as a hazardous waste. See SUSTAINABILITY - Hazardous Materials.

5.9 PERMITS

5.9.1 Soil Erosion Control Permit

5.9.2 Macomb County

5.9.2.1 Soil Erosion Control Permit Required

5.9.2.2 Draft permit package must contain minimum information as contained in the Macomb SESC standards.

5.9.2.3 Draft permit package must be reviewed and approved by Department of Public Works – Environment and Sustainability Division prior to submittal to Macomb County.

5.9.2.4 All meetings with Macomb County must be scheduled through the Department of Public Works – Environment and Sustainability Division.

5.9.2.5 All plan changes as required by Macomb County must be reviewed and approved by the Department of Public Works – Environment and Sustainability Division prior to submittal to Macomb County.

5.9.2.6 All permit packages approved by the Department of Public Works – Environment and Sustainability Division will be submitted through that office to Macomb County.

5.9.2.7 All public meetings and hearings related to the permit package under review by Macomb County will be coordinated through and attended by Department of Public Works – Environment and Sustainability Division.

SPECIFICATION CONDITION(S) / MITIGATION(S):

Contact: Cheryl Neades, cheryl.l.neades@us.army.mil, 586-282-8344 **Date:** 09-May-11

COMMENT:

SESC controls required by permit must be met. Mitigation to predevelopment hydrology is required. This can be accomplished through a treatment train of multiple methods. I.E. vegetated roof, rain gardens, permeable pavers etc. Infiltration practices are not acceptable due to site conditions. Pretreatment of construction site runoff may be required depending upon timing of construction. Project must manage and dispose of soil spoils.

6. WATER (Storm Water / Water Quality / Waste Water (Sanitary) / Permits)

STORM WATER:

6.1 The contractor shall monitor all -activities to prevent pollution of surface and ground water.

6.2 Toxic or hazardous chemicals shall not be applied to soils or vegetation.

6.3 The Detroit Arsenal is located adjacent to an impaired water way, Bear Creek. The contractor must continually monitor their site to assure no pollutants enter the water way. This could be through spills to the ground, runoff or through the storm sewer or trash from the site that could end up in the water.

6.4 Soil erosion and sedimentation control must be maintained at all times on the activity site. Provide soil erosion and sedimentation control plan to the Environmental Management Division for approval prior to the disturbing any soil. The plan must conform to the state of Michigan and Macomb County soil erosion and sedimentation control requirements. Failure to install and maintain approved soil erosion controls will result in the project being shut down.

6.4.1 RESERVED:

6.4.2 Soil erosion and sedimentation control must be kept in place until the soil is stabilized. Stabilization includes such things as vegetation growth, concrete or asphalt, or gravel/rocks. The site is considered to be stabilized when all permanent control structures have been installed, maintenance for the permanent controls has been arranged, vegetation is well established, and temporary controls have been removed.

6.4.3 Any disturbance of soil may require adherence to State and County requirements. Before disturbing any soil, coordinate with the Environmental Management Division.

6.4.3.1 RESERVED:

6.4.3.2 See Storm Water Attachment B for requirements for soil disturbance 1 acre or more, but less than 5 acres.

6.4.3.3 See Storm Water Attachment C for requirements for soil disturbances 5 acres or more.

6.4.3.4 RESERVED:

6.4.3.5 See Storm Water Attachment E, Macomb County permit application checklist. The checklist is offered as an aid. To ensure the most up-to-date checklist see Macomb County Soil Erosion Department.

6.5 The contractor will not dispose of any waste, solid or liquid, through a storm sewer.

6.6 It is illegal to connect Storm water sewer lines to the sanitary wastewater sewer lines. Contact the design engineer and the Environmental Management Division if there are conflicts with this requirement in other parts of the contract.

WATER QUALITY:

6.7 All contractor actions must assure that the drinking water is not contaminated.

6.8 Contractor must use backflow protection when ever connecting to the potable water system. Prior to connecting to any potable water system, contact the USAG-DTA DPW Project Engineer. Provide the following:

6.8.1 Location of connection.

6.8.2 Purpose of connection.

6.8.3 Time when the contractor will be connect to the water system.

6.8.4 Type of backflow prevention being used to protect the water system.

6.9 Contractor must use AWWA procedures to disinfect the system after any work on the potable water system.

6.10 Contractors connecting, replacing, or modifying any equipment which connects to the water system must provide the appropriate backflow prevention device either on the water connection or the equipment. Equipment includes process devices, heat exchangers, pumps, in-line coffee pots, water fountains, etc.

WASTE WATER (Sanitary):

6.11 The contractor shall not dispose of any waste through the sanitary sewer other than normal restroom wastewater.

6.12 All sanitary waste water discharges must comply with the City of Warren's Code of City Ordnances, chapter 41. The link to this is: http://www.municode.com/services/mcsgateway.asp?sid=22&pid=10936

6.13 Accidental releases to the sanitary sewer must be reported immediate to the Fire Department.

6.12.1 Detroit Arsenal: (586) 282-7117

6.14 It is illegal to connect sanitary wastewater sewer lines to Storm water sewer lines. Contact the design engineer and the Environmental Management Division if there are conflicts with this requirement in other parts of the contract.

PERMITS:

6.15 STORM WATER MANAGEMENT - Section 404 / 301 Bear Creek Drain

6.15.1 RESERVED

6.15.2 RESERVED

6.15.3 Michigan Department of Natural Resources – Environmental (MiDNR-E)

6.15.3.1 Draft permit package must contain minimum information as contained in the USACE – Detroit District Regulatory Division and MiDNR-E permit information standards.

6.15.3.2 Draft permit package must be reviewed and approved by Department of Public Works – Environment and Sustainability Division prior to submittal to USACE – Detroit District Regulatory Division and MiDNR-E.

6.15.3.3 All meetings with USACE and/or MiDNR-E must be scheduled through the Department of Public Works – Environment and Sustainability Division.

6.15.3.4 All plan changes as required by either the USACE – Detroit District Regulatory Division or MiDNR-E must be reviewed and approved by the Department of Public Works – Environment and Sustainability Division prior to submittal to either agency.

6.15.3.5 All permit packages approved by the Department of Public Works – Environment and Sustainability Division will be submitted through that office to USACE – Detroit District Regulatory Division and MiDNR-E.

6.15.3.6 All public meetings and hearings related to the permit package under review by USACE – Detroit District Regulatory Division and/or MiDNR-E will be coordinated through and attended by Department of Public Works – Environment and Sustainability Division staff.

6.16 STORM WATER MANAGEMENT - MI DNRE Storm Water Construction Site

6.16.1 NPDES Permit

6.16.2 Michigan Department of Natural Resources - Environmental

6.16.2.1 Draft permit package must contain minimum information as contained in the MiDNR NPDES standards.

6.16.2.2 Draft permit package must be reviewed and approved by Department of Public Works – Environment and Sustainability Division prior to submittal to MiDNR.

6.16.2.3 All meetings with MiDNR must be scheduled through the Department of Public Works – Environment and Sustainability Division.

6.16.2.4 All plan changes as required by MiDNR must be reviewed and approved by the Department of Public Works – Environment and Sustainability Division prior to submittal to MiDNR.

6.16.2.5 All permit packages approved by the Department of Public Works – Environment and Sustainability Division will be submitted through that office to MiDNR.

6.16.2.6 All public meetings and hearings related to the permit package under review by MiDNR will be coordinated through and attended by Department of Public Works – Environment and Sustainability Division staff.

SPECIFICATION CONDITION(S) / MITIGATION(S):

Contact: Cheryl Neades, cheryl.l.neades@us.army.mil, 586-282-8344 **Date:** 09-May-11

COMMENT:

A City of Warren design review is required. County SESC and State construction NPDES permits are required. All permit requirements must be met. Site must be stabilized before permits will be terminated.

SUSTAINABILITY:

1. AIR EMMESSIONS

1.1 The USAG-DTA's air emissions are restricted. The USAG-DTA is currently located in a Non-Attainment Area for ozone and particulate matter (PM) 2.5 as defined by the EPA. The EPA has the authority to change this at any time, based on emissions in the Southeastern Michigan regional area.

1.2 The USAG-DTA has been issued a synthetic minor air permit from the State of Michigan permit for all emissions at the Detroit Arsenal (DTA). Attach file below.

File Attachment

1.3 Ozone and PM 2.5 Actions Alerts are forecast by the Clean Air Coalition's meteorology team under a number of factors that include meteorological conditions like temperature, wind speed, direction, cloud cover and ultraviolet radiation. The team also considers the likelihood of ozone transport from other areas and expected emissions from regional sources. While there are no legally binding requirements to reduce emissions that could reduce ground level ozone, the contractor should be cognizant of the actions they can take to reduce emissions that contribute to ozone development. Ozone and PM 2.5 Action Alerts address the importance of preventing the formation of ground-level ozone and protecting public health.

1.4 GENERAL CONFORMITY RULE (GCR):
All Army actions (projects, events, etc.) on this installation must be considered under the GCR, due to the fact we're in a non-attainment area. An applicability analysis must be performed which calculates and compares all direct and indirect emissions of the action to the de minimis threshold values of the non-attainment area. A copy of the analysis shall be turned into the Air Quality Manager.

1.5 AIR PERMIT REQUIREMENTS:

1.5.1 Permit Number #566-96B applies to all work on-site.

1.5.2 Permit to install - If this job involves installing a source of air emissions or modifying a current air emissions source (vent hood, boiler, stationary engine, paint booth, etc.), the contractor shall complete the permit to install and submit it to the Garrison Air Quality Manager who will review it for impact on the current air permit before the Government submits it to the State.
REF: http://www.deq.state.mi.us/aps/

1.5.3 If using portable power generators, the contractor must develop and maintain a log, it must show hours run per day and the amount and type of fuel burned per day. A legible copy of this log must be turned in weekly to the Garrison Air Quality Manager. Prior to this, the contractor shall prepare an estimate of use for the entire job and the Air Quality Manager shall review the estimate for its effect on the air permit.

1.5.4 The contractor shall use either low or no VOC paint as defined in 40 CFR xxx. The amount and type of paint used shall be reported in the form of a log to the Air Quality Manager on a weekly basis. Any welding performed must also be reported. A log showing the amount of rods/wire used and the make up of these rods/wire must be turned into the Air Quality Manager on a weekly basis.

1.5.5 These logs may be combined.

1.6 OZONE DEPLETING CHEMICALS/SUBSTANCES (ODC/ODS - verbally used/interchangeable):

1.6.1 It is Army policy to minimize the procurement, use and emissions of ODCs to the greatest extent possible. Installation of new equipment using Class I ODCs is prohibited. Only equipment and refrigerants listed by the EPA Strategic New Alternatives Program (SNAP) are acceptable. No equipment using HCFC 141b shall be used. It should be noted, however, that HCFC 142b and HCFC 22 shall be phased out in 2020. All HCFCs shall be phased out in 2030 respectively and not recommended for use or future liability. Equipment must be labeled with type of chemical used and date installed. As-built drawings shall include location of equipment, installation date, and type of refrigerant used.

1.6.2 The use of Class I or II ODCs are not by themselves damaging to the environment provided the refrigerant does not leak during operation and is recovered upon retirement of the equipment. All personnel maintaining, repairing or replacing ODCs must be licensed and their equipment must be certified. Licenses and equipment certification must be retained on site and copy submitted to the Environmental Management Division (EMD) prior to the start of work.

1.6.3 DOD has a program to retain certain Class I or Class II ODCs for strategic reuse. Turn all recovered and excess ODCs into the HAZMART for disposal. Place recovered ODCs in cylinders meeting ARI guideline K suitable for type of ODC (filled no more than 80% capacity) and provide appropriate labeling.

1.6.4 Class I and Class II ODCs are defined in Section 602(a) & (b) of the Clean Air Act.

1.7 FUGITIVE DUST:

The contractor must control fugitive dust in and around the work site to prevent soil and any attached pollutants from leaving the installation. Dust control measures should be applied any time dust is generated on construction sites or roads. The Contractor shall establish control measures to maintain excavations, stockpiles, haul roads, and other work related areas within or outside the project boundaries free of particulate release that would exceed environmental regulations or would cause a hazard or nuisance. Sprinkling as a control must be repeated to keep the site damp, contractor must take care to prevent sediment from entering surface waters. The Contractor must provide sufficient information.

2. HAZARDOUS MATERIALS

2.1 The definition of hazardous material is located in Fed Std 3 13C, dated 1 March 1988.

2.2 All hazardous material coming on the installation must be tracked through the HAZMART. There are procedures for permanent installations operations (where the Government provides space for operations) and temporary operations (e.g. construction or maintenance contracts).

2.2.1 All hazardous materials required by the contractor must be obtained through the USAG-DTA HAZMART. The HAZMART Users Pamphlet explains how to requisition materials. In conjunction with the HAZMART, the contractor shall establish its Authorized Usage List (AUL) 45 days after contract award (during the phase-in period) in order to have deliveries when the contractor starts work.

2.2.2 The contractor's subcontractors do not have to obtain their hazardous materials through the HAZMART, however, all hazardous materials must be processed through the HAZMART when they come on the installation and all containers must be processed through the HAZMART before they leave the installation. The contractor must assure that their subcontractors are aware of the hours of the HAZMART for processing materials.

2.3 The contractor shall not store or dispose of Hazardous or toxic materials on USAG-DTA. This does not include temporary accumulation of a limited quantity of a material used in support of the contract and processed through the HAZMART.

2.4 All contractor and subcontractor personnel handling hazardous material must have USAG-DTA Storm Water Awareness training. Contact the USAG-DTA Environmental Management Division to schedule training.

2.5 The contractor will provide a representative to the Installation Hazardous Material Committee (IHMC) which meets monthly

2.6 All material used by the contactor/subcontractor on the USAG-DTA shall be processed through the HAZMART and bar coded. Contact the HAZMART for hours of operation.

2.6.1 Detroit Arsenal: (586) 282-5665

2.6.2 At the end of the contract or task order, the contractor will check out through the HAZMART. Hazardous waste will be disposed of through the HAZMART.

2.6.3 All hazardous material brought on the installation will have a MSDS and a copy of the MSDS will be given to the HAZMART during check in.

2.7 Reference Far Clause 52.233-5 Alternate I and Alternate II.

3. HAZARDOUS WASTE

3.1 The Detroit Arsenal is classified as a large quantity hazardous waste generator.

3.2 Hazardous waste is defined as Hazardous Material no longer having commercial value that must be discarded.

3.3 The contractor shall not store or dispose of Hazardous or toxic waste on USAG-DTA brought from off the installation.

3.4 All hazardous waste generated on the Detroit Arsenal must be disposed of through the HAZMART. The contractor shall reimburse the Government for all disposal costs. Contact the HAZMART for hours of operation and coordination instructions.

3.4.1 RESERVED:
Detroit Arsenal: (586) 282-5665

3.5 Hazardous waste generated as a result of work being conducted can be handled in one of two ways. Prior to the start of work, the contractor must notify the contracting officer which method they will use.

3.5.1 At the end of each day the contractor can bring the waste to the HAZMART. This must done during the HAZMART open hours

3.5.2 The Contractor can establish a satellite accumulation point

3.5.2.1 The satellite accumulation point must be managed IAW with all state and federal laws.

3.5.2.2 The contractor must provide all training documentation for the satellite accumulation point operator prior to establishing the point.

3.5.2.3 The operator must inspect the SAS daily using the USAG-DTA inspection form. The completed inspection form must be kept on site at all times. Each Monday submit copies of the previous weeks completed inspection forms to the Environmental Management Division. The Government may inspect these sites at any time to assure compliance.

3.5.2.4 The material shall be turned into the HAZMART

3.6 All waste must be properly packaged and marked prior to turning it in to the HAZMART. The contractor shall provide containers/boxes for hazardous waste.

3.7 UNIVERSAL WASTE:

3.7.1 Contractor shall collect, package and properly label all universal waste. Coordinate with the HAZMART for turn and disposal.

3.7.2 Includes:

3.7.2.1 Mercury (used in fluorescent light tubes switches and thermostats)

3.7.2.2 Lead acid batteries.

3.8 TSCA. While TSCA waste are not classified as hazardous waste, all TSCA wastes shall be processed through the HAZMART for disposal.

3.8.1 Asbestos.

3.8.2 PCBs

3.8.2.1 Light ballasts

3.8.2.2 Contractor shall collect, package and properly label. Coordinate with the HAZMART for turn and disposal.

SPECIFICATION CONDITION(S) / MITIGATION(S):

Contact: Florence Trevino, florence.trevino@us.army.mil, 586-282-6615 **Date:** 06-May-11

COMMENT:

4. ENERGY CONSERVATION (Usage)

4.1 RESERVED:

4.2 ENERGY STAR EQUIPMENT:

4.2.1 RESERVED:

4.2.2 RESERVED:

4.3 ENERGY USE ON SITE:

4.3.1 RESERVED:

4.3.2 RESERVED:

4.3.3 RESERVED:

SPECIFICATION CONDITION(S) / MITIGATION(S):

Contact: Bernie Teshich, bernard.teshich@us.army.mil, 586-282-4908 **Date:** 23-May-11

COMMENT:

5. RESERVED

6. POLLUTION PREVENTION (P2)

6.1 It is the Federal Governments goal to:

6.1.1 Reduce the use of hazardous and toxic materials.

6.1.2 Establish work processes that reduce pollutants to the air and water.

6.1.3 Recycle waste rather than dispose of it.

6.1.4 Use materials that have recycled content.

6.1.5 Reduce energy consumption.

6.2 The contractor and all subcontractors are an integral part to the Pollution Prevention program at the USAG-DTA.

6.3 The three areas that contribute to the success of the USAG-DTA's Pollution Prevention program:

6.3.1 Comprehensive Procurement Guidelines for Resource Conservation.

6.3.2 Energy Conservation (Usage)

6.3.3 Solid Waste Management.

6.4 The contractor shall use double sided printing or copying and use recycled paper when ever practicable.

SPECIFICATION CONDITION(S) / MITIGATION(S):

Contact: Florence Trevino, florence.trevino@us.army.mil, 586-282-6615 **Date:** 06-May-11

COMMENT:

7. COMPREHENSIVE PROCUREMENT GUIDELINES FOR RESOURCE CONSERVATION

7.1 Green Procurement is part of the Federal Government's program to promote recycling and the use of recycled material. The requirements are defined in Executive Order 13423.

7.2 The use of EPA designated items is required during performance of this contract. The EPA issued the Comprehensive Procurement Guidelines (CPGs) that have established the mandatory procurement by federal agencies of 58 items produced with recovered materials. The EPA has also issued Recovered Material Advisor Notices (RMANs) to accompany the CPGs and provide detailed information on the designated items. The number of items designated by the EPA may change during the contract period. The contractor must use all newly designated items. The use of these items is mandatory for all actions on the USAG-DTA unless one of the following exemptions applies. The contractor must follow the USAG-DTA Green Procurement Plan in order to obtain a waiver to not use one of the EPA designated items RCRA provides the following exemptions from the requirement to purchase EPA-designated items:

7.2.1 The product is not available within a reasonable period of time.

7.2.2 The product does not meet the performance standards in applicable specifications or fails to meet reasonable performance standards of the procuring agency.

7.2.3 The product is not available at a reasonable price. For USAG-DTA purposes, "unreasonable price" is defined as follows: If the price of the recycled-content product exceeds the cost of a non-recycled item, then the price is considered unreasonable.

7.3 APPLICABILITY:

7.3.1 Applies to Federal agencies including USAG-DTA and to persons/companies contracting with Federal agencies with respect to work performed as part of these contracts.

7.3.2 Applies to all procurement or purchasing actions using Federal funds. Procurement action include:

7.3.2.1 Purchases made directly by USAG-DTA.

7.3.2.2 Purchases made directly by the Contractor in support of work being performed for USAG-DTA.

7.4 EPA List of Available Construction Products Composed.of Recovered Materials (refer to http://www.epa.gov/cpg/products.htm for availability of suppliers and additional information). A list of recycled content requirements can be found on the Environmental website at https://usagmi.army.mil/sites/directorates/green_procurement_chart.doc.

7.4.1 Construction Products

7.4.1.1 Insulation

7.4.1.2 Carpet

7.4.1.3 Cement and/or concrete

7.4.1.4 Paint

7.4.1.5 Floor Tiles

7.4.1.6 Floor tile and/or patio blocks

7.4.1.7 Structural fiberboard and laminated paperboard

7.4.1.8 Restroom or shower dividers

7.4.1.9 Modular Threshold Ramps

7.4.1.10 Non Pressure Pipe

7.4.1.11 Patio Blocks

7.4.1.12 RESERVED:

7.4.1.13 Roofing Materials

7.4.1.14 Dividers

7.4.2 Landscaping Products

7.4.2.1 Compost

7.4.2.2 Garden and Soaker Hose

7.4.2.3 Hydraulic Mulch

7.4.2.4 Lawn and Garden Edging

7.4.2.5 Plastic Lumber Landscaping Timber and Posts

7.4.3 RESERVED:

7.4.3.1 RESERVED:

7.4.3.2 RESERVED:

7.4.3.3 RESERVED:

7.4.3.4 RESERVED:

7.4.3.5 RESERVED:

7.4.3.6 Office Furniture

7.4.3.7 Recycling Containers/Waste Receptacles

7.4.3.8 RESERVED:

7.4.3.9 RESERVED:

7.4.3.10 RESERVED:

7.4.3.11 RESERVED:

7.4.3.12 RESERVED:

7.4.4 RESERVED:

7.4.4.1 RESERVED:

7.4.4.2 RESERVED:

7.4.4.3 RESERVED:

7.4.4.4 RESERVED:

7.4.5 Park and Recreation Products

7.4.5.1 Park Benches & Picnic Tables

7.4.5.2 Plastic Fencing

7.4.5.3 Playground Equipment

7.4.5.4 Playground Surfaces

7.4.5.5 Running Tracks

7.4.6 RESERVED:

7.4.6.1 RESERVED:

7.4.6.2 RESERVED:

7.4.6.3 Parking Stops

7.4.6.4 Traffic Barricades (Type I and II only)

7.4.6.5 Traffic Cones

7.4.7 Vehicle Maintenance Products

7.4.7.1 RESERVED:

7.4.7.2 RESERVED:

7.4.7.3 RESERVED:

7.4.8 Miscellaneous Products

7.4.8.1 RESERVED:

7.4.8.2 Bike Racks

7.4.8.3 RESERVED:

7.4.8.4 RESERVED:

7.4.8.5 RESERVED:

7.4.8.6 Mats

7.4.8.7 RESERVED:

7.4.8.8 RESERVED:

7.5 The Contractor will evaluate the reasonable availability, reasonable performance standards, and price of EPA "Available Construction Products Composed of Recovered Materials" as compared to virgin materials that will be used on the construction project. The Contractor will consult with and report to the Contracting Officer on the choice of materials. Waiver from the requirement to use recovered materials will be determined by the Contracting Officer in consultation with the USAG-DTA Environmental Management Division.

7.6 As new items are added to the CPG list, the Contractor must use these new items or obtain a waiver.

7.7 Provide a list of all recovered materials used at the end of the contract to the Contracting Officer.

SPECIFICATION CONDITION(S) / MITIGATION(S):

Contact: Florence Trevino, florence.trevino@us.army.mil, 586-282-6615 **Date:** 06-May-11

COMMENT:

8. PEST MANAGEMENT

8.1 Pesticide application at the USAG-DTA can only be accomplished by a licensed pest applicator approved by the USAG-DTA pest management program manger. Any pest control activities required by the contractor or its subcontractors must be requested through the installation base support contractors work control desk. This includes all administrative space and outside work areas. (586) 282-5326.

8.2 Fertilizer, not containing pesticides or herbicides, may be applied by your personnel or a sub-contracted non-licensed applicator. Fertilizer applications must minimize any impacts to storm water.

8.3 No pesticides (herbicides, rodenticides, algaecides, insecticides, etc) can be applied, even as part of your contract without approval of the USAG-DTA Pest Management Program Manager. Approval can take 60 days.

8.4 If pesticide application is required in other sections of this contract, contact the contracting officer and the USAG-DTA Pest Management Program Manager immediately and do not apply any pesticides.

9. RESERVED

10. ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS)

10.1 The Detroit Arsenal has established a Mission-Focused Installation Wide Environmental Management System that conforms to ISO 14001.

10.2 See FAR Clause 52.223-5.

10.3 The contractor will be a member of the Garrison's EMS Cross Functional Team (CFT).

10.4 All contractors' personnel must receive EMS awareness training annually. See the EMS work directives in the EMS web program for procedures.

10.5 All subcontractors must receive EMS training. See the EMS work directives in the EMS web program for procedures.

10.6 The contractor must follow all procedures identified in the EMS work directives.

10.7 Contractor must use all forms identified in the EMS Web Page Forms tab. If they want to change the forms, they must be reviewed and approved by the EMS Environmental Management Representative (EMR) prior to use. The contractor does not have to have a conforming EMS.

10.8 Reference FAR Clause 52.233-5 Alternate I and Alternate II.

11. SOLID WASTE MANAGEMENT

11.1 Disposal of solid waste, including construction and demolition (C&D) debris is the responsibility of the contractor. Refer to Unified Facilities Guide Specifications Section 01 74 19 for requirements of Solid Waste Management. The Waste Management Plan developed by the contractor will outline how all C&D materials generated will be handled for disposal and recycling. Section 01 74 19 paragraph 1.6 of the Unified Facilities Guide Specifications outlines the requirements of the Waste Management Plan.

11.2 The contractor shall recycle fifty percent (50%) of all C&D waste generated from the landfill. Cost effectiveness will need to be considered to meet these requirements. Documents must be submitted to support the finding if it is not cost effective to recycle this material. The documentation must be approved by the Contracting officer and the DPW prior to being waived.

11.2.1 The contractor shall make an effort to deliver non-hazardous materials to a commercial recycler and provide USAG-DTA with a summary of weights of materials recycled.

11.2.2 By the 15th of each month the contractor shall provide the following information to the Contracting Officer and Environmental Management Division:

11.2.2.1 The weight and type of all solid waste material recycled. Quantities may be measured by weight or by volume, but must be consistent throughout.

11.2.2.2 The name and location of the landfill, recycling facility or waste processor receiving the waste or a description of the recycling disposition. Submit manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material.

11.2.2.3 Provide explanations for any waste not recycled or reused.

11.3 If the contract allows the contractor to use the installations dumpsters and custodial services, they will not have to submit information for material disposed using the facilities services.

SPECIFICATION CONDITION(S) / MITIGATION(S):

Contact: Florence Trevino, florence.trevino@us.army.mil, 586-282-6615 **Date:** 06-May-11

COMMENT:

12. SPILL CONTROL & RESPONSE

12.1 The contractor shall conduct all operations to minimize the possibility of a spill or release of a hazardous material or pollutant.

12.2 All hazardous materials or pollutants must be stored on containment pallets, in containment storage cabinets (contractor must assure material in the cabinets are compatible) or in a diked/bermed area.

12.3 Notify the Environmental Management Division of the storage location of hazardous materials or pollutants when they come on the installation.

12.4 The contractor must comply with the USAG-DTA SPCC/ISPC.

12.5 Report all spills, other than small "bench stock" types to the Fire Department for response.

12.5.1 Detroit Arsenal: (586) 282-7117

12.6 The contractor must have a spill kit on site at all times with the appropriate type and amount of containment material for the materials on site.

12.7 The contractor shall reimburse the Government for all clean up and disposal costs.

12.8 The contractor is responsible for the actions of all subcontractors.

ACRONYMS AND ABBREVIATIONS

ACM: Asbestos Containing Material
COR: Contracting Officer's Representative
COFR: Contracting Officer's Functional Representative
CPG: Comprehensive Procurement Guidelines
DTA: Detroit Arsenal
EMS: Environmental Management System
EPA: Environmental Protection Agency
HCFC: Hyrdochlorofluorocarbons
IAW: In Accordance With
LBP: Lead Based Paint
NESHAP: National Emission Standards for Hazardous Air Pollutants
ODC: Ozone Depleting Chemicals
ODS: Ozone Depleting Substances
PACM: Presumed Asbestos Containing Material
RMAN: Recovered Material Advisor Notices
SHPO: State Historical Preservation Office
SNAP: Strategic New Alternatives Program
SPCC/ISPC: Spill Prevention Control & Countermeasures/Installation Spill Contingency Plan
USAG-MI: United States Army Garrison-Michigan

DEFINITIONS

Enforcement Action: This is any Notice of Violation, fine or warning letter from a regulator, Federal, State or Local.

Cultural Resources Attachment A

Historical Preservation Requirements

Project Description Report

1. Preservation Report Format:

- 8 ½" X 11" narrative report, with captioned photographs showing existing conditions, keyed to a location plan (s) showing photo orientation, and drawings of each preservation design solutions, reduced to 8 ½" X 11" and bound into report, or, if not legible at 8 ½" X 11", 11" X 17" foldout or placed in cover pocket.

2. Cover:

- Building name, Address, Project title, Project Control Number, Author (Preservation Architect), Preservation Architect's Signature, and Date of Submission.

3. Executive Summary:

- Scope and purpose of project
- Individuals and groups involved: A/E firm, Preservation Consultant, GSA Project Officer, Building Manager, GSA Regional Preservation Officer or Preservation Program staff reviewer.

4. Site Conditions:

Include captioned photographs showing existing site and building conditions at each affected area.

- Building and project location.
- Building size, configuration, materials, conditions.

5. Preservation Design Issues:

- Explain solutions explored, how resolved and why, such as (not inclusive):
  - Locating new work/installation: visibility, protection of ornamental finishes, cost concerns.
  - Design of new work/installation: address compatibility with existing original materials, research on original design (if original materials non-extant), materials/finishes chosen.
  - Method of supporting new work/installation.
  - Preservation and protection of historic materials.
- Include reduced project drawings of site plan, elevations, sections, and details.
- For work on historic building, include restoration specifications for work requiring restoration specialists; competency of bidder requirements (Sections 00120 and 009[00]).

6. Effects:

- Summarize and effects the project will have on the building's architecturally significant qualities. If there are unavoidable adverse affects, explain measures proposed to mitigate the negative impact of changes.

Storm Water Attachment B

Project Requirements

Construction or Earth Disturbance Sites < 1 Acre

Contractor Shall:

- Comply with all MI Part 91 SESC Requirements to protect waters of State.
- If within 500 feet of a waterway (Bear Creek, Clinton River or Lake St. Clair) and disturbs 225 sq ft or more, then:
    - prepare Storm Water Management/Soil Erosion Control Plan.
    - prepare Site Map with elevations and all other County requirements.
    - Submit documentation to Garrison DPTMS for OPSEC Review.
    - After OPSEC Review and approval, Contractor shall apply for Macomb County SESC Erosion Permit.
        - *As the land owner/permitee, the Government must provide written authorization for permit application*
    - Provide Copy of above documentation to the Government
    - Pay Macomb County SESC permit and inspection fees
    - Construction will not begin until County permit is obtained and a copy provided to the Government.
    - Provide copy of approved Macomb County SESC Permit
- Manage/maintain temporary storm water/soil erosion control, inspections etc. until site is stabilized.
- Government must approve the site is stabilized.
- Remove any temporary controls once area is stabilized (i.e. silt fences, catch basin inserts, etc.)

Storm Water Attachment C

Project Requirements

Construction or Earth Disturbance Sites from 1 to < 5 Acres

Contractor Shall:

- Pay all County and State permit and inspection fees.
- Prepare all documentation for outside agency submission (County, MDEQ, City) must receive Garrison DPTMS OPSEC review and approval prior to submission.
- Comply with all Part 91 Soil Erosion and Sedimentation Control Program (SESC) Requirements and Macomb County Storm Water Design Standards, effective Aug 1, 2008.
    - Prepare Storm Water Management/Soil Erosion Control Plan.
    - Provide all Information Required by Macomb County to Include Site Map with elevations, etc.
    - Contractor shall apply for Macomb County SESC Erosion Permit
        - *As the land owner/permitee, the Government must provide written authorization for permit application.*
- Comply with all MDEQ NPDES Construction Site Permit by Rule Requirements.
    - Provide Certified Storm Water Operator.
    - Perform Weekly Inspections for Soil Erosion and Sedimentation Control Practices.
    - Inspect within 24 hours after Major Rain Events.
    - Keep Inspection Logs and Provide to Government on monthly basis throughout duration of project.
- For DTA projects, prepare and submit Concept Design package for City of Warren storm water review. Shall include concept and design criteria as relates to storm water **only**.
- Construction will not begin until all permits and reviews are obtained and a copy provided to the Government.
- Maintain storm water/soil erosion control, management, inspections until site is stabilized.
- Government must approve the site is stabilized.
- Remove any temporary controls once area is stabilized (i.e. silt fences, catch basin inserts, etc.).

Storm Water Attachment D

Project Requirements

Construction or Earth Disturbance Sites for 5 Acres or More

Contractor Shall:

- Pay all County and State permit and inspection fees.
- Prepare all documentation for outside agency submission (County, MDEQ, City) must receive Garrison DPTMS OPSEC review and approval prior to submission.
- Comply with all Part 91 Soil Erosion and Sedimentation Control Program (SESC) Requirements and the Macomb County Storm Water Design Standards, effective Aug 1, 2008.
    - Prepare Storm Water Management/Soil Erosion Control Plan.
    - Provide all Information Required by Macomb County to Include Site Map with elevations, etc.
    - Contractor shall apply for Macomb County SESC Erosion Permit.
        - *As the land owner/permitee, the Government must provide written authorization for permit application.*
- Comply with all MDEQ Construction Site NPDES Permit Requirements.
    - File Notice of Coverage (NOC).
        - *As the land owner/permitee, the Government must provide written authorization for permit application.*
    - Provide Certified Storm Water Operator.
    - Perform Weekly Inspections for Soil Erosion and Sedimentation Control Practices.
    - Inspect within 24 hours after Major Rain Events.
    - Keep Inspection Logs and Provide to Government monthly throughout project duration.
    - Obtain Stabilization Certification from Government.
    - File Notice of Termination (NOT) and provide Government a copy.
- Apply for any special additional permits that may be required by County, City, MDEQ or the Army Corp (For Example: Sea Walls, Bridges, or new installation of access roads).
- For DTA projects, prepare and submit Concept Design package for City of Warren storm water review. Shall include concept and design criteria as relates to storm water **only**.
- Construction will not begin until all permits and reviews are obtained and a copy provided to the Government.
- Contractor maintains storm water/soil erosion control, management, inspections until site is stabilized **and the Notice of Termination is filed**.

Storm Water Attachment E

Macomb County Checklist

Notice to Builders and Developers

The following are examples of County submission requirements. The contractor is required to consult the Macomb County Storm Water Design Standards for exact design and permit requirements.

A person shall prepare a soil erosion and sedimentation control plan for any earth change identified in R 323.1704. A person shall design the plan to effectively reduce accelerated soil erosion and sedimentation and shall identify factors that may contribute to soil erosion or sedimentation, or both. The plan shall include, but not be limited to, all of the following:

- A map or maps at a scale of not more than 200 feet to the inch or as otherwise determined by the county or local enforcing agency. A map shall include a legal description and site location sketch that includes the proximity of any proposed earth change to lakes or streams, or both; predominant land features; and contour intervals or slope description.
- A soils survey or a written description of the soil types of the exposed land area contemplated for the earth change.
- Details for proposed earth changes, including all of the following:
    - A description and the location of the physical limits of each proposed earth change.
    - A description and the location of all existing and proposed on-site drainage and dewatering facilities.
    - The timing and sequence of each proposed earth change.
    - The location and description for installing and removing all proposed temporary soil erosion and sediment control measures.
    - A description and the location of all proposed permanent soil erosion and sediment control measures.
    - A program proposal for the continued maintenance of all permanent soil erosion and sediment control measures that remain after project completion, including the designation of the person responsible for the maintenance. Maintenance responsibilities shall become a part of any sales or exchange agreement for the land on which the permanent soil erosion control measures are located.

In addition please include the parcel ID number, the gross acreage disturbed for the project, the distance to the nearest water body or drain, and the name of the nearest water body or drain.

The County requires identification of persons responsible for temporary and permanent control measures. The contractor must coordinate with the government for the appropriate permanent POC and government signatures.

D. REQUIRED DIGITAL SIGNATURES:

NAME: *(Digital Signatures Required for Approval)*

ERM:
IMNW-MIG-PWE

James R. Knowles

LEGAL:
AMSTA-LA

Steven Whittington, steven.g.whittington@us.army.mil, **586-282-8580**

Click here to sign this section

APPROVED:
ENVIRONMENTAL COORDINATOR

Terry Tighe, terry.tighe@us.army.mil, **586-282-5824**

6/30/2011

X Cheryl L. Neades, for Terr...

Signed by NEADES.CHERYL.L.1147693458 View details
on Thursday, June 30, 2011 3:30 PM (Eastern Daylight Time)

APPROVED:
ALTERNATE

Click here to sign this section

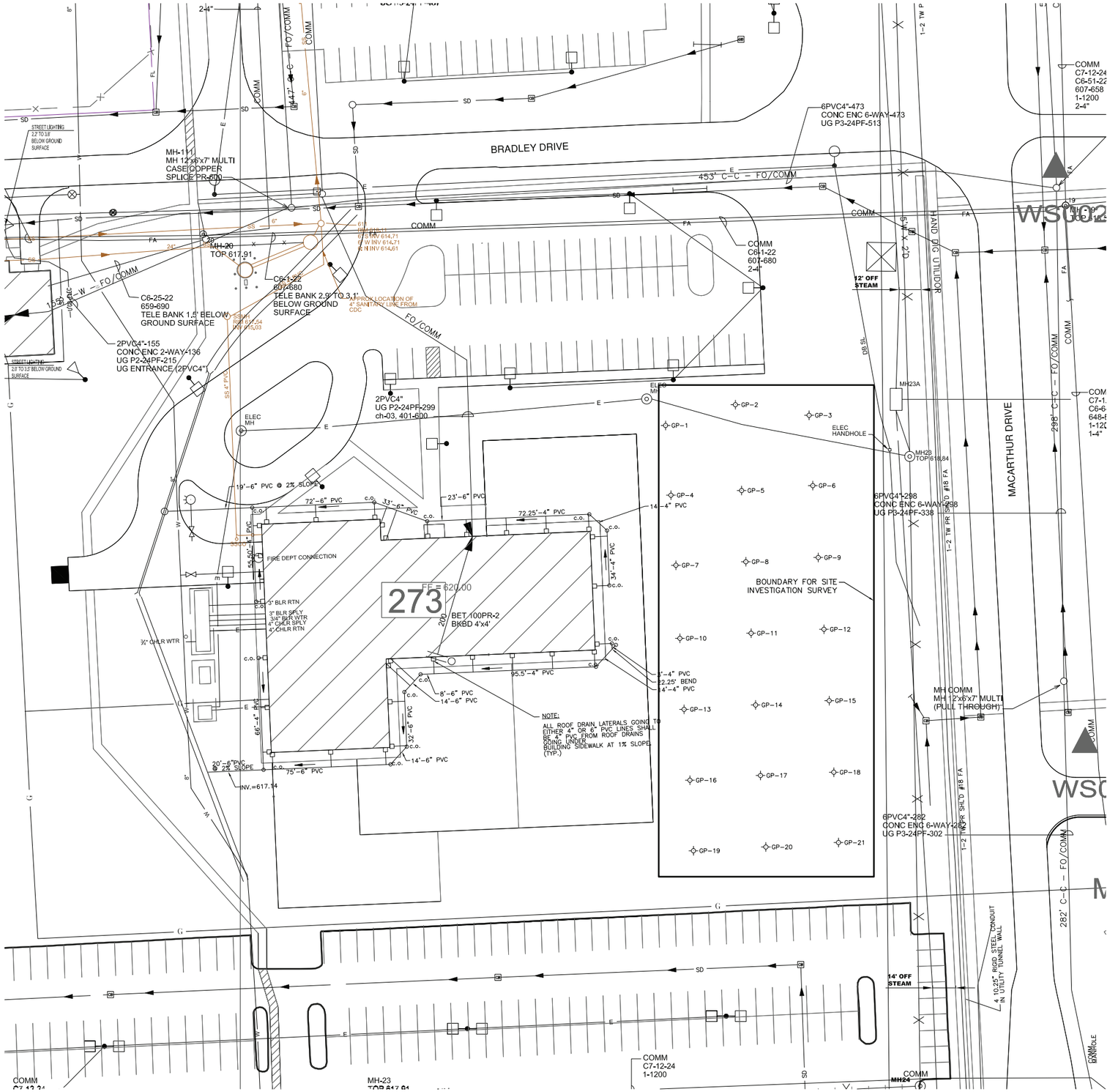
GENERAL:

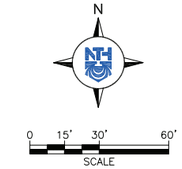
Comment(s):

Click here to sign this section

APPENDIX E.1
Environmental Information

Soils Testing Report





Point Table				
Point #	Elevation	Northing	Easting	Description
1001	619.63	365625.00	13481251.42	GP-1
1002	618.96	365637.25	13481292.61	GP-2
1003	618.54	365630.99	13481336.08	GP-3
1004	620.09	365583.88	13481254.58	GP-4
1005	619.37	365586.63	13481296.27	GP-5
1006	618.61	365589.53	13481338.27	GP-6
1007	620.00	365542.56	13481257.52	GP-7
1008	619.10	365544.63	13481298.78	GP-8
1009	618.33	365547.12	13481341.49	GP-9
1010	619.89	365499.48	13481259.86	GP-10
1011	618.85	365502.49	13481301.88	GP-11
1012	618.19	365504.81	13481344.87	GP-12
1013	619.50	365457.59	13481262.35	GP-13
1014	618.45	365460.18	13481304.54	GP-14
1015	617.75	365462.71	13481347.96	GP-15
1016	619.32	365415.82	13481265.79	GP-16
1017	618.06	365418.60	13481307.42	GP-17
1018	617.44	365420.51	13481350.67	GP-18
1019	618.82	365374.23	13481267.88	GP-19
1020	617.55	365376.45	13481310.58	GP-20
1021	617.99	365379.07	13481353.44	GP-21

UTILITY LEGEND

WATER SYSTEM
- 8" CI W — WATER MAIN
- VALVE
- SCV — SECTIONAL CONTROL VALVE
- PIV — POST INDICATOR VALVE
- YARD HYDRANT
- METER PIT

FIRE LINE SYSTEM
- 8" CI FL — FIRE MAIN
- VALVE
- SCV — SECTIONAL CONTROL VALVE
- PIV — POST INDICATOR VALVE
- FIRE HYDRANT
- METER PIT

IRRIGATION SPRINKLER SYSTEM
- 1" PE IR — SPRINKLER PIPE
- SPRINKLER HEAD
- VALVE
- SOLENOID

SANITARY SEWER SYSTEM
- 8" VC SS — SANITARY SEWER MAIN
- MANHOLE
- CLEANOUT

STORM DRAINAGE SYSTEM
- 30" C SD — STORM DRAINAGE MAIN
- 15" CM SD — STORM DRAINAGE CULVERT
- MANHOLE
- CB — CATCH BASIN
- CLEANOUT

ELECTRICAL DISTRIBUTION SYSTEM
- 2 – 3 500MCM E — UNDERGROUND CABLE
- 1 – 3 #1/0 DB E — DIRECT BURIED CABLE
- OVERHEAD CABLE
- MANHOLE
- POWER POLE
- TRANSFORMER

EXTERIOR LIGHTING SYSTEM
- 1 – 2 #6 SL — UNDERGROUND CABLE
- 1 – 2 #6 DB SL — DIRECT BURIED CABLE
- STREET LIGHT

GAS, OIL AND PETROLEUM SYSTEM
- 1" FB GL — GASOLINE LINE
- 2" G — GAS MAIN

TELEPHONE SYSTEM
- C6–6–22, 304–3592–4" T — UNDERGROUND TELEPHONE CABLE
- DB T — DIRECT BURIED TELEPHONE CABLE
- MANHOLE AND HANDHOLE
- 6 308–314–T16 — TERMINAL
- EMER. WARNING SYSTEM CONTROL

LAN SYSTEM
- LAN — UNDERGROUND LAN CABLE

HEATING AND AIR SYSTEM
- 12" T/A 175 (S), 6" T/A (R)6" T/A (S) — SERVICE MAIN

FIRE ALARM SYSTEM
- 1–2 TW PR SHL'D #18 FA — UNDERGROUND FIRE ALARM CABLE
- FIRE ALARM STATION
- FIRE ALARM CONTROL PANEL
- WATER CONTROL SWITCH
- UTILITY CUTOFF

GENERAL LEGEND

- SITE INVESTIGATION BOUNDARY
- GP — SOIL BORING LOCATION
- EXISTING BUILDING

REFERENCE NOTE:
BASE MAP ADOPTED FROM PHASE 1 & PHASE 2 SITE CHARACTERIZATION & RISK ASSESSMENT, DRAWING C–101, TITLED SITE PLAN PROVIDED BY USAG–DTA

NTH Consultants, Ltd.
Infrastructure Engineering and Environmental Services

Northville, MI	248.553.6300
Detroit, MI	313.237.3900
Lansing, MI	517.484.6900
Grand Rapids, MI	616.957.3690
Exton, PA	610.524.2300
Lehigh Valley, PA	484.893.1440
Cleveland, OH	216.334.4040
Indianapolis, IN	317.735.7649

SUBMITTAL

REV	DESCRIPTION	DATE	BY

PROJECT NAME:
CHILD DEVELOPMENT CENTER ADDITION PROPERTY

PROJECT LOCATION:
WARREN, MICHIGAN

NTH PROJECT NO.: 61-110632	CAD FILE NAME: 110632-SBL
DESIGNED BY: CJA	INCEP DATE: 6/21/2011
DRAWN BY: CWS	DRAWING SCALE: 1" = 30'
CHECKED BY: BCM	SUBMITTED DATE: 6/24/2011

SHEET TITLE:
BORING LOCATION PLAN

SHEET REFERENCE NUMBER:
3

J:\2011\11\110632\reports\wes\detroit arsenal\110632-sbl.dwg Plotted: 6/24/2011 10:08 AM by cwilson

TABLE 1: SUMMARY OF CHEMICAL ANALYSES

DETROIT ARSENAL – CHILD DEVELOPMENT CENTER
NTH PROJECT NO. 61-110632-00

SAMPLE DESIGNATION	SAMPLE DEPTH [FT]	PARAMETERS												
		METALS [MG/KG]										POLYCHLORINATED BIPHENYLS (PCBs) 1336363 [µG/KG]	SEMI-VOLATILE ORGANICS [µG/KG]	VOLATILE ORGANICS [µG/KG]
		ARSENIC 7440382	BARIUM 7440393	CADMIUM 7440439	CHROMIUM 7440473	COPPER 7440508	LEAD 7439921	MERCURY 7439976	SELENIUM 7782492	SILVER 7440224	ZINC 7440666			
SOIL SAMPLING:														
GP-1 : S-1	2.0 – 3.0	4.0	46	0.36	11	16	34	ND	0.45	ND	59	ND	ND	ND
GP-2 : S-1	2.0 – 3.0	3.8	90	0.41	19	21	21	ND	0.91	ND	76	ND	ND	ND
GP-2 : S-2	4.0 – 5.0	**16**	130	0.32	24	26	18	ND	0.35	ND	64	ND	ND	ND
GP-3 : S-1	2.0 – 3.0	3.8	70	0.17	14	16	8.6	ND	0.28	ND	44	ND	ND	ND
GP-4 : S-1	3.0 – 4.0	2.0	70	0.44	14	21	17	ND	0.83	ND	55	ND	ND	ND
DUPLICATE (GP-4 : S-1)	3.0 – 4.0	3.2	63	0.38	17	17	25	0.068	0.65	ND	64	ND	ND	ND
GP-5 : S-1	2.5 – 3.5	4.6	97	0.60	16	13	11	ND	0.28	ND	50	ND	ND	ND
GP-6 : S-1	2.5 – 3.5	3.5	50	0.37	13	17	18	ND	0.59	ND	53	ND	ND	ND
GP-7 : S-1	2.0 – 3.0	3.7	78	0.65	18	19	40	ND	0.62	ND	240	ND	ND	ND
GP-8 : S-1	3.0 – 4.0	2.4	75	0.40	14	20	15	ND	0.80	ND	53	ND	ND	ND
GP-9 : S-1	2.0 – 3.0	3.2	68	0.56	17	19	30	ND	0.55	ND	63	ND	ND	ND
GP-10 : S-1	3.0 – 4.0	2.8	77	0.40	16	21	21	ND	0.86	ND	63	ND	ND	ND
GP-11 : S-1	2.0 – 3.0	3.2	62	0.49	17	17	39	ND	0.58	0.11	63	ND	ND	ND
GP-11 : S-2	5.0 – 6.0	**14**	120	0.45	15	23	13	ND	0.46	ND	52	ND	ND	ND
GP-12 : S-1	1.0 – 2.0	3.9	79	0.29	16	17	12	ND	0.62	ND	54	ND	ND	ND
GP-13 : S-1	2.0 – 3.0	4.2	70	0.87	22	21	51	0.056	0.68	0.11	85	ND	ND	ND
GP-14 : S-1	2.0 – 3.0	3.6	69	0.24	16	14	12	ND	0.65	ND	60	ND	ND	ND
GP-15 : S-1	1.0 – 2.0	4.1	67	0.65	15	15	26	ND	0.51	ND	58	ND	ND	ND
GP-16 : S-1	2.0 – 3.0	3.2	81	0.31	19	18	14	0.052	0.86	ND	75	ND	ND	ND
DUPLICATE (GP-16 : S-1)	2.0 – 3.0	5.3	86	0.42	18	19	24	ND	0.64	ND	65	ND	ND	ND
GP-17 : S-1	2.0 – 3.0	3.6	67	0.23	17	15	11	ND	0.66	ND	55	ND	ND	ND
GP-18 : S-1	1.0 – 2.0	5.6	70	0.22	16	17	12	ND	0.32	ND	51	ND	ND	ND
GP-19 : S-1	1.0 – 2.0	4.0	80	0.43	18	24	19	ND	0.91	ND	67	ND	ND	ND
GP-20 : S-1	1.0 – 2.0	4.2	78	0.29	19	16	18	ND	0.63	ND	67	ND	ND	ND
GP-20 : S-2	4.0 – 5.0	**7.7**	170	0.63	26	30	17	ND	0.46	ND	78	ND	ND	ND
GP-21 : S-1	1.0 – 2.0	3.0	62	0.36	16	21	22	ND	0.86	ND	60	ND	ND	ND
PART 201 RESIDENTIAL SOIL CLEANUP CRITERIA	SWDB	5.8	75.0	1.2	18.0	32.0	21.0	0.13	0.41	1.0	47.0	N/A	N/A	N/A
	DC	7.6	37,000	550	2,500	20,000	400	160	2,600	2,500	170,000	4,000* (TSCA: 1,000)	VARIOUS	VARIOUS
	GCP	2,000	1,000,000	230,000	140,000	1,000,000	(ID)	47	78,000	200,000	1,000,000	NLL	VARIOUS	VARIOUS
	SVIIC	NLV	NLV	NLV	NLV	NLV	NLV	48	NLV	NLV	NLV	3,000,000	VARIOUS	VARIOUS
	VSIC	NLV	NLV	NLV	NLV	NLV	NLV	52	NLV	NLV	NLV	240,000	VARIOUS	VARIOUS
	PSIC	720	330,000	1,700	260	130,000	100,000	27,000	130,000	6,700	(ID)	5,200,000	VARIOUS	VARIOUS

NOTES:

[1] SAMPLES COLLECTED BY NTH CONSULTANTS PERSONNEL AND ANALYZED BY FIBERTEC ENVIRONMENTAL SERVICES OF HOLT, MI.
[2] **MG/KG** - MILLIGRAMS PER KILOGRAM (≈ PARTS PER MILLION).
[3] **µG/KG** - MICROGRAMS PER KILOGRAM (≈ PARTS PER BILLION).
[4] **ND** - NOT DETECTED AT OR ABOVE LABORATORY-REPORTED METHOD DETECTION LIMIT FOR INDICATED PARAMETER.
[5] **(ID)** - INADEQUATE DATA TO DEVELOP CRITERION.
[6] **NLL** - CHEMICAL IS NOT LIKELY TO LEACH UNDER MOST SOIL CONDITIONS.
[7] **NLV** - CHEMICAL IS NOT LIKELY TO VOLATILIZE UNDER MOST CONDITIONS.
[8] **SWDB** - STATE-WIDE DEFAULT BACKGROUND.
[9] **DC** - CONCENTRATION IN SOIL, IF NOT EXCEEDED, IS CONSIDERED SAFE FOR HUMAN EXPOSURE VIA DIRECT (ORAL AND DERMAL) CONTACT.
[10] **GCP** - GROUNDWATER CONTACT PROTECTION CRITERIA.
[11] **SVIIC** - SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA.
[12] **VSIC** - VOLATILE SOIL INHALATION CRITERIA (AMBIENT AIR; INFINITE SOURCE).
[13] **PSIC** - PARTICULATE SOIL INHALATION CRITERIA.
[14] * - HAZARDOUS SUBSTANCE MAY BE PRESENT IN SEVERAL ISOMER FORMS. ISOMER-SPECIFIC CONCENTRATIONS SHALL BE ADDED TOGETHER FOR COMPARISON TO CRITERIA. REFER TO THE FEDERAL TOXIC SUBSTANCES CONTROL ACT (TSCA), 40 CFR 761, D AND G SUBPARTS TO DETERMINE THE APPLICABILITY OF TSCA CLEANUP STANDARDS.
[15] - REPORTED CONCENTRATION EXCEEEDS ONE OR MORE APPLICABLE PART 201 CRITERIA.

APPENDIX E.2
Environmental Information

Limited Phase I and II Environmental Site Assessment

Report

Limited Phase I and II Environmental Site Assessment Child Development Center Addition Property US Army Garrison-Detroit Arsenal Warren, Michigan

VMX International, LLC
3011 W. Grand Boulevard, Detroit, MI 48202

July 5, 2011
NTH Project No. 61-110632-00

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Northville, MI 48168

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Ms. Heather Fawcett
VMX International, LLC
3011 W. Grand Boulevard
Detroit, Michigan 48202

July 6, 2011
NTH Project No. 61-110632-00

RE: Report on Limited Phase I and Phase II Environmental Site Assessments
Child Development Center Addition Property
US Army Garrison - Detroit Arsenal
Warren, Michigan
Contract No. W56HZVIIPA705

Dear Ms. Fawcett:

NTH Consultants, Ltd. (NTH) is pleased to submit this report on Limited Phase I Environmental Site Assessment (ESA) and Phase II ESA for the above referenced property. These studies were performed in accordance with the document entitled: *"Directorate of Public Works - Detroit Arsenal - Technical Specifications - Project Title: Phase I & Phase 2 Site Characterization & Risk Assessment – Work Order Number: IMA 32532 1J, dated April 8, 2011"* and in accordance with our accepted proposal (NTH Proposal No. 61-110632) dated May 31, 2011.

We trust that this report provides the information required to evaluate the environmental risks associated with the property and we appreciate the opportunity to assist you with this project. Should you have any questions or require additional information on this study, please call us at 248-553-6300.

Sincerely,

NTH Consultants, Ltd.

Cliff J. Andrews
Senior Project Professional

Philip J. Spalding, P.E.
Senior Vice President

CJA/PJS/mam

Attachments

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ACEC MEMBER

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ACEC MEMBER

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1.0 EXECUTIVE SUMMARY

This report presents the results of a Limited Phase I Environmental Site Assessment (ESA) and Phase II ESA for the Child Development Center Addition Property located at the US Army Garrison - Detroit Arsenal (USAG-DTA), Warren, Michigan, Contract No. W56HZVIIPA705.

The subject property is approximately 37,120 square feet in size and is comprised of a vacant grass-covered land.

The Limited Phase I and Phase II ESAs were performed in accordance with the Scope of Work included in the document entitled: *"Directorate of Public Works - Detroit Arsenal - Technical Specifications - Project Title: Phase I & Phase 2 Site Characterization & Risk Assessment – Work Order Number: IMA 32532 1J, dated April 8, 2011"*

The ESAs were limited to the area depicted on the Site Plan C-101 as *"Boundary for Site Investigation Survey"* provided by USAG-DTA personnel during the project kick off meeting on June 9, 2011.

The Limited Phase I ESA has revealed the following evidence of potential environmental concerns in connection with the property:

- The property was part of a tank test track from the 1950's to the early 1980's. Based on this known past use, there is potential for subsurface environmental contamination resulting from fluid leaks and spills from the tanks.
- An available drawing dated 1953 depicted Hartsig Drain traversing through the property. This drain is no longer present at the property. No information regarding the nature, origin or environmental status of the fill soil used to backfill the drain was available.
- Surplus soil from an on-base construction project was stockpiled on the property in 2009. Review of analytical data for the soil stockpile identified arsenic, chromium, selenium and zinc in some of the soil samples above Michigan Department of Environmental Quality's (MDEQ's) Part 201 residential cleanup

criteria. The stockpile was later removed from the property; however, no surface soils samples were collected for analysis to determine the impact of the stockpiled soil at the property.

The Phase II ESA consisted of advancing 21 geoprobe borings and analysis of 26 soil samples. The results of analytical testing identified arsenic in three samples of native clay soils above MDEQ's Part 201 residential cleanup criteria. The reported concentrations of arsenic are consistent with naturally occurring levels found in southeast Michigan soils. Thus, based upon these analytical data, the property is not a *"facility"* as defined by 1994 P.A. 451, Part 201, as amended.

This Executive Summary should not be reviewed separately from the remainder of the report. The Executive Summary provides an overview and is not a substitute for a thorough review of the entire report.

2.0 INTRODUCTION

NTH Consultants, Ltd. (NTH) was retained by VMX International, LLC, as their subconsultants, to perform a Limited Phase I Environmental Site Assessment (ESA) and Phase II ESA for the Child Development Center Addition Property located at the US Army Garrison - Detroit Arsenal (USAG-DTA) base in Warren, Michigan.

The USAG-DTA base is approximately 352 acres in size and is headquarters to the US Army's Tank Automotive and Armaments Command (TACOM). The original base was developed in the 1940's, and divided into east and west portions separated by the existing railroad tracks. The eastern approximately 157 acres was used for tank production, retrofitting and support services by Chrysler and later by General Dynamics. In February 1995, the eastern portion of the base was slated for closure under the Base Realignment and Closure (BRAC) Act. All manufacturing activities on the eastern portion of the base ceased in 1996 and General Dynamics vacated the site in 1997. In the late 1990's and early 2000, the eastern portion of the base was turned over to Warren Tank Development Associates, LLC for redevelopment.

The western portion of the base has been used for administrative and research and development purposes since the 1940's, and includes the subject property.

The subject property is approximately 37,120 square feet in size and is comprised of a vacant grass-covered land. The property is located between the existing Child Development Center (CDC) and MacArthur Drive, and between two existing parking lots. A map depicting the location of the property is included as Figure 1 in Appendix A.

The Limited Phase I and Phase II ESAs were performed in accordance with the Scope of Work included in document entitled: *"Directorate of Public Works - Detroit Arsenal - Technical Specifications - Project Title: Phase I & Phase 2 Site Characterization & Risk Assessment – Work Order Number: IMA 32532 1J, dated April 8, 2011*.

The studies were limited to an area depicted on the Site Plan C-101 as *"Boundary for Site Investigation Survey"* provided by USAG-DTA personnel during the project kick off meeting on June 9, 2011.

The Limited Phase I ESA is not intended to, nor does it conform to ASTM Practice E 1527-05, Phase I Environmental Site Assessment guidelines or the All Appropriate Inquiry (AAI) standards of 40 CFR Part 312. Rather, the information gathered during this study was used to identify items of potential environmental concerns at the subject property.

2.1 Purpose

We understand that an approximate 7,200 square foot building addition and an approximate 10,000 square foot playground area will be constructed on the east side of the existing CDC. Thus, the objective of the Limited Phase I ESA was to provide the authorized users of this report with an independent opinion regarding potential environmental concerns, if any, associated with the property.

The objective of the Phase II ESA was to attempt to identify potential environmental impacts at the property prior to proposed construction activity, thereby enabling USAG-DTA to anticipate and plan for handling impacted near-surface soil and groundwater (if encountered). No project specific information, such as building location, types of foundations, earthwork requirements, etc. was available at the time of this investigation.

2.2 Scope of Services

Limited Phase I ESA

The scope of services for the Limited Phase I ESA comprised of the following key tasks:

- A visual survey of the property was performed to identify potential environmental concerns. Color photographs were taken to document prominent surface features observed at the time of the site reconnaissance. These photographs are presented in Appendix B and are referenced in the text of the report. During the visual survey, the neighboring properties were observed to assess whether surface features or activities on these properties may have a negative environmental impact on the subject property.

- Obtained and reviewed historical Sanborn maps, aerial photographs and topographic maps of the property.

- Obtained information on previous uses and any known environmental concerns by interviewing USAG-DTA personnel and reviewing any records provided to NTH.
- Obtained and reviewed readily available published information pertaining to physical setting (i.e., geology, hydrogeology and topography) for the property.
- An approximately 100-year or greater land use history of the property was developed from the information complied during this study.

Phase II ESA

The scope of services for the Phase II ESA comprised of the following key tasks:

- Twenty-one (21) geoprobes were advanced in a grid-pattern to facilitate the collection of soil samples and water samples (if groundwater was encountered) for analyses.
- Soil samples were screened in the field for the presence of total volatile organic compounds (VOCs) using a portable photoionization detector (PID).
- Select soil samples were submitted to NTH's subcontracted laboratory for chemical analyses.

3.0 VISUAL SURVEY

A visual survey of the property was conducted on June 15, 2011 by Cliff Andrews of NTH. This survey was conducted to observe for surface features indicative of potential environmental concerns at the property.

The property is located in the Southwest ¼ of Section 16, Township 1 North, Range 12 East, City of Warren, Macomb County, Michigan. A map showing the location of the property is presented as Figure 1 in Appendix A of this report. The approximate configuration of the property, along with prominent surface features observed by NTH during the site visit, is shown on Figure 2 included in Appendix A. This plan was prepared from a Site Plan C-101 provided by USAG-DTA personnel, a recent aerial photograph and observations made during the visual survey. NTH's site plan should be considered as a preliminary reference drawing and should

not be used as a legal boundary survey. Color photographs of the property taken during the visual survey are included in Appendix B.

The property is vacant grass-covered land (Photographs 1 through 4). NTH personnel did not observe any evidence of potential environmental concerns at the property.

3.1 Current Uses of Adjoining Properties

During the visual survey, the adjoining properties were observed and identified from the boundaries of the subject property and readily accessible public right-of-ways. Observed land uses at the adjoining properties are listed below:

Location	Observed Uses/Features	Potential Environmental Concerns
North	CDC's paved parking lot and vacant land	None observed
East	Vacant grass-covered easement area for high voltage overhead electrical lines	None observed
South	Paved parking lot	None observed
West	CDC Building	None observed

For ease of reference, the locations of above-mentioned features are shown on Figure 2 in Appendix A.

4.0 HISTORICAL USES

The following sections present the results of the historical searches conducted during this study.

4.1 Information Provided by the Current Property Owners

NTH-developed Owner's Questionnaire was completed by Ms. Cheryl L. Neades, Environmental Protection Specialist with USAG-DTA and is included in Appendix C. Additionally, during the project kick off meeting on June 9, 2011, NTH conducted interviews with Ms. Cheryl Neades and Messrs. LeRoy Proszkowski, Nabil Tomimma and Peter Schappach of USAG-DTA, and reviewed available drawings.

Based on the information provided by Ms. Neades, the property was purchased from Detroit Trust Company and Camille Huys. The subject property was vacant land until about the early 1950's, when it used as an unofficial tank test track. The test track was used sporadically for after production equipment testing until about 1980. According to Ms. Neades, the tank track was not used for destructive testing. Since about 1980, the property has remained vacant land and sporadically used for special events parking, concession tents, displays, etc.

The property is currently maintained by the Roads & Grounds contractor under an Army required Integrated Pest Management Plan (IPMP). The IPMP controls and requires minimum use of pesticides.

A drawing of the area dated 1954 depicts Hartsig Drain traversing through the property. This drain was later backfilled (date unknown). No information regarding the nature, origin or environmental status of the backfill material used for filling in the drain was available.

In 2009, the property was used for stockpiling or storage of surplus soils generated from construction of the Administration Building and parking structure. According to Ms. Neades, the stockpiled soils exhibited concentrations of arsenic above state-wide default background levels, but below the "action levels." However, review of analytical data for nine soil samples provided by Ms. Neades indicated that arsenic, chromium, selenium and zinc were above the current Part 201 residential cleanup criteria. The stockpiled soils were removed from the property and disposed of at a landfill. Ms. Neades indicated that no sampling and analyses of the surface soil, exposed upon removal of the stockpiled material, was conducted.

Ms. Neades also provided a report entitled: "Final Report – Soil Sampling and analysis at the Administration and Research (West) Side of Detroit Arsenal, Warren, Michigan" dated April 27, 2001, prepared by CKY Incorporated (CKY). The investigation was conducted for TACOM as part of the USGA-DTA Environmental Baseline Survey (EBS). Ten areas of suspected of soil contamination were investigated. The investigation comprised of reviewing previous investigations, collection and analyses of 203 soil gas samples from the ten areas, followed by another soil investigation at five of the ten areas. The subject property identified as "Proposed Area for ADP/Computer Center (Area 7)" was one of the site investigated.

CKY's review of previous investigations indicated that Engineering & Testing Services (ETS) conducted a subsurface investigation at the property in 1990 for a proposed ADP/Computer Center, which was never constructed on the property. The subsurface investigation comprised of drilling five soil borings at the property. Composite soil samples from two of the borings were analyzed for chlorinated hydrocarbons, volatile aromatic hydrocarbons, EP Toxicity for 10 Michigan metals, oil and grease, and total phenols. The report indicated that 240 and 95 micrograms per kilogram (µg/Kg) or parts per billion (ppb) of total phenols, and 1.2 and 1.8 milligrams per kilogram (mg/Kg) or parts per million (ppm) of carbon tetrachloride were detected in the soil samples. Oil and grease were not detected, and heavy metals were below the published background levels for the area. No analytical data for these samples were included in the ETS report. The completed Owners Questionnaire (see Appendix C) indicates that the analytical data could not be duplicated. The above-mentioned concentrations of total phenols and carbon tetrachloride are below the current Part 201 residential cleanup criteria.

As part of CKY's investigation, soil gas samples were collected from 15 sampling points located at and in the immediately vicinity of the property. The results of soil gas analysis indicated that none of the analyzed volatile organic compounds (VOCs) were detected above the laboratory detection limit (which was 5 micrograms per cubic meter of air).

CKY's subsequent subsurface investigations were conducted at five areas, which are located between 400 and 2,400 feet from the subject property. Results of these investigations did not reveal any off-site migration issues that would be expected to impact the subject property.

4.2 Sanborn Fire Insurance Maps

NTH retained Environmental Data Resources, Inc. (EDR), a private environmental information agency, to conduct a search of Sanborn fire insurance maps for the property. Sanborn maps are primarily used by insurance companies to assess fire risks, and when available for a particular property can provide relevant information about the history of the property. According to EDR, no such maps exist for the subject property.

4.3 Aerial Photographs

NTH obtained copies of historical aerial photographs dated 1937, 1940, 1949, 1957, 1961, 1973, 1985, 1993, 2000 and 2005 from EDR. Additional aerial photographs 2002, 2007 and 2010 were reviewed on the Google Earth webpage. These aerial photographs were reviewed to determine past uses of the property. Copies of the EDR's aerial photographs are included in Appendix D.

The scales on the referenced aerial photographs range from 1″ = 100′ to 1″ = 604′. Thus, certain photographs, particularly those with larger scales, did not clearly identify all the surface features at the property. Due to poor photo quality, many features on the referenced aerial photographs were indiscernible.

A review of the referenced aerial photographs is summarized in the following table:

Year	Scale	Surface Features
1937	1″ = 500′	Agricultural land.
1940	1″ = 500′	Similar features as depicted in the 1937 aerial photograph.
1949	1″ = 500′	Vacant land.
1957	1″ = 500′	Scarred land with partial testing track traversing through the property.
1961	1″ = 500′	Similar features as depicted in the 1957 aerial photograph.
1973	1″ = 600′	Vacant land with partial test track traversing through the property.
1985	1″ = 500′	Vacant land with evidence of surface scarring at the location of the test track.
1993	1″ = 600′	Similar features as depicted in the 1985 aerial photograph.
2000	1″ = 100′	Vacant grass-covered land.
2002	1″ = 100′	Similar features as depicted in the 2000 aerial photograph.
2005	1″ = 604′	Similar features as depicted in the 2000 aerial photograph.
2006	1″ = 604′	Similar features as depicted in the 2000 aerial photograph.
2007	1″ = 100′	Similar features as depicted in the 2000 aerial photograph.
2010	1″ = 100′	Similar features as depicted in the 2000 aerial photograph.

4.4 Topographic Maps

Historical USGS "Detroit and Highland Park, Michigan" topographic maps dated 1905, 1952, 1968, 1983 and 1980 were reviewed to determine past uses of the property. The referenced maps depict the property as vacant land. Copies of the above topographic maps are included in Appendix E.

4.5 Past Use Summary

The following table summarizes the past uses of the property:

Years	Property Uses	Sources	Potential
1905 – mid 1940's	Agricultural land	Historical aerial photographs and topographic maps	None noted
Mid 1940's – early 1950's	Vacant land	Historical aerial photographs and topographic maps	None noted
Early 1950's – early 1980's	Tank test track	Historical aerial photographs and topographic maps and interviews	Potential for fluid leaks and spills
Early 1980's - present	Vacant land sporadically used for special events	Historical aerial photographs and topographic maps, interviews and visual survey	None noted

5.0 ENVIRONMENTAL DATABASE

EDR was retained to perform a regulatory agency database search to evaluate the possible presence of federal and state-listed sites of known or potential environmental concerns that may be located in the vicinity of the property. A list of the state and federal databases researched by EDR for the current study, along with the respective search distances and a brief description of each database are presented in the EDR report. The EDR report, dated June 8, 2011, is included in Appendix F.

The EDR report identified 61 sites, of which 33 sites were plotted on a street map and 28 sites were listed as "orphan sites." The orphan sites could not be plotted by EDR on a map due to lack of proper addresses or other pertinent information required for precise computer plotting, and as such could only be located within the city, county or zip code area of the subject property.

The following tables summarize the databases searched, the search distances, and the number of sites found within the search radius for each database:

FEDERAL DATABASES	SEARCH RADIUS (in miles)	NUMBER OF SITES WITHIN RADIUS
National Priorities List (NPL) - Identifies the nation's most hazardous sites that warrant further investigation. Sites are first identified as a CERCLIS Site and the degree of contamination determines whether the site will be included on the NPL. Also known as Superfund.	1.0	0
Proposed NPL - Sites are published in the federal register prior to final inclusion in the NPL and are listed as proposed NPL sites.	1.0	0
Delisted NPL – Sites deleted from the NPL where no further response is appropriate	1.0	0
Comprehensive Environmental Response. Compensation. **Liability Index System (CERCLIS)** - Compilation of properties that the EPA has identified as having actual or suspected releases of contamination. The sites are reported to the EPA through states, municipalities, and private companies/ citizens. Each site undergoes a series of reviews that determine the severity of the contamination from the discovery and preliminary assessment to the site inspection and the hazard ranking system, which will determine whether the site will be included on the NPL.	0.5	TACOM base
CERCLIS No Further Remedial Action Planned (CERC-NFRAP) - CERCLIS Sites where no further remedial action is planned at the federal level.	0.5	0
Corrective Action Report (CORRACTs) List - Includes hazardous waste handlers with RCRA corrective action activities.	1.0	TACOM base
Resource Conservation Recovery Act (RCRA) Treatment **Storage and/or Disposal (TSD) Facilities** - RCRA provides for the cradle to grave management of hazardous wastes by regulating the operations of those who operate treatment, storage or disposal facilities.	0.5	TACOM base
RCRA Large Quantity Generator (LQG) - RCRA provides for the management of properties that generate more than 1,000 kilograms of hazardous waste or over 1 kilogram of acutely hazardous waste per month.	0.25	0
RCRA Small Quantity Generator (SQG) - RCRA provides for the management of properties that generate more than 100 kilograms and less than 1,000 kilograms of hazardous waste.	0.25	TACOM base plus 1 site
RCRA Conditionally Exempt Small Quantity Generator (CESQG) - RCRA provides for the management of properties that generate less than 100 kilograms of hazardous waste or less than 1 kilogram of acutely hazardous waste per month.	0.25	3
RCRA Non-Generators (NonGen) – Non-generators do not presently generate hazardous waste, but may have in the past.	0.25	TACOM base plus 2 sites
Brownfields – List of brownfields properties addressed by Cooperative Agreement Recipients and/or Targeted Brownfields Assessments	0.50	0
Emergency Response Notification Sites (ERNS) List - Records information about reported releases of hazardous substances and/or petroleum products. These sites are maintained by the EPA and the MDEQ.	Property	TACOM base

STATE DATABASES	SEARCH RADIUS (in miles)	NUMBER OF SITES WITHIN SEARCH RADIUS
State Hazardous Waste Sites (SHWS) - Known as Part 201 Sites in Michigan, SHWS are Michigan's equivalent to CERCLIS. The sites are reported to the State through municipalities, private companies/citizens. The State has developed a numerical ranking model for determining the present and potential hazard that each site poses to public health, safety, welfare and/or the environment. Each site is scored using this model once identified and annually thereafter.	1.0	3
State Landfill and/or Solid Waste Disposal Site List - Part 115 of Act 451, as amended, regulates and maintains an inventory of solid waste disposal facilities or landfills.	0.5	0
Leaking Underground Storage Tank (LUST) List - Part 213 of Act 451, as amended, regulates and details the corrective action required due to releases from leaking USTs. Part 213 also prescribes the powers and duties of certain State agencies and officials, and provides penalties and remedies.	0.5	TACOM base plus 4 sites
Underground Storage Tank (UST) List - Part 211 of Act 451, as amended, regulates certain UST systems, requires the registration of certain UST systems, prescribes the powers and duties of certain state and local agencies and officials, imposes fees, and prescribes penalties and remedies.	0.25	TACOM base plus 1 site
Aboveground Storage Tank (AST) List – Listing of registered ASTs	0.25	0
Baseline Environmental Assessment (BEA) List - Sites which have been identified as a facility and have submitted a BEA to MDEQ.	0.5	2
Brownfields – BEA or leaking UST sites which have been redeveloped by private entities using the BEA process.	0.5	0
Dry Cleaners – State registered/inspected dry cleaning establishments	0.25	0

Numerous environmental studies have been undertaken at the TACOM base. Thus, the base is currently listed in several regulatory agency databases.

The EDR report indicates that 25 underground storage tanks (USTs) have been removed from the TACOM base and nine confirmed leaking UST (LUST) incidents have been reported. All the LUST incidents appear to have been closed, which means that subsurface contamination associated with the leaking USTs have been remediated in accordance with the applicable regulatory guidelines. Most of the USTs were located near Building 203 or on the eastern portion of the base, which is at least 400 feet away from the subject property.

Three 10,000-gallon USTs are still located near Building 212, which is over 1,000 feet away from the subject property. The USTs reportedly contain JP-8, diesel and Jet A fuels.

The CERCLIS listing is associated with the former eastern portion of the base. A Five Year Review Report dated November 2004, obtained from the US Environmental Protection Agency (EPA), reveal contamination associated with the production of tanks and former landfilling activities within the former Chrysler test track area. The report concludes that four years of groundwater sample analyses has not revealed any further impact. Thus, the report suggests that the monitoring wells could be removed if the next five-year review does not reveal any evidence of contamination. According to Ms. Neades, these wells have since been removed and she is unaware of any off-site migration of contamination.

The other EDR-identified sites are located more than 300 feet away from the subject property. Based on prevailing subsurface conditions in the area (comprising of clayey soils with perched and discontinuous shallow groundwater), none of the EDR-identified sites would be expected to have an adverse environmental impact on the subject property.

6.0 PHYSICAL SETTING

The physical setting of the property was determined based on a review of readily available published information.

6.1 Topography

Information on the topography of the subject property was obtained from the 1983 USGS "Highland Park, Michigan" topographic map. Based on this map, the property exhibits a level topography with an approximate USGS elevation of 620 feet above mean sea level.

6.2 Geology

According to the *USDA Soil Survey of Macomb County, Michigan,* the near surface soils at the property consist of Lenawee clay loam.

According to readily available published sources, the geology at the property is characterized by about 70 to 120 feet of non-homogeneous glacial lacustrine clay deposits. Underlying these glacial deposits is Antrim Shale bedrock formation.

6.3 Hydrology

No surface water bodies are located at or in the immediate vicinity of the subject property. The nearest surface water body is Bear Creek, which is located approximately 1,500 feet northwest of the subject property.

6.4 Hydrogeology

Groundwater in the area is generally present in both the glacial deposits and in the underlying bedrock; however, shallow groundwater in the area of the property is expected to be erratic and almost negligible due to the high clay content of the glacial soils. Intermittent accumulations of perched water may be encountered where granular and/or fill soils overlie the native clays.

7.0 LIMITED PHASE I ESA FINDINGS AND OPINIONS

The subject property was agricultural or vacant land from at least 1905 to the early 1950's, when it property became a part of a tank test track. The test track remained on the property until the early 1980's, and subsequent to this period the property has remained as a vacant/dormant land. The past use of the property as a test track with potential fluid leaks and spills from the tanks is a potential environmental concern.

A drawing dated 1953 depicts Hartsig Drain at the property. The drain has since been backfilled. No information regarding the nature, origin or environmental status of the backfill soils is available. Thus, the presence of unknown backfill material at the property is a potential environmental concern.

Surplus soils from construction projects at the base were stockpiled on the property in 2009. Review of available analytical results identify arsenic, chromium, selenium and zinc in the soil samples above MDEQ's Part 201 residential cleanup criteria. The stockpile was later removed but no samples from the exposed surface were collected for analysis to determine the impact of the contaminated soil stored at the property.

Thus, there is a potential for residual contamination from previous soil stockpiles to be present at the property.

8.0 PHASE II ENVIRONMENTAL SITE ASSESSMENT

As indicated earlier, the purpose of the Phase II ESA was to attempt to identify potential environmental impacts prior to proposed construction activity at the property, thereby enabling USAG-DTA to anticipate and plan for proper handling and disposal of soil generated during this activity.

The Phase II ESA was performed in accordance with the Scope of Work included in the document entitled: *"Directorate of Public Works - Detroit Arsenal - Technical Specifications - Project Title: Phase I & Phase 2 Site Characterization & Risk Assessment – Work Order Number: IMA 32532 1J, dated April 8, 2011."*

8.1 Field Investigation

On June 15 and 16, 2011, 21 geoprobe borings, designated as GP-1 through GP-21, were advanced at the property by Fibertec Environmental Services (FES) under the full-time observation of Eric Schupp of NTH. Mr. Alex Emmitt with VMX International, LLC, represented as project supervisor.

The borings were advanced with continuous soil sampling to depths up to approximately 16 feet below ground surface (bgs). The borings were advanced in a grid pattern to provide appropriate coverage of the property. Subsequent to drilling activities, the boring locations were surveyed by McNeely & Lincoln Associates, Inc. The approximate locations of these borings are indicated on the **Boring Location Plan, Figure 3** in Appendix A.

The geoprobe drilling method involves mechanically driving or pushing a two-inch outside diameter stainless steel sampling tool, with a disposable clear acetate liner, to a desired sampling depth. This method does not generate soil cuttings because the probe rods push soils away from the rods as the tool string advances through the hole. The probing tools and equipment were steam-cleaned prior to arrival at the project site. Furthermore, between each successive boring location, the probing tools and equipment were steam-cleaned and new sample liners were used to minimize the possibility of cross-contamination.

Upon completion of drilling activities and after collecting samples, the boreholes were backfilled with excavated soil and bentonite chips hydrated with tap water.

Soil samples retrieved from the borings were screened in the field with a RAE Systems MiniRae™ photoionization detector (PID). The PID is capable of detecting total VOCs, which include many petroleum-related substances, to a detection level of one part per million (ppm). The field PID measurements on the soil samples are shown on the boring logs. As indicated, none of the VOC readings exceeded the detection limit of the PID.

8.2 Subsurface Data

Subsurface conditions observed at the boring locations are presented on the **Log of Geoprobes, Figure 4** in Appendix F. The stratification described on the logs represents the approximate boundary between soil types; the actual transition may be more gradual. In addition, the soil layers are described based on field classification of observed soil samples. As such, the soil layer descriptions should be considered generalized.

The subsurface conditions at the explored locations consist of surface layer topsoil followed by up to 4 feet of sandy and clayey fill soil, which in turn is underlain by native clayey soil to the explored depths of the borings. No groundwater was observed in the borings.

8.3 Analytical Testing

Soil samples selected for analytical testing were placed in laboratory-supplied containers and stored in a clean cooler packed with ice. The soil samples for VOC testing were prepared in the field using Michigan-modified methanol preservation (EPA Method 5035). The samples were then released to FES' laboratory in accordance with NTH's standard chain-of-custody procedures.

The soil samples were analyzed for VOCs, semi-VOCS (SVOCs), polychlorinated biphenyls (PCBs), and the Michigan 10 metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc). For quality control/quality assurance (QA/QC) purposes, a trip blank, two field blanks and two duplicate samples were collected for analysis. One field blank sample jar was broken during transportation; thus, could not be analyzed. Laboratory data sheets are included in Appendix H.

8.4 Evaluation of Analytical Data

The results of the soil analyses were compared to current MDEQ-established generic residential cleanup criteria, pursuant to 1994 P.A. 451, Part 201, as amended. The Part 201 rules provide generic cleanup criteria for a number of potential exposure routes and migratory pathways, which include:

- Direct contact (including soil ingestion) with impacted soil and/or groundwater;
- Inhalation of impacted particulate (soil) and/or volatilized compounds from soil and/or groundwater;
- Ingestion of impacted groundwater;
- Groundwater/surface water interface; and
- Migration of hazardous substances from soil into groundwater or surface water.

Part 201 allows for evaluation of relevant or applicable pathways of exposure or migration by considering geologic and hydrogeologic characteristics and prevailing surface conditions at the impacted sites. Depending on site-specific factors (e.g., soil and water conditions, nature, extent, and severity of identified hazardous substances), certain exposure or migration can be eliminated or determined not to be applicable, and thus, not relevant to assessment of subsurface environmental risk at a site.

Subsurface conditions at the property have been defined to depths of approximately 16 feet bgs. No groundwater was encountered in at any of the borings locations and drinking water in the area is supplied by municipal water supply system. No surface water bodies are located at or in the immediate vicinity of the property. The nearest surface water body is Bear Creek, which is located approximately 1,500 feet northwest of the subject property. Therefore, based on the prevailing geologic and hydrogeologic conditions in the area, the drinking water and groundwater/surface water interface pathways were eliminated when comparing the analytical results with Part 201 residential cleanup criteria.

8.5 Soil Analytical Data

Based on the above-discussed pathway evaluation, the results of the soil analyses were compared to the Part 201 generic residential direct contact (DC) criteria, groundwater contact protection (GCP) criteria, soil volatilization to indoor air inhalation criteria (SVIIC), infinite source soil volatilization to ambient air criteria (VSIC), and particulate soil inhalation criteria (PSIC). The results of the metals analyses were also compared to the statewide default background (SWDB) concentrations, as established by MDEQ.

As stated in the technical specifications, *"If no soil samples in a boring exhibit elevated PID readings or display other field evidence of impact, then the soil sample shall be collected from the interval that appears most likely to be impaired based on the site geology and potential source of impact. Soil samples are not required for each interval. It is assumed that at least a shallow soil sample will be submitted from each of the soil borings in the areas of potential child contact."*

During the field investigation, one sample of near-surface fill soil and one sample of the underlying native soil were collected from each boring. The native soil samples were collected in the case the future construction plans entails excavation and handling of these soils. Subsequent to field activities, USAG-DTA personnel requested that only three native soil samples be analyzed.

The following soil samples were selected for analyses:

Geoprobe No.	Sample No.	Sample Depth (ft.)	Soil Type
GP-1	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-2	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-2	S-2	4.0 – 5.0	Native soil
GP-3	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-4 Duplicate	S-1	3.0 – 4.0	Fill soil directly above native soil
GP-5	S-1	2.5 – 3.5	Fill soil directly above native soil
GP-6	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-7	S-1	3.0 – 4.0	Fill soil directly above native soil
GP-8	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-9	S-1	1.0 – 2.0	Fill soil
GP-10	S-1	3.0 – 4.0	Fill soil directly above native soil

Geoprobe No.	Sample No.	Sample Depth (ft.)	Soil Type
GP-11	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-11	S-1	2.0 – 3.0	Native soil
GP-12	S-1	0.0 – 2.0	Fill soil directly above native soil
GP-13	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-14	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-15	S-1	0.0 – 2.0	Fill soil directly above native soil
GP-16 Duplicate	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-17	S-1	2.0 – 3.0	Fill soil directly above native soil
GP-18	S-1	0.0 – 2.0	Fill soil directly above native soil
GP-19	S-1	0.0 – 2.0	Fill soil directly above native soil
GP-20	S-1	0.0 – 2.0	Fill soil directly above native soil
GP-20	S-2	4.0 – 5.0	Native soil
GP-21	S-1	0.0 – 2.0	Fill soil directly above native soil

The results of the sample analyses are summarized in **Table 1: Summary of Chemical Analyses** in Appendix H.

8.5.1 Volatile Organic Compounds (VOCs)

VOCs were not detected above laboratory method detection limits (MDLs) in the analyzed soil samples.

8.5.2 Semi-Volatile Organic Compounds (SVOCs)

SVOCs were not detected above MDLs in the analyzed soil samples.

8.5.3 Polychlorinated Biphenyls (PCBs)

PCBs were not detected above MDLs in the analyzed soil samples.

8.5.4 Heavy Metals

Arsenic in all the fill soil samples was below SWDB level. Thus, the arsenic in these samples is considered to be consistent with naturally occurring levels. Arsenic in the three native clay samples was above Part 201 residential DC criterion of 7.6 mg/Kg. Although the arsenic in the native soil samples was detected above Part 201 residential DC criterion, these concentrations are consistent with naturally occurring levels in Michigan soils in southeast Michigan.

For comparison purposes, it is appropriate to consider information referenced in the MDEQ guidance document "Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria," such as that presented in the MDEQ's "Michigan Background Soil Survey 2005" to estimate regional specific background concentrations for naturally occurring metals in soils. The regional sampling data for the Huron-Erie Glacial lobe includes the western and northeastern suburbs of Detroit, including all of Macomb, Wayne, Monroe, Washtenaw counties, and the SE half of Oakland County. The regional sampling data for arsenic in the Huron-Erie Glacial Lobe contained in the background soil survey document includes 126 clay samples. The results for this data set represent a lognormal distribution with a mean concentration of 9 mg/kg, a mean with one standard deviation (SD) concentration data range of 18.4 mg/kg, and a mean with two SD concentration data range of 36.6 mg/kg. For sandy soils in the Huron-Erie glacial lobe, the regional sampling data represent a lognormal distribution, having a mean concentration of 8.3 mg/kg, and a mean with two SD data range concentration of 19.6 mg/kg, respectively. Since the arsenic concentration found in the native clay soil samples is less than the estimated regional specific background concentrations, it supports a determination that the reported concentrations of arsenic in these native soil samples are consistent with naturally occurring levels found in soils within southeast Michigan.

Barium in the soil samples from GP-1, GP-3, GP-4, GP-6, GP-8, GP-9, GP-11, GP-13, GP-14, GP-15, GP-17, GP-18 and GP-21 was below the SWDB level. Thus, the barium in these samples is considered to be consistent with naturally occurring levels. Barium in the remaining 12 samples from GP-2, GP-5, GP-7, GP-10, S-2 of GP-11, GP-12, GP-16, GP-19 and GP-20 was above the SWDB level, but below the applicable Part 201 generic residential risk-based cleanup criteria.

Cadmium in the all the soil samples was below the SWDB level. Thus, the cadmium in these samples is considered to be consistent with naturally occurring levels.

Chromium in the soil samples from GP-1, GP-3 through GP-12, GP-14, GP-15, duplicate of GP-16, GP-17, GP-18, GP-19 and GP-21was below the SWDB level. Chromium in the remaining six samples from GP-2, GP-13, GP-16 and GP-20 was above the SWDB level, but below applicable Part 201 generic residential risk-based cleanup criteria. We note that chromium was detected in the sample from GP-16 at 19 mg/kg, while chromium in the duplicate sample from GP-16 was detected at 18 mg/kg, which is the SWDB level.

Copper in all the soil samples was below the SWDB level. Thus, the copper in these samples is considered to be consistent with naturally occurring levels.

Lead in the soil samples from GP-2, GP-3, S-1 of GP-4, GP-5, GP-6, GP-8, GP-10, S-2 of GP-11, GP-12, GP-14, S-1 of GP-16, GP-17, GP-18, GP-19 and GP-20 was below the SWDB level. Thus, the lead in these samples is considered to be consistent with naturally occurring levels. Lead in the remaining nine soil samples from GP-1, duplicate from GP-4, GP-7, GP-9, S-1 of GP-11, GP-13, GP-15, duplicate from GP-16 and GP-21 was above the SWDB level, but below the applicable Part 201 generic residential risk-based cleanup criteria.

Mercury was detected in all the soil samples from GP-1, GP-2, GP-3, S-1 of GP-4 through GP-12, GP-14, GP-15, duplicate from GP-16, GP-17, GP-18, GP-19 and GP-20 above the laboratory MDL. Mercury in the remaining three soil samples (duplicate from GP-4, GP-13 and S-1 of GP-16) was detected below the SWDB level. Thus, the mercury in these samples is considered to be consistent with naturally occurring levels.

Selenium in the soil samples from GP-2 (S-2), GP-3, GP-5 and GP-18 was below the SWDB level. Thus, the selenium in these samples is considered to be consistent with naturally occurring levels. Selenium in the remaining 22 samples was above the SWDB level, but below applicable Part 201 generic residential risk-based cleanup criteria.

Silver was not detected in the soil samples from GP-1 through GP-10, S-2 of GP-11, GP-12 and GP-14 through GP-21 above the laboratory MDL. Silver in the remaining two samples (S-1 of GP-11 and GP-13) was below the SWDB level. Thus, the silver in these samples is considered to be consistent with naturally occurring levels.

Zinc in the soil sample from GP-3 was below the SWDB level. Thus, the zinc in this sample is considered to be consistent with naturally occurring levels. Zinc in the remaining 25 samples was above the SWDB level, but below applicable Part 201 generic residential risk-based cleanup criteria.

9.0 PHASE II ESA FINDINGS AND OPINIONS

NTH's Phase II ESA consisted of advancing 21 geoprobe borings at the property and analyses of 26 soil samples. Certain analyzed parameters were found in the near-surface soil above the laboratory MDLs; however, the reported concentrations of these contaminants were below the applicable MDEQ Part 201 residential cleanup criteria, except for arsenic. Arsenic was found in three native clayey soil samples above MDEQ Part 201 residential cleanup criteria, but the reported concentrations are consistent with naturally occurring levels found in southeast Michigan soils.

Based upon analytical results and estimated regional background concentrations for naturally occurring metals, the property is **not** a ***"facility"*** as defined by 1994 P.A. 451, Part 201, as amended.

According to Section 1(1)(o) of Part 201, "facility means any area, place, or property where a hazardous substance in excess of the concentrations which satisfy the requirements of Section 20120a(1)(a) or (17) or the cleanup criteria for unrestricted residential use under Part 213 has been released, deposited, disposed of, or otherwise comes to be located. Facility does not include any area, place, or property at which response activities have been completed which satisfy the cleanup criteria for the residential category provided for in section 20120a(1)(a) and (17) or at which corrective action has been completed under Part 213 which satisfies cleanup criteria for unrestricted residential use."

10.0 CONCLUSIONS AND RECOMMENDATIONS

The Limited Phase I ESA has revealed the following evidence of potential environmental concerns in connection with the property:

- The property was part of a tank test track from the 1950's to the early 1980's. Based on this known past use, there is potential for subsurface environmental contamination resulting from fluid leaks and spills from the tanks.

- An available drawing dated 1953 depicted Hartsig Drain traversing through the property. This drain is no longer present at the property. No information regarding the nature, origin or environmental status of the fill soil used to backfill the drain was available.

- Surplus soil from an on-base construction project was stockpiled on the property in 2009. Review of analytical data for the soil stockpile identified arsenic, chromium, selenium and zinc in some of the soil samples above Michigan Department of Environmental Quality's (MDEQ's) Part 201 residential cleanup criteria. The stockpile was later removed from the property; however, no surface soils samples were collected for analysis to determine the impact of the stockpiled soil at the property.

The items of potential environmental concerns were evaluated during the concurrently performed Phase II ESA.

The Phase II ESA consisted of advancing 21 geoprobe borings and analysis of 26 soil samples. The results of analytical testing identified arsenic in three samples collected from native clay soils above Michigan Department of Environmental Quality (MDEQ) Part 201 residential cleanup criteria, but the reported concentrations are consistent with naturally occurring levels found in Southeast Michigan soils. Thus, based upon the results of the analytical testing, the property is **not** a ***"facility"*** as defined by 1994 P.A. 451, Part 201, as amended.

Although contamination was not detected in excess of the applicable MDEQ Part 201 residential generic cleanup criteria or risk-based cleanup criteria, we offer the following recommendations:

- Due to the presence of non-homogenous fill material covering the property and future use of portions of the property as playground, subsequent to completing earthwork and land balancing activities, sampling should be conducted within the playground areas to further evaluate surface soils and determine whether an exposure barrier cap or cover is warranted.

- Any off-site relocation of soils would require proper characterization prior to their removal from the subject property, especially if the soils are transported to a location where drinking water or surface water are determined to be potential exposure routes or migratory pathways. Based on the available

analytical data, the near-surface soils would be expected to be classified, as "non-hazardous" waste for disposal purposes and could be disposed of at a licensed "Type II" landfill.

- If evidence of additional subsoil contamination is encountered during construction activities, such as through visual and/or olfactory means, NTH should be notified to provide appropriate response actions.

- Construction and utility workers may encounter groundwater or surface runoff; depending on the depth of excavations, presence of water bearing strata and quantity of groundwater encountered, dewatering and proper management and offsite disposal may be necessary. Should groundwater be encountered and/or if storm water accumulates within excavations in sufficient quantities that must be removed, NTH should be notified to provide appropriate response actions.

11.0 LIMITATIONS

The evaluations and opinions presented in this report have been made to assist the authorized users of this report in making a reasonable assessment of risk with respect to the presence of potential environmental concerns at the property. The studies have been performed in accordance with a standard of care and diligence, which is considered to be representative of the local environmental due diligence practice at the present time.

The evaluations and opinions presented in this report are based on the scope of services defined herein, and should not be misconstrued as those pertaining to an environmental compliance audit. Considering the limited scope of the present investigations, data collection and testing, our findings should not be construed as absolute certainties, but rather as probabilities based on our professional judgment. NTH Consultants, Ltd. cannot offer any form of warranty or guarantee with respect to the type and extent of hazardous substances on the property, other than those identified and discussed in this report.

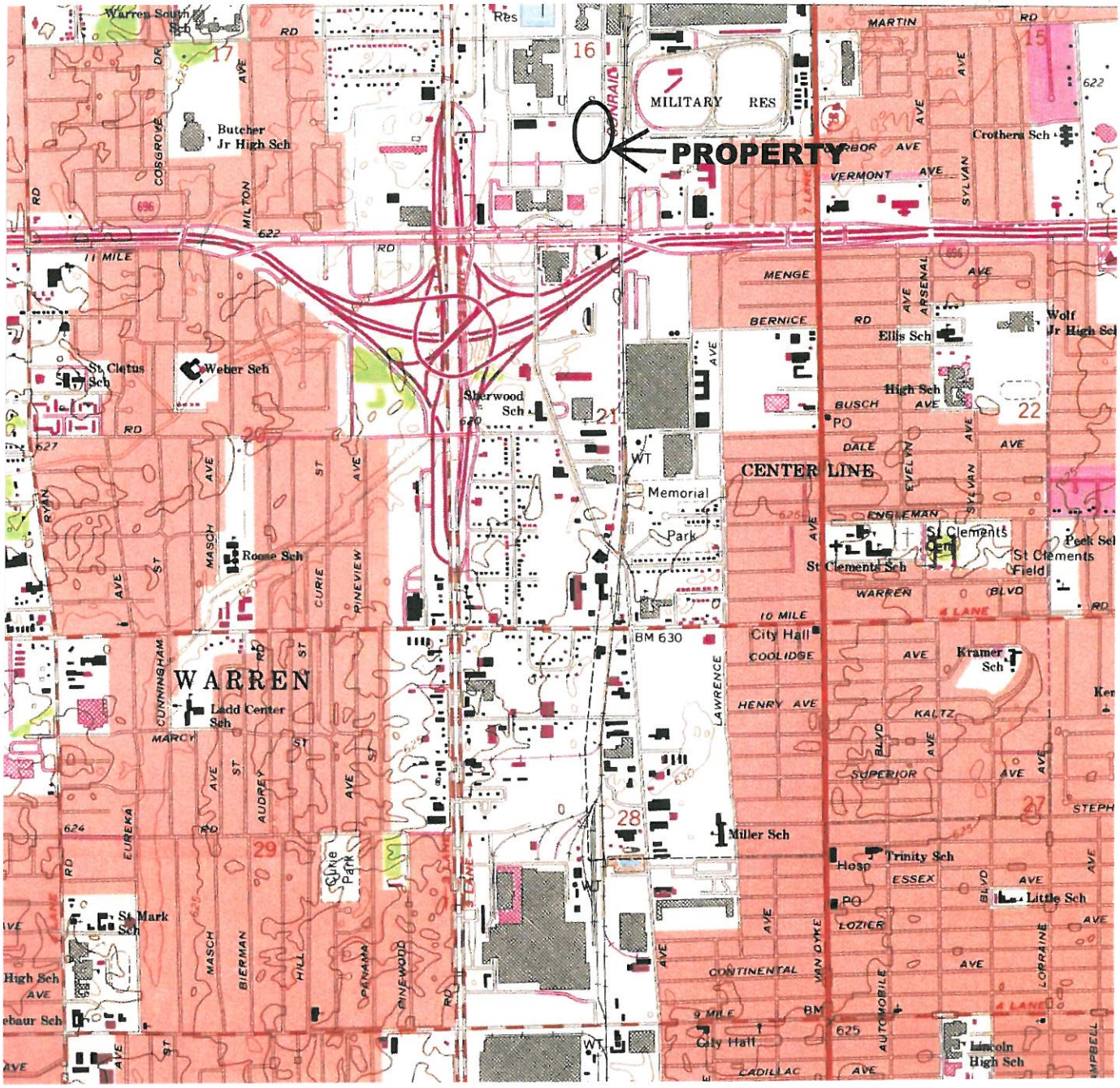
This report is intended for the exclusive use of VMX International, LLC and US Army Garrison - Detroit Arsenal. This report presents NTH's opinion of the property as of this date, based on the results of these studies. The results of the studies may not be relied upon by parties other than those identified above without the prior knowledge and written consent of NTH.

12.0 QUALIFICATIONS

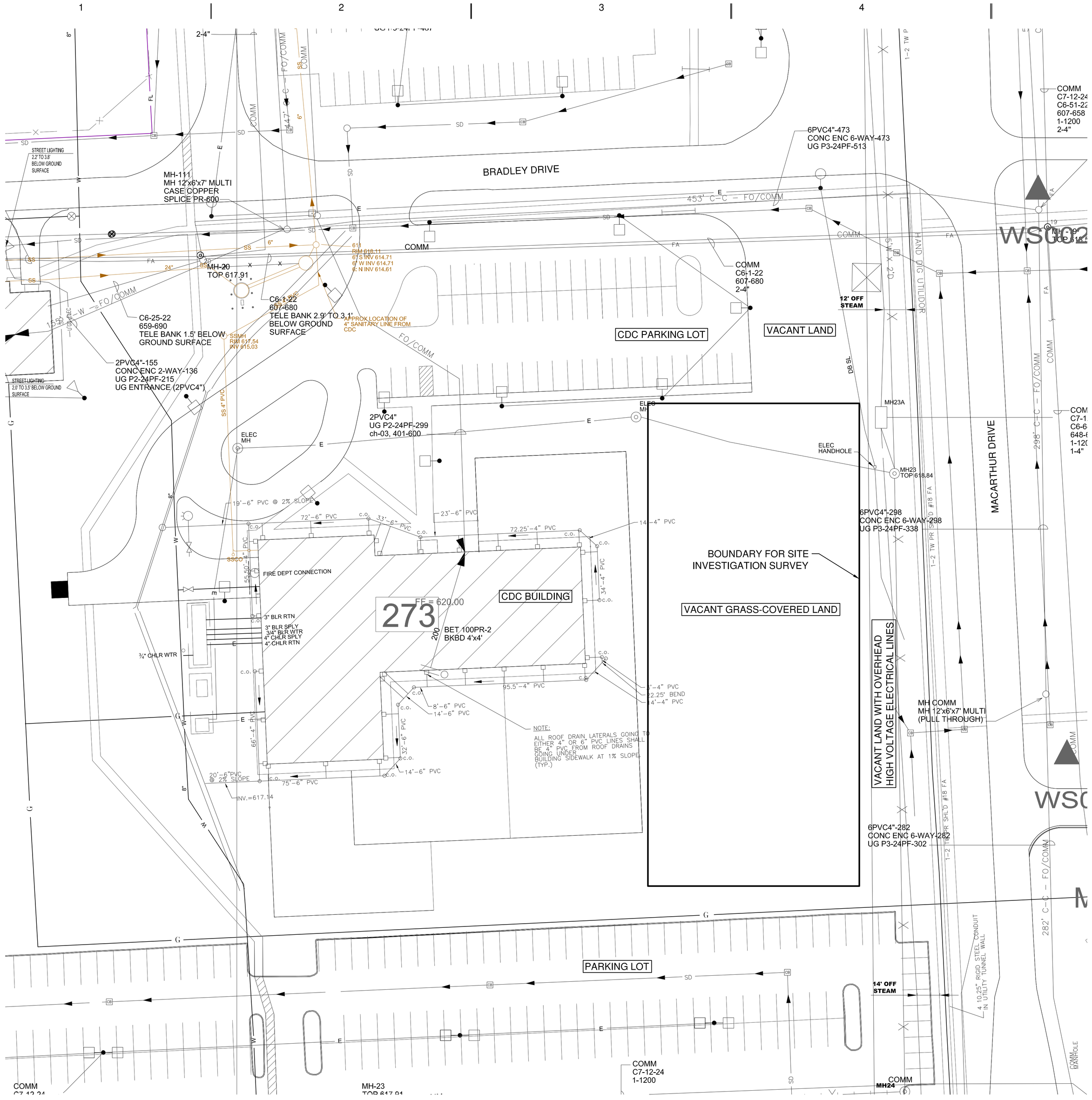
The field investigation for the Limited Phase I ESA was performed by Cliff Andrews. The Phase II ESA was preformed by Eric. The Limited Phase I ESA and Phase II ESA report was authored by Mr. Andrews and was reviewed by Philip J. Spalding and Bhushan C. Modi. NTH's qualifications and resumes for Messrs. Schupp, Andrews, Modi and Spalding are included in Appendix I.

APPENDIX A

SITE LOCATION PLAN, FIGURE 1; SITE PLAN, FIGURE 2; AND BORING LOCATION PLAN, FIGURE 3



PROJECT NO. 61-110632-00	LOCATION: Child Development Center Addition Property US Army Garrison - Detroit Arsenal Warren, Michigan Contract No. W56HZVIIPA705	TITLE: **SITE LOCATION PLAN**	DATE: 6/19/2011
SCALE: AS SHOWN			SHEET: 1 OF 1
DRAWN BY: CJA	**NTH Consultants, Ltd.** Professional Engineering & Environmental Services Northville · Detroit · Exton · Grand Rapids · Lansing		FIGURE NO: 1
CHECKED BY: CJA			



UTILITY LEGEND

WATER SYSTEM
- 8" CI W — WATER MAIN
- VALVE
- SCV — SECTIONAL CONTROL VALVE
- PIV — POST INDICATOR VALVE
- YARD HYDRANT
- METER PIT

FIRE LINE SYSTEM
- 8" CI FL — FIRE MAIN
- VALVE
- SCV — SECTIONAL CONTROL VALVE
- PIV — POST INDICATOR VALVE
- FIRE HYDRANT
- METER PIT

IRRIGATION SPRINKLER SYSTEM
- 1" PE IR — SPRINKLER PIPE
- SPRINKLER HEAD
- VALVE
- SOLENOID

SANITARY SEWER SYSTEM
- 8" VC SS — SANITARY SEWER MAIN
- MANHOLE
- CLEANOUT

STORM DRAINAGE SYSTEM
- 30" C SD — STORM DRAINAGE MAIN
- 15" CM SD — STORM DRAINAGE CULVERT
- MANHOLE
- CATCH BASIN
- CLEANOUT

ELECTRICAL DISTRIBUTION SYSTEM
- 2 – 3 500MCM E — UNDERGROUND CABLE
- 1 – 3 #1/0 DB E — DIRECT BURIED CABLE
- OVERHEAD CABLE
- MANHOLE
- POWER POLE
- TRANSFORMER

EXTERIOR LIGHTING SYSTEM
- 1 – 2 #6 SL — UNDERGROUND CABLE
- 1 – 2 #6 DB SL — DIRECT BURIED CABLE
- STREET LIGHT

GAS, OIL AND PETROLEUM SYSTEM
- 1" FB GL — GASOLINE LINE
- 2" G — GAS MAIN

TELEPHONE SYSTEM
- C6-6-22, 304-3092-4" T — UNDERGROUND TELEPHONE CABLE
- DB T — DIRECT BURIED TELEPHONE CABLE
- MANHOLE AND HANDHOLE
- 6 309-3/4 T16 — TERMINAL
- EMER. WARNING SYSTEM CONTROL

LAN SYSTEM
- LAN — UNDERGROUND LAN CABLE

HEATING AND AIR SYSTEM
- 12" T/A (75 CS) 6" T/A (R)6" T/A (A) — SERVICE MAIN

FIRE ALARM SYSTEM
- 1-2 TW PR SHLD #18 FA — UNDERGROUND FIRE ALARM CABLE
- FIRE ALARM STATION
- FIRE ALARM CONTROL PANEL
- WATER CONTROL SWITCH
- UTILITY CUTOFF

REFERENCE NOTE:
BASE MAP ADOPTED FROM PHASE 1 & PHASE 2 SITE CHARACTERIZATION & RISK ASSESSMENT, DRAWING C–101, TITLED SITE PLAN PROVIDED BY USAG–DTA

NTH Consultants, Ltd.
Infrastructure Engineering and Environmental Services

Northville, MI	248.553.6300
Detroit, MI	313.237.3900
Lansing, MI	517.484.6900
Grand Rapids, MI	616.957.3690
Exton, PA	610.524.2300
Lehigh Valley, PA	484.893.1440
Cleveland, OH	216.334.4040
Indianapolis, IN	317.735.7649

Monday, September 26, 2011

SUBMITTAL

REV	DESCRIPTION	DATE	BY

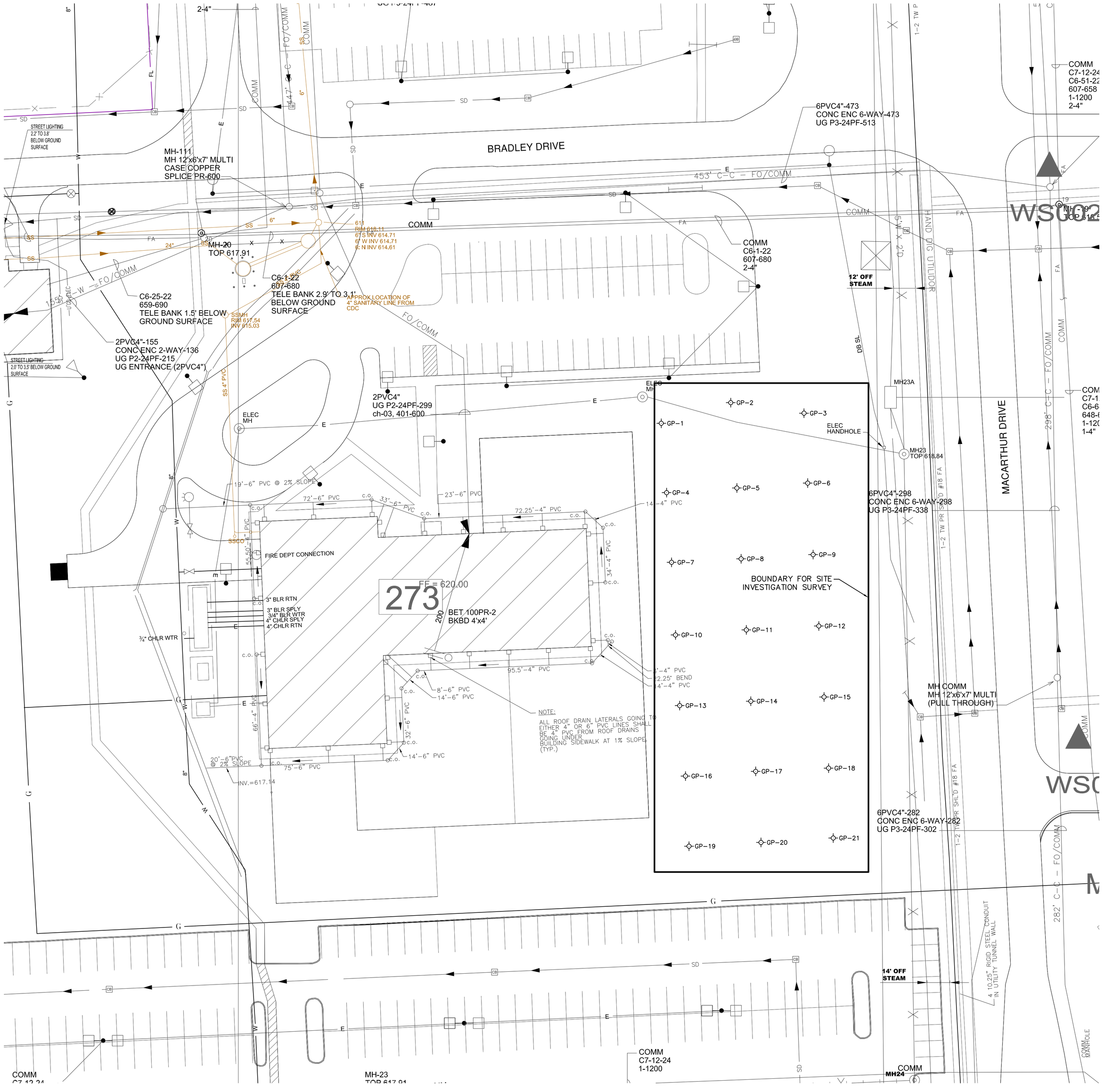
PROJECT NAME:
CHILD DEVELOPMENT CENTER ADDITION PROPERTY

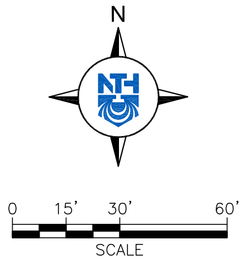
PROJECT LOCATION:
WARREN, MICHIGAN

NTH PROJECT NO.: 61-110632	CAD FILE NAME: 110632-LAY
DESIGNED BY: CJA	INCEP DATE: 6/21/2011
DRAWN BY: CWS	DRAWING SCALE: 1" = 30'
CHECKED BY: BCM	SUBMITTED DATE: 6/29/2011

SHEET TITLE:
SITE PLAN

FIGURE NUMBER:
2





Point Table				
Point #	Elevation	Northing	Easting	Description
1001	619.63	365625.00	13481251.42	GP-1
1002	618.96	365637.25	13481292.61	GP-2
1003	618.54	365630.99	13481336.08	GP-3
1004	620.09	365583.88	13481254.58	GP-4
1005	619.37	365586.63	13481296.27	GP-5
1006	618.61	365589.53	13481338.27	GP-6
1007	620.00	365542.56	13481257.52	GP-7
1008	619.10	365544.63	13481298.78	GP-8
1009	618.33	365547.12	13481341.49	GP-9
1010	619.89	365499.48	13481259.86	GP-10
1011	618.85	365502.49	13481301.88	GP-11
1012	618.19	365504.81	13481344.87	GP-12
1013	619.50	365457.59	13481262.35	GP-13
1014	618.45	365460.18	13481304.54	GP-14
1015	617.75	365462.71	13481347.96	GP-15
1016	619.32	365415.82	13481265.79	GP-16
1017	618.06	365418.60	13481307.42	GP-17
1018	617.44	365420.51	13481350.67	GP-18
1019	618.82	365374.23	13481267.88	GP-19
1020	617.55	365376.45	13481310.58	GP-20
1021	617.99	365379.07	13481353.44	GP-21

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- 8" CI W — WATER MAIN
- VALVE
- SCV — SECTIONAL CONTROL VALVE
- PIV — POST INDICATOR VALVE
- YARD HYDRANT
- METER PIT

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- 8" CI FL — FIRE MAIN
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- MANHOLE AND HANDHOLE
- 6 X09-314 T16 — TERMINAL
- EMER. WARNING SYSTEM CONTROL

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- LAN — UNDERGROUND LAN CABLE

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- 12" T/A 175 (S) 6" T/A (R)6" T/A (S) — SERVICE MAIN

FIRE ALARM SYSTEM
- 1-2 TW PR. SHLD #18 FA — UNDERGROUND FIRE ALARM CABLE
- FIRE ALARM STATION
- FIRE ALARM CONTROL PANEL
- WATER CONTROL SWITCH
- UTILITY CUTOFF

GENERAL LEGEND

- SITE INVESTIGATION BOUNDARY
- GP — SOIL BORING LOCATION
- EXISTING BUILDING

REFERENCE NOTE:
BASE MAP ADOPTED FROM PHASE 1 & PHASE 2 SITE CHARACTERIZATION & RISK ASSESSMENT, DRAWING C-101, TITLED SITE PLAN PROVIDED BY USAG-DTA

NTH Consultants, Ltd.
Infrastructure Engineering and Environmental Services

Northville, MI	248.553.6300
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Lehigh Valley, PA	484.893.1440
Cleveland, OH	216.334.4040
Indianapolis, IN	317.735.7649

Monday, September 26, 2011

SUBMITTAL			
REV	DESCRIPTION	DATE	BY

PROJECT NAME:
CHILD DEVELOPMENT CENTER ADDITION PROPERTY

PROJECT LOCATION:
WARREN, MICHIGAN

NTH PROJECT NO.: 61-110632	CAD FILE NAME: 110632-SBL
DESIGNED BY: CJA	INCEP DATE: 6/21/2011
DRAWN BY: CWS	DRAWING SCALE: 1" = 30'
CHECKED BY: BCM	SUBMITTED DATE: 6/29/2011

SHEET TITLE:
BORING LOCATION PLAN

FIGURE NUMBER:
3

APPENDIX B

SITE PHOTOGRAPHS

PROPERTY PHOTOGRAPHS

Photograph 1: Subject property facing south

Photograph 2: Subject property facing northwest

PROPERTY PHOTOGRAPHS

Photograph 3: Subject property facing northeast

Photograph 4: Subject property facing southeast

APPENDIX C

PHASE I ESA OWNER'S QUESTIONNAIRE

Phase I Environmental Site Assessment Owners Questionnaire

VMX Project No: W56HZV-11-P-A705
Child Development Center Addition Property
US Army Garrison – Detroit Arsenal
Warren, Michigan

The Phase I Environmental Site Assessment (ESA) Questionnaire is an intricate portion of our Phase I ESA report. We ask that you answer the following questions to the best of your knowledge. Since the Phase I ESA Questionnaire is such an intricate portion of the Phase I ESA report, a complete and prompt return of the Phase I ESA Questionnaire is critical in the completion of the Phase I ESA report deadline. ***Please fax the completed questionnaire to Cliff Andrews at 248-324-5179 or e-mail to candrews@nthconsultants.com.***

PROPERTY OWNERSHIP & USES

Current Property Owner(s): US Army Garrison Detroit Arsenal

Length of Ownership: Prior to 1960

Current Property Address: 6501 East Eleven Mile Rd, Warren, MI 48397-5000

Current Property Occupant(s): US Army Garrison Detroit Arsenal

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Current Property Use: National Defense, Administrative & Research

Length of Occupancy of Current Property Occupant(s): >51 years

Past Property Owner(s): CDC site was formerly 2 tracts of land. The site potentially involves a 3rd tract, depending upon the final site footprint. The 2 known tracts were owned by Detroit Trust Co. and Camille Huys. The 3rd tract of land potentially within the CDC footprint was owned by Clarence LeFevre.

Length of Past Ownership: Unknown

Past Property Use(s): Facility record states site was always vacant land. It is known from photographs the site was used sporadically as an unofficial test track. The dates when the test track use ceased are unknown. Current personnel state track was not there in the early 1980's. The vacant land has been used for special events parking, concession tents, displays etc. In 2009 the site was used for construction soil spoil storage.

Phase I Environmental Site Assessment Owners Questionnaire

VMX Project No: W56HZV-11-P-A705
Child Development Center Addition Property
US Army Garrison – Detroit Arsenal
Warren, Michigan

Length of Past Property Use(s): Sometime prior to 1960

PROPERTY STRUCTURE INFORMATION

Number of structures on the property: One - current Child Development Center

Date(s) of original construction of structures on the property: 2008

Date(s) of construction of any additions/improvements: N/A

Type(s) of heating source(s) for all current structures: on-site natural gas boiler

Past type(s) of heating source(s) for all current structures: N/A

Number of former structures no longer on the property: None

Former structure(s) purpose/use on the property: None

Former structure(s) date(s) of construction: N/A

Former structure(s) date(s) of demolition: N/A

CHEMICAL STORAGE INFORMATION

Number of chemical container(s) currently on the property: N/A

Size and contents of chemical container(s) currently on the property: N/A Current Child Care Center contains only typical janitorial supplies. The supply cabinets/closets have minimal amounts of janitorial supplies as they are resupplied from the stock room elsewhere on post.

Length of the current use of chemical container(s) on the property: 2008

Number of past chemical containers on the property: N/A

Phase I Environmental Site Assessment Owners Questionnaire

VMX Project No: W56HZV-11-P-A705
Child Development Center Addition Property
US Army Garrison – Detroit Arsenal
Warren, Michigan

Size and contents of past chemical containers on the property: N/A Chemicals have never been stored on this site since Army possession.

Length of the past use of chemical container(s) on the property: N/A

Number of aboveground storage tanks (ASTs), underground storage tanks (USTs), and/or oil/water separators currently on the property: ASTs 0 USTs 0 oil/water sep. 0

Describe the purpose and contents of each previously indicated ASTs, USTs, and/or oil/water separators: N/A None on this site.

Number of the following types of transformers located on the property:
Pole-mounted: N/A 0 Slab-mounted: 1

Indicate the owner(s) of each of the transformers on the property: Detroit Edison

Information on polychlorinated biphenyls (PCBs) content of each transformer: Non-PCB

ENVIRONMENTAL ACTIVITY INFORMATION

Describe all known current vehicle and/or machinery storage and/or maintenance practices on the property: No known vehicle and/or machinery storage in the field. The field is/was maintained by the Road & Grounds contractor under the Army required integrated pest management plan (IPMP). The IPMP controls and requires minimization of the use of pesticides. The building occupant parks mini-buses for recreational use in the parking lot.

Describe location(s) and length(s) of all known current vehicle and/or machinery storage and/or maintenance practices on the property: None

Describe all known past vehicle and/or machinery storage and/or maintenance practices on the property: None known, vehicles have parked on this site only during one-day special events.

Phase I Environmental Site Assessment Owners Questionnaire

VMX Project No: W56HZV-11-P-A705
Child Development Center Addition Property
US Army Garrison – Detroit Arsenal
Warren, Michigan

Describe location(s) and length(s) of all known past vehicle and/or machinery storage and/or maintenance practices on the property: None known

Describe all known environmental concerns and/or incidents on the property: No known incidents. Property likely has naturally occurring levels of Michigan metals (Arsenic) in the soil above state default background levels but below action levels.

Describe all known environmental concerns and/or incidents on the adjacent properties to the subject property: No known concerns or incidents. Soil sampling on post indicates consistent presence of naturally occurring Arsenic above state default background levels, but below action levels.

Number of previous environmental studies at the property: An environmental baseline survey was conducted in 2001. Sampling/analysis of stockpiled soil on property in. 2009.

Describe the results of all environmental studies at the property: No issues were identified with the property beyond the naturally occurring Arsenic. The EBS had 2 composite samples with small amounts of carbon tetrachloride. The results could not be duplicated.

Are copies of the environmental studies available for review by NTH? Provided

Number of all types of groundwater wells on the property: None

Describe the purpose and type of all groundwater wells on the property: N/A

Amount of any hazardous wastes generated/stored on the property: N/A

Indicate the amounts and type(s) of all hazardous wastes generated/stored on the property: N/A

Phase I Environmental Site Assessment Owners Questionnaire
VMX Project No: W56HZV-11-P-A705
Child Development Center Addition Property
US Army Garrison – Detroit Arsenal
Warren, Michigan

Indicate the waste transporter and/or waste disposal companies: Solid wastes are disposed through contract. Currently the contract is awarded to: Unlimited Recycling

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PROPERTY UTILITY INFORMATION

~~Circle~~ Highlight all the following types of utilities that are located on the property:

municipal water	on-site water well	community water well
municipal sanitary sewer	on-site septic system	community septic system
municipal storm sewer	on-site storm water detention	
natural gas	fuel oil	other, describe: _____

Indicate the date(s) of all known utility connections: 2008

PREPARER INFORMATION

Name of Preparer: Cheryl L. Neades

Signature of Preparer: _____

Title of Preparer: Environmental Protection Specialist

Employer of Preparer: US Army Garrison Detroit Arsenal

Relation of Preparer to the Property: Department of Army Civilian employee

Date of Questionnaire Completion: June 27, 2011

Phone No.: 586-282-8344

Phase I Environmental Site Assessment Owners Questionnaire
VMX Project No: W56HZV-11-P-A705
Child Development Center Addition Property
US Army Garrison – Detroit Arsenal
Warren, Michigan

Indicate the waste transporter and/or waste disposal companies: Solid wastes are disposed through contract. Currently the contract is awarded to: Unlimited Recycling

---

PROPERTY UTILITY INFORMATION

~~Circle~~ Highlight all the following types of utilities that are located on the property:

municipal water	on-site water well	community water well
municipal sanitary sewer	on-site septic system	community septic system
municipal storm sewer	on-site storm water detention	
natural gas	fuel oil	other, describe: _____

Indicate the date(s) of all known utility connections: 2008

PREPARER INFORMATION

Name of Preparer: Cheryl L. Neades

Signature of Preparer: Cheryl L. Neades

Title of Preparer: Environmental Protection Specialist

Employer of Preparer: US Army Garrison Detroit Arsenal

Relation of Preparer to the Property: Department of Army Civilian employee

Date of Questionnaire Completion: June 27, 2011

Phone No.: 586-282-8344

APPENDIX D

HISTORICAL AERIAL PHOTOGRAPHS

Child Development Center Addition Property
6501 E. 11 Mile Road
Warren, MI 48092

Inquiry Number: 3090255.5
June 13, 2011

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Monday, September 26, 2011

EDR Aerial Photo Decade Package

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Date EDR Searched Historical Sources:

Aerial Photography June 13, 2011

Target Property:

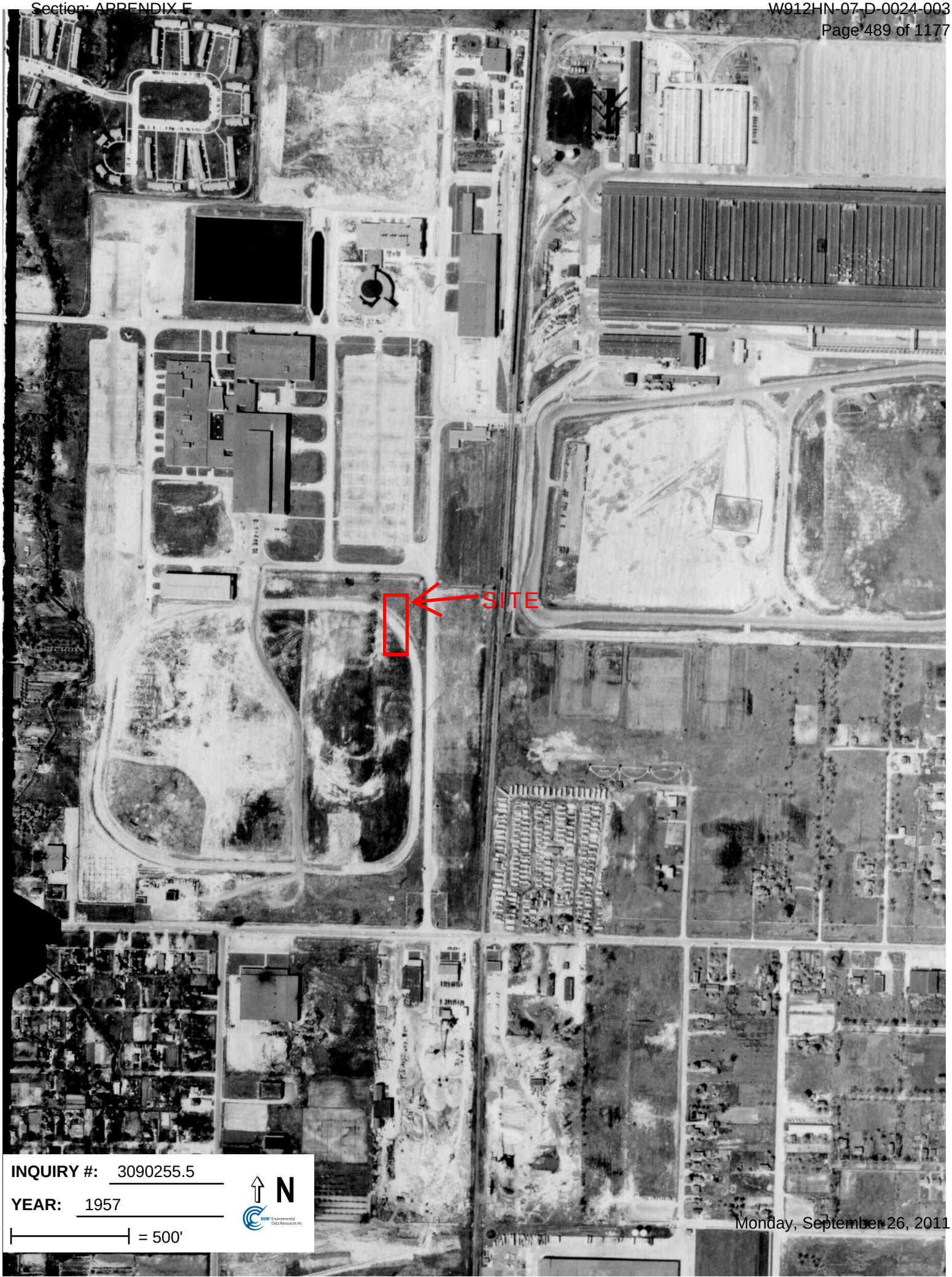
6501 E. 11 Mile Road
Warren, MI 48092

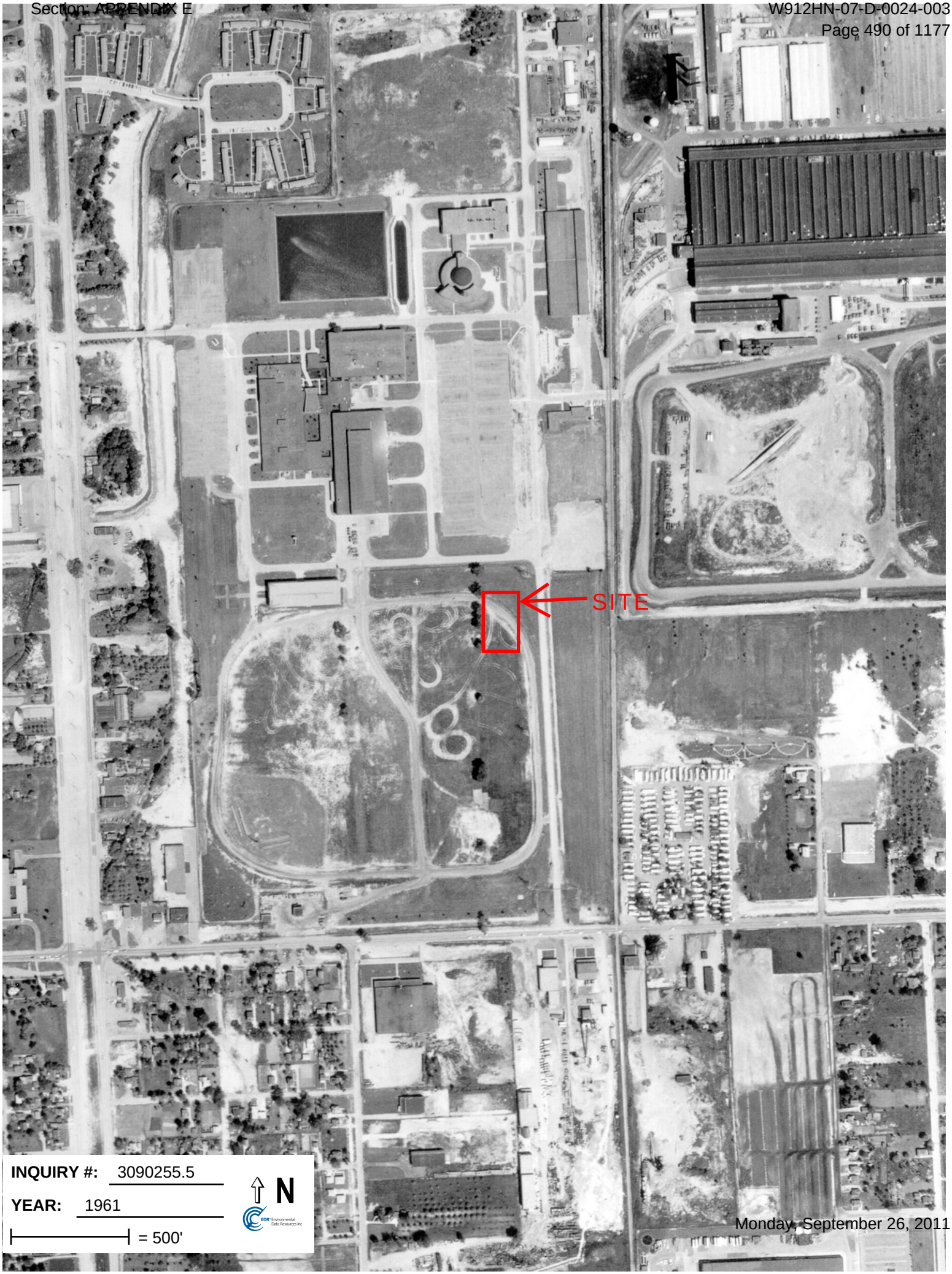
Year	***Scale***	***Details***	***Source***
1937	Aerial Photograph. Scale: 1"=500'	Flight Year: 1937	AAA
1940	Aerial Photograph. Scale: 1"=500'	Flight Year: 1940	AAA
1949	Aerial Photograph. Scale: 1"=500'	Flight Year: 1949	Detroit Edison
1957	Aerial Photograph. Scale: 1"=500'	Flight Year: 1957	Detroit Edison
1961	Aerial Photograph. Scale: 1"=500'	Flight Year: 1961	Detroit Edison
1973	Aerial Photograph. Scale: 1"=600'	Flight Year: 1973	ASCS
1985	Aerial Photograph. Scale: 1"=500'	Flight Year: 1985	SEMCOG
1993	Aerial Photograph. Scale: 1"=600'	Flight Year: 1993	NAPP
2000	Aerial Photograph. Scale: 1"=500'	Flight Year: 2000	SEMCOG
2005	Aerial Photograph. Scale: 1"=604'	Flight Year: 2005	EDR

SITE
INQUIRY #: 3090255.5
YEAR: 1937
= 500'
N
EDR Environmental Data Resources Inc

SITE
INQUIRY #: 3090255.5
YEAR: 1940
= 500'
N

SITE
INQUIRY #: 3090255.5
YEAR: 1949
= 500'
N

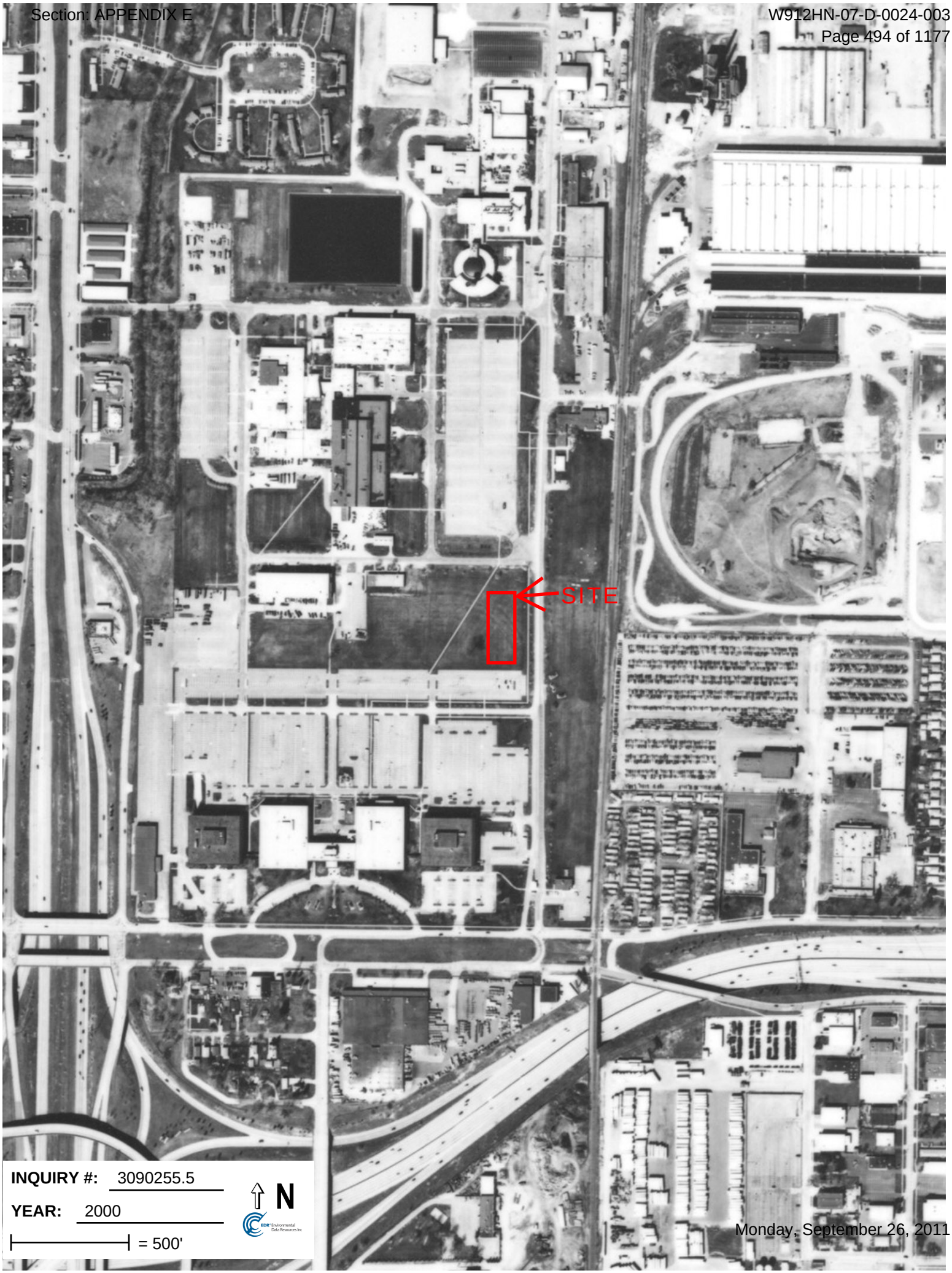

SITE
INQUIRY #: 3090255.5
YEAR: 1957
= 500'
N


SITE
INQUIRY #: 3090255.5
YEAR: 1961
= 500'
N

SITE
INQUIRY #: 3090255.5
YEAR: 1973
= 600'
N

SITE
INQUIRY #: 3090255.5
YEAR: 1985
= 500'
N
Monday, September 26, 2011

SITE
INQUIRY #: 3090255.5
YEAR: 1993
= 600'
N
EDR Environmental Data Resources Inc
Monday, September 26, 2011


SITE
INQUIRY #: 3090255.5
YEAR: 2000
= 500'
N

SITE
INQUIRY #: 3090255.5
YEAR: 2005
= 604'
N
EDR Environmental Data Resources Inc
Monday, September 26, 2011

APPENDIX E

HISTORICAL TOPOGRAPHIC MAPS

Child Development Center Addition Property
6501 E. 11 Mile Road
Warren, MI 48092

Inquiry Number: 3090255.4
June 08, 2011

EDR Historical Topographic Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

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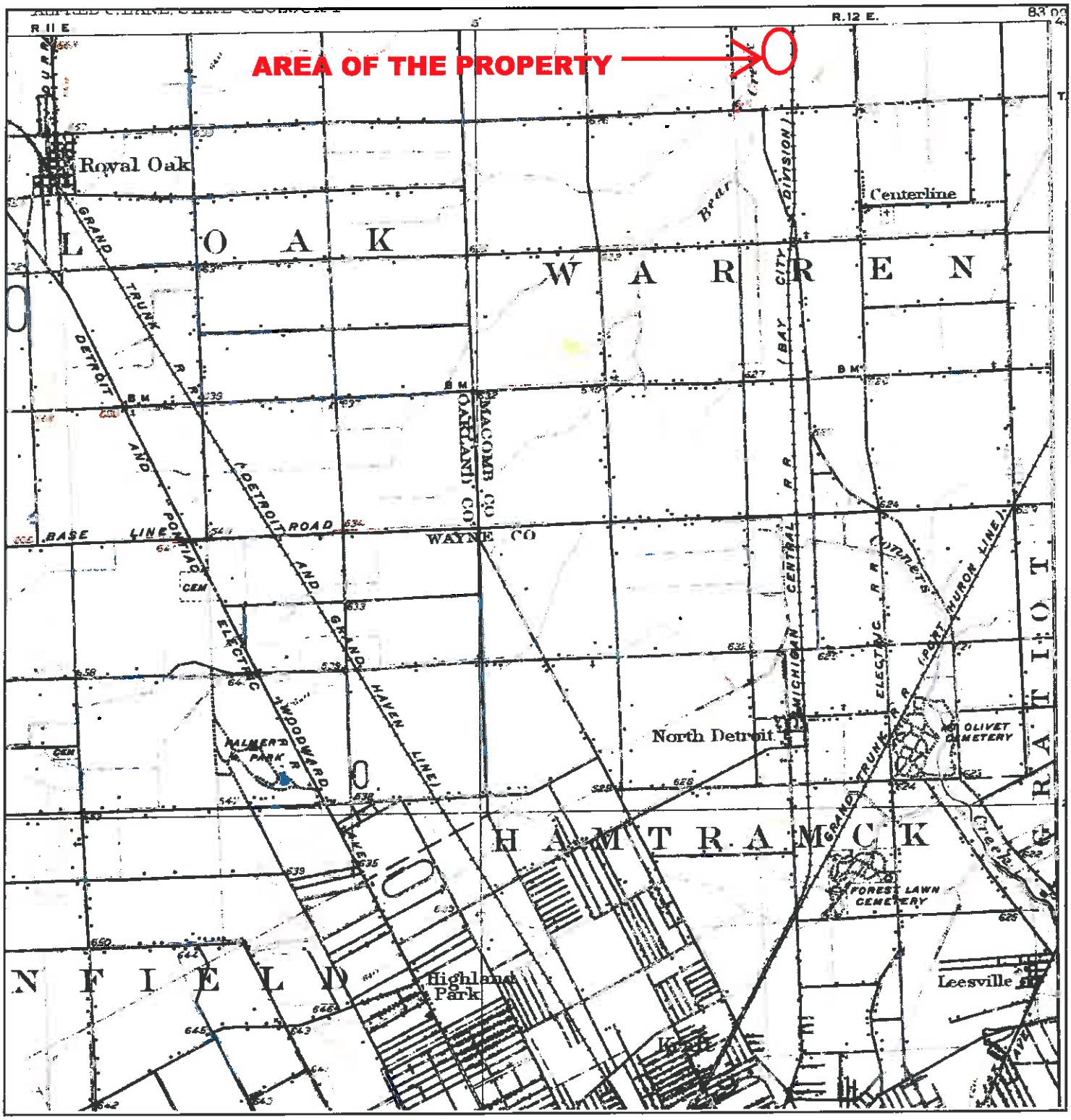
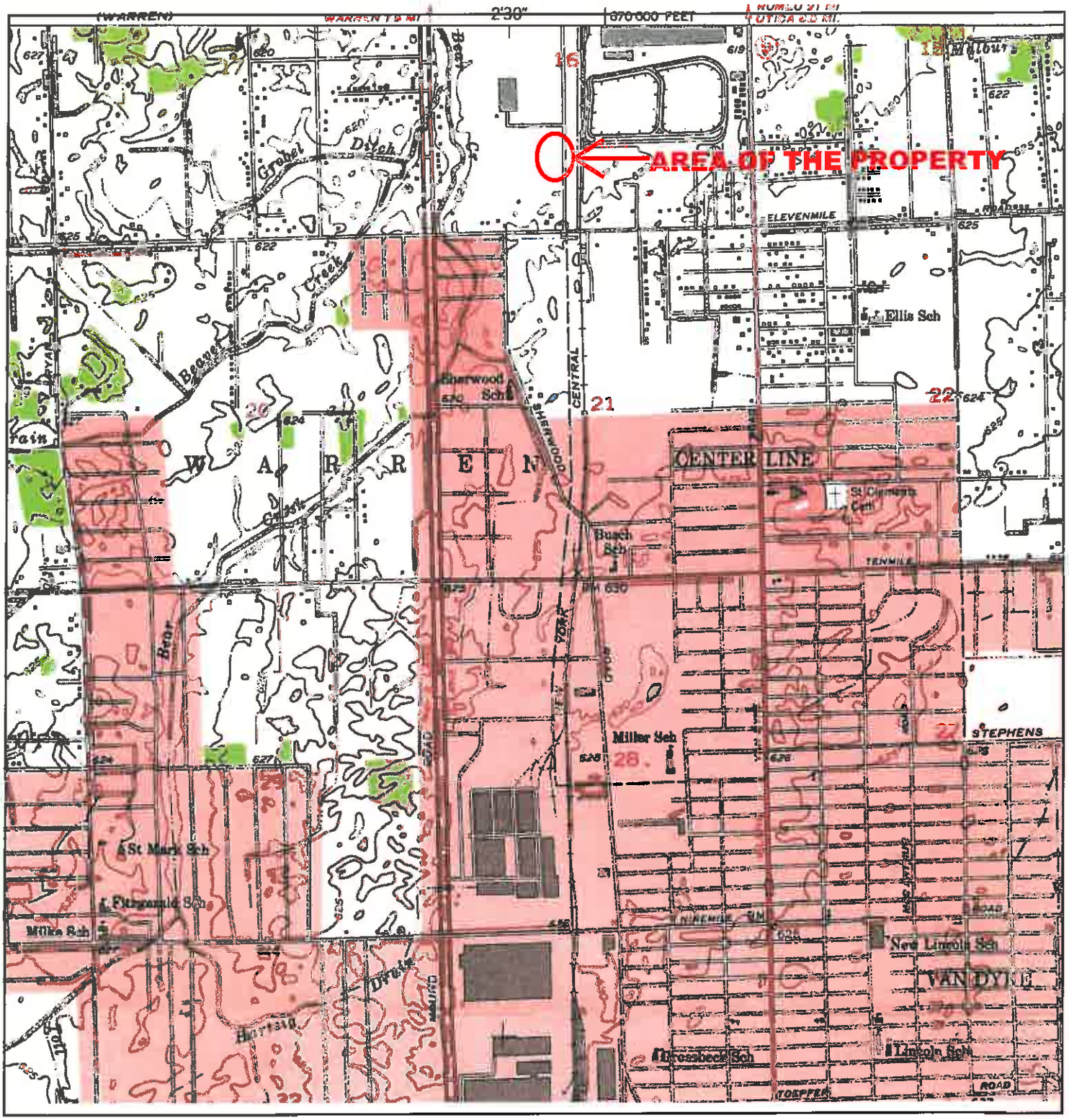
Historical Topographic Map



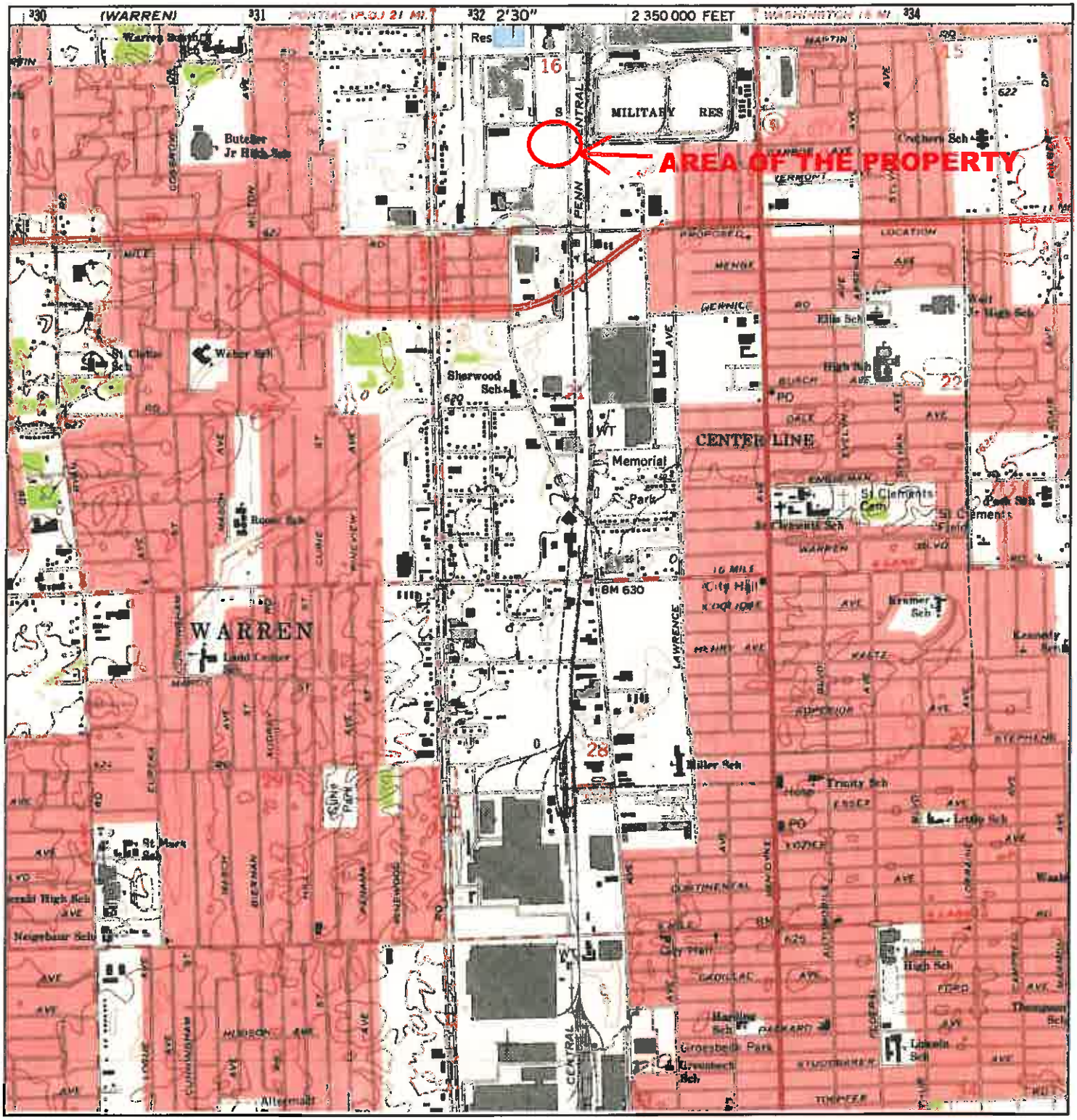
N	TARGET QUAD NAME: DETROIT MAP YEAR: 1905 SERIES: 15 SCALE: 1:62500	SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren, MI 48092 LAT/LONG: 42.495 / -83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY#: 3090255.4 RESEARCH DATE: 06/08/2011

Historical Topographic Map



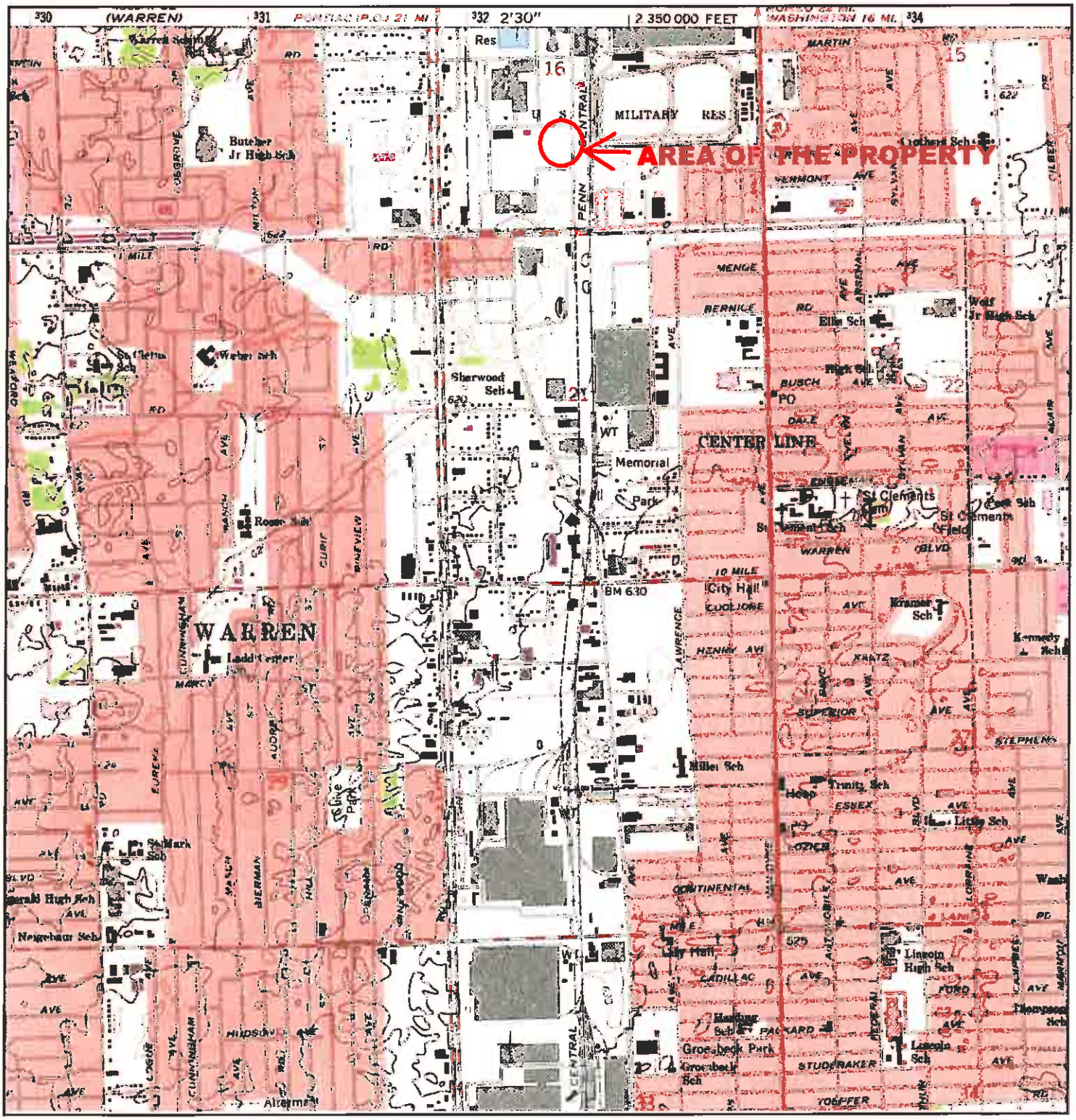
N	TARGET QUAD NAME: HIGHLAND PARK MAP YEAR: 1952 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren, MI 48092 LAT/LONG: 42.495 / -83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY#: 3090255.4 RESEARCH DATE: 06/08/2011

Historical Topographic Map



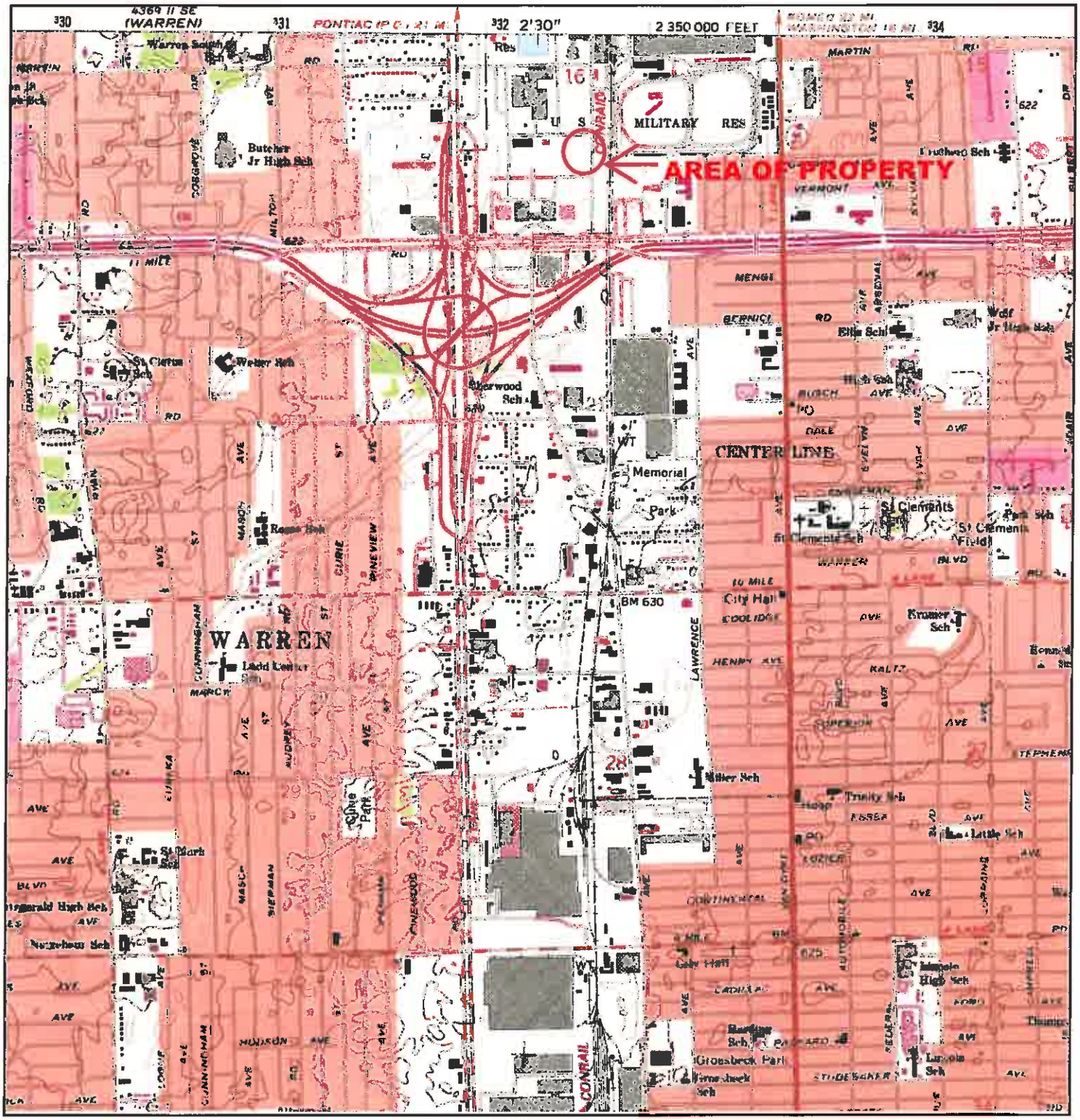
N	TARGET QUAD NAME: HIGHLAND PARK MAP YEAR: 1968 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren, MI 48092 LAT/LONG: 42.495 / -83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY#: 3090255.4 RESEARCH DATE: 06/08/2011

Historical Topographic Map



N	TARGET QUAD NAME: HIGHLAND PARK MAP YEAR: 1973 PHOTOREVISED:1968 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren, MI 48092 LAT/LONG: 42.495 / -83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY#: 3090255.4 RESEARCH DATE: 06/08/2011

Historical Topographic Map



N ↑	TARGET QUAD NAME: HIGHLAND PARK MAP YEAR: 1983 PHOTOREVISED:1968 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren, MI 48092 LAT/LONG: 42.495 / -83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY#: 3090255.4 RESEARCH DATE: 06/08/2011

APPENDIX F

ENVIRONMENTAL DATABASE REPORT

Child Development Center Addition Property
6501 E. 11 Mile Road
Warren, MI 48092

Inquiry Number: 3090255.2s
June 08, 2011

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

Monday, September 26, 2011

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Government Records Searched/Data Currency Tracking	GR-1

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

6501 E. 11 MILE ROAD
WARREN, MI 48092

COORDINATES

Latitude (North):	42.495000 - 42˚ 29' 42.0''
Longitude (West):	83.039800 - 83˚ 2' 23.3''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	332376.3
UTM Y (Meters):	4706539.5
Elevation:	619 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	42083-D1 HIGHLAND PARK, MI
Most Recent Revision:	1983
North Map:	42083-E1 WARREN, MI
Most Recent Revision:	1980

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	2006, 2005
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 7 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
U. S. ARMY TANK AUTOMOTIVE & ARMA 6501 E ELEVEN MILE RD WARREN, MI 48397	AIRS	N/A
U.S. ARMY GARRISON-DETROIT ARSENA 6501 E ELEVEN MILE RD IMWE-MIG-PWE, MS#117 WARREN, MI 48397	AIRS	N/A
US ARMY TANK AUTOMOTIVE COMMAND 6501 EAST 11 MILE ROAD WARREN, MI 48092	FINDS	N/A
6501 EAST 11 MILE ROAD BUILDING 2 6501 EAST 11 MILE ROAD BUILDING 215 WARREN, MI 48397	ERNS	N/A

EXECUTIVE SUMMARY

DETROIT ARSENAL 6501 EAST 11 MILE RD WARREN, MI 48090	LUST Facility Status: Closed Facility Status: Closed **Additional key fields are available in the Map Findings section* UST NPDES	N/A
US ARMY TANK AUTOMOTIVE COMMAND 6501 EAST 11 MILE ROAD WARREN, MI 48092	RCRA-TSDF CERCLIS CORRACTS RCRA-SQG FINDS MANIFEST	MI5210022781
6501 EAST 11 MILE RD BUILDING 7 A 6501 EAST 11 MILE RD BUILDING 7 AIR LAB WARREN, MI 48397	ERNS	N/A
U S ARMY GARRISON - MICHIGAN 6501 E 11 MILE RD WARREN, MI 48397	AIRS	N/A
ARMY, DEPARTMENT OF THE 6501 EAST ELEVEN MILE ROAD WARREN, MI 48397	MLTS	N/A
U S ARMY TANK-AUTO COMMAND 6501 E 11 MILE RD WARREN, MI 48397	AIRS	N/A
US DEPT/DEFENSE 6400 E 11 MILE RD WARREN, MI 48092	RCRA-NonGen	MI8210090405
ADMIN BLDG 270 / PARKING STRUCTUR 6501 E ELEVEN MILE ROAD WARREN, MI 48397	NPDES	N/A
TANK-AUTOMOTIVE ARMAMENTS COMMAND TANK-AUTOMOTIVE ARMAMENTS COMMAND 6501 EAST 11 MILE WARREN, MI 48397	ERNS	N/A
DETROIT ARSENAL ARRA REPAIR ROADS 6501 EAST 11 MILE ROAD WARREN, MI 48397	NPDES	N/A
DETROIT ARSENAL COMMERCIAL VEHICL 6501 EAST 11 MILE ROAD WARREN, MI 48397	NPDES	N/A

EXECUTIVE SUMMARY

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ..... National Priority List
Proposed NPL ..... Proposed National Priority List Sites
NPL LIENS ..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ..... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ..... CERCLIS No Further Remedial Action Planned

Federal RCRA generators list

RCRA-LQG ..... RCRA - Large Quantity Generators

Federal institutional controls / engineering controls registries

US ENG CONTROLS ..... Engineering Controls Sites List
US INST CONTROL ..... Sites with Institutional Controls

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ..... Solid Waste Facilities Database

State and tribal leaking storage tank lists

INDIAN LUST ..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

AST ..... Aboveground Tanks
INDIAN UST ..... Underground Storage Tanks on Indian Land
FEMA UST ..... Underground Storage Tank Listing

State and tribal institutional control / engineering control registries

AUL ..... Engineering and Institutional Controls

EXECUTIVE SUMMARY

State and tribal voluntary cleanup sites

INDIAN VCP ..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS ..... Brownfields and UST Site Database

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

ODI ..... Open Dump Inventory
DEBRIS REGION 9 ..... Torres Martinez Reservation Illegal Dump Site Locations
SWRCY ..... Recycling Facilities
HIST LF ..... Inactive Solid Waste Facilities
INDIAN ODI ..... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL ..... Clandestine Drug Labs
DEL SHWS ..... Delisted List of Contaminated Sites
CDL ..... Clandestine Drug Lab Listing
US HIST CDL ..... National Clandestine Laboratory Register

Local Land Records

LIENS 2 ..... CERCLA Lien Information
LUCIS ..... Land Use Control Information System
LIENS ..... Lien List

Records of Emergency Release Reports

HMIRS ..... Hazardous Materials Information Reporting System
SPILLS ..... Pollution Emergency Alerting System

Other Ascertainable Records

DOT OPS ..... Incident and Accident Data
DOD ..... Department of Defense Sites
FUDS ..... Formerly Used Defense Sites
CONSENT ..... Superfund (CERCLA) Consent Decrees
ROD ..... Records Of Decision
UMTRA ..... Uranium Mill Tailings Sites
MINES ..... Mines Master Index File
TRIS ..... Toxic Chemical Release Inventory System
TSCA ..... Toxic Substances Control Act
FTTS ..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

EXECUTIVE SUMMARY

HIST FTTS..... FIFRA/TSCA Tracking System Administrative Case Listing
SSTS..... Section 7 Tracking Systems
ICIS..... Integrated Compliance Information System
PADS..... PCB Activity Database System
RADINFO..... Radiation Information Database
RAATS..... RCRA Administrative Action Tracking System
UIC..... Underground Injection Wells Database
WDS..... Waste Data System
DRYCLEANERS..... Drycleaning Establishments
INDIAN RESERV..... Indian Reservations
SCRD DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing
FINANCIAL ASSURANCE.... Financial Assurance Information Listing
COAL ASH DOE..... Sleam-Electric Plan Operation Data
COAL ASH EPA..... Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER..... PCB Transformer Registration Database
COAL ASH..... Coal Ash Disposal Sites

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants..... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Federal RCRA generators list

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/11/2011 has revealed that there is 1 RCRA-SQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
DETROIT TESTING LABORATORY INC	27485 GEORGE MERRELLI D	E 1/8 - 1/4 (0.212 mi.)	17	52

EXECUTIVE SUMMARY

RCRA-CESQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-CESQG list, as provided by EDR, and dated 03/11/2011 has revealed that there are 3 RCRA-CESQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
SCHWARTZ INDUSTRIES INC	***6909 E 11 MILE RD***	***SE 1/8 - 1/4 (0.221 mi.)***	***18***	***54***
DUCT CONNECTION & SHEET METAL	28408 LORNA DR	NNE 1/8 - 1/4 (0.226 mi.)	19	55
BRIDGEWATER INTERIORS LLC	***7500 TANK AVE***	***NE 1/8 - 1/4 (0.235 mi.)***	***B20***	***57***

State- and tribal - equivalent CERCLIS

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Environmental Quality's' Contaminated Sites List on Diskette With Address.

A review of the SHWS list, as provided by EDR, and dated 05/02/2011 has revealed that there are 3 SHWS sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
DETROIT ARSENAL - BLDG 200C Facility Status: Interim Response in progress	28251 VAN DYKE	ENE 1/2 - 1 (0.621 mi.)	33	68

Lower Elevation	Address	Direction / Distance	Map ID	Page
FIRST STATE BANK PROPERTY Facility Status: Interim Response in progress	27483 MOUND ROAD	W 1/4 - 1/2 (0.309 mi.)	C25	63
MOLD TECH Facility Status: Inactive - no actions taken to address contamination	28750 LORNA	NNE 1/2 - 1 (0.603 mi.)	32	68

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Environmental Quality's Leaking Underground Storage Tank (LUST) Database.

A review of the LUST list, as provided by EDR, and dated 02/22/2011 has revealed that there are 4 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
VOLKSWAGEN OF AMERICA, INC Facility Status: Closed	7111 E 11 MILE RD	ESE 1/4 - 1/2 (0.282 mi.)	24	62
NW CORNER 1696 & LAWRENCE AVE Facility Status: Closed	***26829 LAWRENCE***	***SE 1/4 - 1/2 (0.392 mi.)***	***30***	***66***

EXECUTIVE SUMMARY

Lower Elevation	Address	Direction / Distance	Map ID	Page
A & J INSULATION CORP Facility Status: Closed	***27439 MOUND RD***	***W 1/4 - 1/2 (0.311 mi.)***	***C26***	***63***
NORMAN WINSKY Facility Status: Closed	***27275 MOUND RD***	***W 1/4 - 1/2 (0.313 mi.)***	***D28***	***64***

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Environmental Quality's Michigan UST database.

A review of the UST list, as provided by EDR, and dated 02/22/2011 has revealed that there is 1 UST site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
MELROSE VARNEY	6200 E 11 MILE RD	SSW 1/8 - 1/4 (0.237 mi.)	23	61

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

RCRA-NonGen: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA-NonGen list, as provided by EDR, and dated 03/11/2011 has revealed that there are 2 RCRA-NonGen sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MSP INDUSTRIES CORP DEL	***6400 E 11 MILE RD***	***S 1/8 - 1/4 (0.198 mi.)***	***16***	***50***
COLLINS AND AIKMAN PRODUCTS CO	7500 TANK AVE	NE 1/8 - 1/4 (0.235 mi.)	B21	59

BEA: Baseline Environmental Assessment.

A review of the BEA list, as provided by EDR, and dated 02/25/2011 has revealed that there are 4 BEA sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
DETROIT ARSENAL PROPERTY (FORM	7500 TANK AVENUE	NE 1/8 - 1/4 (0.235 mi.)	B22	61

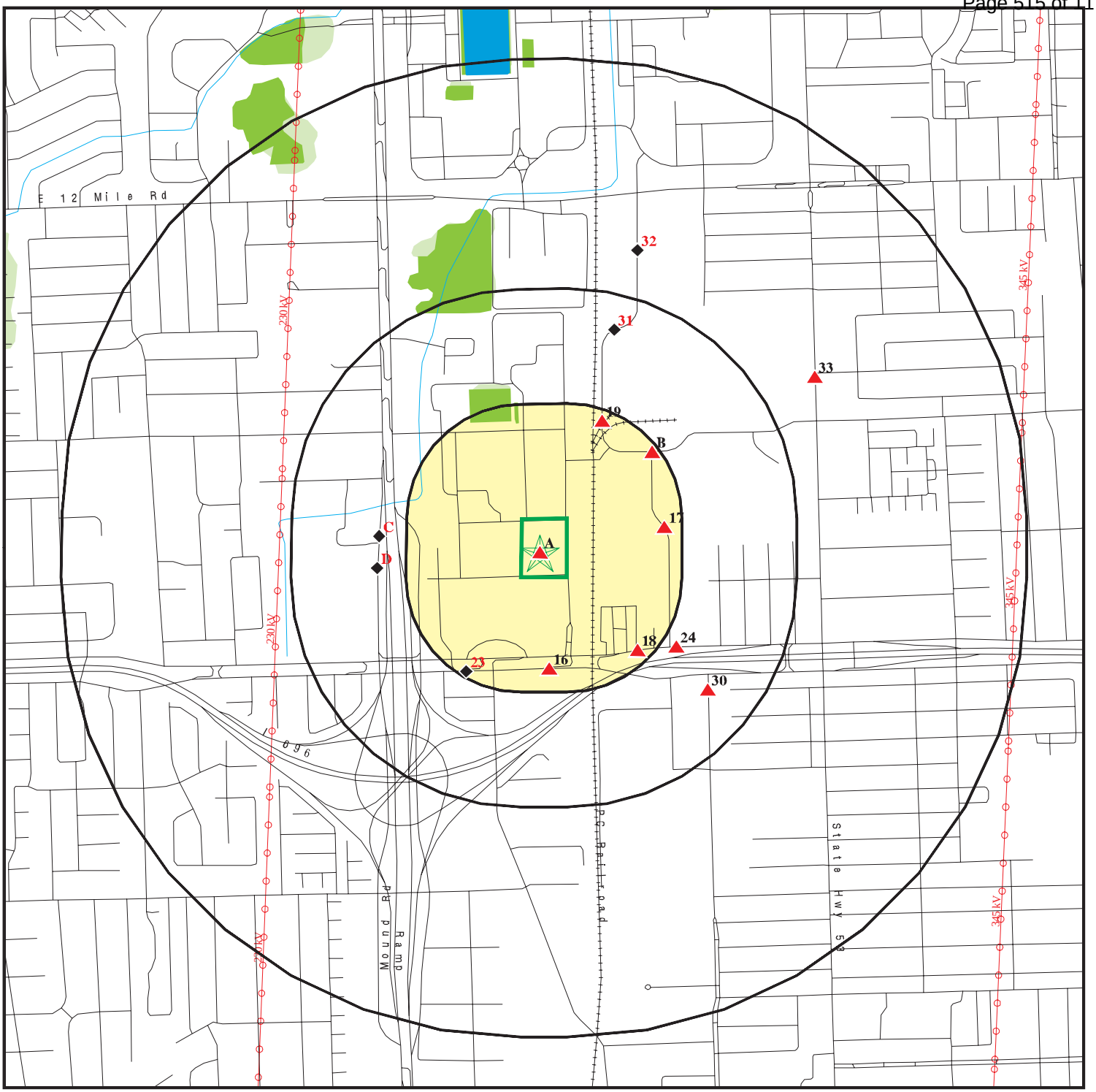
Lower Elevation	Address	Direction / Distance	Map ID	Page
INDUSTRIAL PROPERTY	27365 MOUND ROAD	W 1/4 - 1/2 (0.313 mi.)	D27	64
WINSKY TRUCKING	27275 MOUND ROAD	W 1/4 - 1/2 (0.313 mi.)	D29	66
SENATE STEEL CORPORATION	28408 LORNA DRIVE	NNE 1/4 - 1/2 (0.423 mi.)	31	68

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 28 records.

Site Name	Database(s)
VORELCO PROPERTY	SHWS
SUNSHINE ALUMINUM PROPERTY	SHWS
PRIVATE RESIDENCE	LUST, UST
MI DEPT/TRANSPORTATION	RCRA-NonGen, FINDS
MODULAR TRANSPORTATION	RCRA-NonGen
CITY OF CENTER LINE	RCRA-CESQG
IN BACK OF PROPERTY	ERNS
CENTER LINE	FINDS
CITY OF CENTER LINE	FINDS
INDUSTRIAL PROPERTY	BEA
SPECTRUM METALS	BEA
TWGD., LLC	BEA
VANDERBUSH INDUSTRIAL SITE (FORMER	BEA
X-RAY INDUSTRIES/PPI SERVICES, LLC	BEA
FORMER VORELCO PROPERTY	BEA
VORELCO PROPERTY	BEA
WARREN CITY OF	BEA
SHERWOOD AVENUE INDUSTRIAL PROPERT	BEA
ZACK INVESTMENTS, LLC INDUSTRIAL P	BEA
SYSTEM CAPITAL REAL PROPERTY CORP.	BEA
LEONARDO STRIP CENTER, LLC	BEA
MOTION SAVERS PROPERTY	BEA
CARBOLOY PROPERTY (FORMER)	BEA
FORMER DATP PROPERTY	BEA
POSS. GM TECH CENTER	SPILLS
VILLAGE FAIR PLAZA SHOPPING CENTER	DEL SHWS
CENTER LINE MS4-MACOMB	ICIS
CITY OF CENTER LINE	NPDES

OVERVIEW MAP - 3090255.2s



0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren MI 48092 LAT/LONG: 42.4950 / 83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY #: 3090255.2s DATE: June 08, 2011 4:15 pm

Monday, September 26, 2011

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DETAIL MAP - 3090255.2s

0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren MI 48092 LAT/LONG: 42.4950 / 83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY #: 3090255.2s DATE: June 08, 2011 4:16 pm

Monday, September 26, 2011

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MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL		1.000	0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	X	0.500	0	0	0	NR	NR	0
FEDERAL FACILITY		1.000	0	0	0	0	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	X	1.000	0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	X	0.500	0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG	X	0.250	0	1	NR	NR	NR	1
RCRA-CESQG		0.250	0	3	NR	NR	NR	3
Federal institutional controls / engineering controls registries								
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
Federal ERNS list								
ERNS	X	TP	NR	NR	NR	NR	NR	0
State- and tribal - equivalent CERCLIS								
SHWS		1.000	0	0	1	2	NR	3
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF		0.500	0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	X	0.500	0	0	4	NR	NR	4
INDIAN LUST		0.500	0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST	X	0.250	0	1	NR	NR	NR	1

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
FEMA UST		0.250	0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
AUL		0.500	0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP		0.500	0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS		0.500	0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
ODI		0.500	0	0	0	NR	NR	0
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HIST LF		0.500	0	0	0	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		TP	NR	NR	NR	NR	NR	0
DEL SHWS		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
US HIST CDL		TP	NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS		TP	NR	NR	NR	NR	NR	0
SPILLS		TP	NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA-NonGen	X	0.250	0	2	NR	NR	NR	2
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS	X	TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS	X	TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
UIC		TP	NR	NR	NR	NR	NR	0
WDS		TP	NR	NR	NR	NR	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
NPDES	X	TP	NR	NR	NR	NR	NR	0
AIRS	X	TP	NR	NR	NR	NR	NR	0
BEA		0.500	0	1	3	NR	NR	4
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
FINANCIAL ASSURANCE		TP	NR	NR	NR	NR	NR	0
COAL ASH DOE		TP	NR	NR	NR	NR	NR	0
COAL ASH EPA		0.500	0	0	0	NR	NR	0
PCB TRANSFORMER		TP	NR	NR	NR	NR	NR	0
COAL ASH		0.500	0	0	0	NR	NR	0
EDR PROPRIETARY RECORDS								
EDR Proprietary Records								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
A1 Target Property	**U. S. ARMY TANK AUTOMOTIVE & ARMAMENTS COMMAND 6501 E ELEVEN MILE RD WARREN, MI 48397**	**AIRS**	**S107697345 N/A**

Site 1 of 15 in cluster A

Actual:
619 ft.

AIRS:

State Registration Number:	B2763
Naics Code:	Not reported
Contact Name:	JAMES PARK
Contact Phone:	5865746308
Contact Address:	U S ARMY TACOM, AMSTA-CM-XE
Contact Address 2:	MS#117, 6501 E 11 MILE ROAD
Contact City,St,Zip:	WARREN, MI 48397
Permit Number:	146-02
Date Received:	6/10/2002
State Registration Number:	B2763
Country:	Not reported
Application Reason:	VENTILATION HOOD FOR CAN CRUSHING OPERATION
Record Type:	Not reported
State County FIPS:	Not reported
Facility Category:	Not reported
SIC Primary:	Not reported
Tribal Code:	Not reported
EI Year:	Not reported

Facility:

Facility Site(FS) Identifier:	B2763
FS Program System Code:	MIDEQ
State And County Fips Code:	26099
Tribal Code:	Not reported
State And Country FIPS Code:	Not reported
EIS FS Identifier:	13772
Effective Date:	Not reported
End Date:	Not reported
Organization Formal Name:	Not reported
Affiliation Type Code:	Not reported
Facility Category Code:	Not reported
FS Name:	U.S. Army Garrison-Detroit Arsenal
FS Description:	Not reported
FS Status Code:	OP
FS Status Code Year:	2008
FS Comment:	Not reported
NAICS Code:	928110
Location Address Text:	6501 E Eleven Mile Rd
Supplemental Location Text:	IMWE-MIG-PWE, MS#117
Locality Name:	WARREN
Location Address State Code:	MI
Location Address Postal Code:	48397
Location Address Country Code:	USA
Address Comment:	Not reported

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 02/04/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/23/2011
Next Scheduled EDR Contact: 09/05/2011
Data Release Frequency: Varies

LIENS: Lien List

An Environmental Lien is a charge, security, or encumbrance upon title to a property to secure the payment of a cost, damage, debt, obligation, or duty arising out of response actions, cleanup, or other remediation of hazardous substances or petroleum products upon a property, including (but not limited to) liens imposed pursuant to CERCLA 42 USC * 9607(1) and similar state or local laws. In other words: a lien placed upon a property's title due to an environmental condition

Date of Government Version: 03/15/2011
Date Data Arrived at EDR: 04/28/2011
Date Made Active in Reports: 05/13/2011
Number of Days to Update: 15

Source: Department of Natural Resources & Environment
Telephone: 517-373-9837
Last EDR Contact: 04/26/2011
Next Scheduled EDR Contact: 08/08/2011
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 01/05/2011
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 51

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/05/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Annually

PEAS: Pollution Emergency Alerting System

Environmental pollution emergencies reported to the Department of Environmental Quality such as tanker accidents, pipeline breaks, and release of reportable quantities of hazardous substances.

Date of Government Version: 10/21/2010
Date Data Arrived at EDR: 10/22/2010
Date Made Active in Reports: 10/28/2010
Number of Days to Update: 6

Source: Department of Natural Resources & Environment
Telephone: 517-373-8427
Last EDR Contact: 03/14/2011
Next Scheduled EDR Contact: 06/27/2011
Data Release Frequency: Quarterly

Other Ascertainable Records

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
A2 Target Property	**U.S. ARMY GARRISON-DETROIT ARSENAL 6501 E ELEVEN MILE RD IMWE-MIG-PWE, MS#117 WARREN, MI 48397**	**AIRS**	**S109956725 N/A**

Site 2 of 15 in cluster A

Actual:
619 ft.

AIRS:

State Registration Number:	B2763
Naics Code:	928110
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Address:	Not reported
Contact City,St,Zip:	Not reported
Permit Number:	Not reported
Date Received:	Not reported
State Registration Number:	B2763
Country:	USA
Application Reason:	Not reported
Record Type:	SI
State County FIPS:	26099
Facility Category:	01
SIC Primary:	Not reported
Tribal Code:	000
EI Year:	Not reported

Facility:

Facility Site(FS) Identifier:	B2763
FS Program System Code:	MIDEQ
State And County Fips Code:	26099
Tribal Code:	Not reported
State And Country FIPS Code:	Not reported
EIS FS Identifier:	13772
Effective Date:	Not reported
End Date:	Not reported
Organization Formal Name:	Not reported
Affiliation Type Code:	Not reported
Facility Category Code:	Not reported
FS Name:	U.S. Army Garrison-Detroit Arsenal
FS Description:	Not reported
FS Status Code:	OP
FS Status Code Year:	2008
FS Comment:	Not reported
NAICS Code:	928110
Location Address Text:	6501 E Eleven Mile Rd
Supplemental Location Text:	IMWE-MIG-PWE, MS#117
Locality Name:	WARREN
Location Address State Code:	MI
Location Address Postal Code:	48397
Location Address Country Code:	USA
Address Comment:	Not reported

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
A3 Target Property	**US ARMY TANK AUTOMOTIVE COMMAND 6501 EAST 11 MILE ROAD WARREN, MI 48092**	**FINDS**	**1009575372 N/A**

Site 3 of 15 in cluster A

Actual:
619 ft.

FINDS:

Registry ID: 110025217815

Environmental Interest/Information System
US Base Realignment and Closure (BRAC) is a process used to close excess military installations and realign the total asset inventory in order to save money on operations and maintenance.

A4 Target Property	**6501 EAST 11 MILE ROAD BUILDING 215 6501 EAST 11 MILE ROAD BUILDING 215 WARREN, MI 48397**	**ERNS**	**93351703 N/A**

Site 4 of 15 in cluster A

Actual:
619 ft.

Click this hyperlink while viewing on your computer to access additional ERNS detail in the EDR Site Report.

A5 Target Property	**DETROIT ARSENAL 6501 EAST 11 MILE RD WARREN, MI 48090**	**LUST UST NPDES**	**U003324962 N/A**

Site 5 of 15 in cluster A

Actual:
619 ft.

LUST:

Facility ID:	00021669
Source:	STATE OF MICHIGAN
Owner Name:	US Army Tank-Auto & Armaments Comments
Owner Address:	ATTN: AMSTA-RM-XEM 6501 East 11 Mile Rd
Owner City,St,Zip:	Warren, MI 48397-5000
Owner Contact:	Not reported
Owner Phone:	(810) 574-6615
Country:	USA
District:	SE Michigan District Office
Site Name:	U.S. Army Tank - Automotive
Latitude:	42.4917630000
Longitude:	-83.0412690000
Date of Collection:	01-11-2001
Method of Collection:	Address Matching-House Number
Accuracy:	100
Accuracy Value Unit:	FEET
Horizontal Data:	NAD83
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Leak Number:	C-0207-93
Release Date:	Jan 27 1993
Substance Released:	Other
Release Status:	Closed
Release Closed Date:	Oct 25 1997
Leak Number:	C-0618-94

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL (Continued) **U003324962**

Release Date: Sep 29 1994
Substance Released: Other,Unknown
Release Status: Closed
Release Closed Date: Aug 25 1997

Leak Number: C-0712-97
Release Date: Aug 18 1997
Substance Released: Unknown
Release Status: Closed
Release Closed Date: Jan 30 2009

Leak Number: C-0788-97
Release Date: Sep 3 1997
Substance Released: Diesel
Release Status: Closed
Release Closed Date: Feb 25 1998

Leak Number: C-0831-98
Release Date: Sep 10 1998
Substance Released: Unknown
Release Status: Closed
Release Closed Date: Nov 6 2000

Leak Number: C-0877-98
Release Date: Sep 17 1998
Substance Released: Unknown
Release Status: Closed
Release Closed Date: Nov 16 2000

Leak Number: C-1020-85
Release Date: Jun 29 1988
Substance Released: Not reported
Release Status: Closed
Release Closed Date: Nov 14 1988

Leak Number: C-1345-98
Release Date: Sep 10 1998
Substance Released: Unknown
Release Status: Closed
Release Closed Date: Nov 16 2000

Leak Number: C-2528-90
Release Date: Nov 17 1990
Substance Released: Not reported
Release Status: Closed
Release Closed Date: Nov 16 2000

UST:
Facility ID: 00021669
Facility Type: ACTIVE
Latitude: 42.4917630000
Longitude: -83.0412690000
Owner Name: US Army Tank-Auto & Armaments Comments
Owner Address: ATTN: AMSTA-RM-XEM 6501 East 11 Mile Rd
Owner City,St,Zip: Warren, MI 48397-5000
Owner Country: USA
Owner Contact: Not reported
Owner Phone: (810) 574-6615

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL (Continued) **U003324962**

Contact:	Gary M Voss
Contact Phone:	(810) 574-6615
Date of Collection:	01-11-2001
Accuracy:	100
Accuracy Value Unit:	FEET
Horizontal Datum:	NAD83
Source:	STATE OF MICHIGAN
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Method of Collection:	Address Matching-House Number

Tank ID:	1
Tank Status:	**Removed from Ground**
Capacity:	20000
Install Date:	Apr 17 1977
Product:	Diesel
Remove Date:	Jun 1 1989
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Fiberglass reinforced plastic
Piping Type:	Not reported
Constr Material:	Asphalt Coated or Bare Steel,Cathodically Protected Steel
Impressed Device:	No

Tank ID:	2
Tank Status:	**Removed from Ground**
Capacity:	20000
Install Date:	Apr 17 1977
Product:	Diesel
Remove Date:	Jun 1 1989
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Fiberglass reinforced plastic
Piping Type:	Not reported
Constr Material:	Asphalt Coated or Bare Steel,Cathodically Protected Steel
Impressed Device:	No

Tank ID:	3
Tank Status:	**Removed from Ground**
Capacity:	20000
Install Date:	Apr 17 1977
Product:	Diesel
Remove Date:	Jun 1 1989
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Fiberglass reinforced plastic
Piping Type:	Not reported
Constr Material:	Asphalt Coated or Bare Steel,Cathodically Protected Steel
Impressed Device:	No

Tank ID:	4
Tank Status:	**Removed from Ground**
Capacity:	20000
Install Date:	Apr 17 1977

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL (Continued) **U003324962**

Product: Diesel
Remove Date: Jun 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: Fiberglass reinforced plastic
Piping Type: Not reported
Constr Material: Asphalt Coated or Bare Steel,Cathodically Protected Steel
Impressed Device: No

Tank ID: 5
Tank Status: Removed from Ground
Capacity: 15000
Install Date: Apr 17 1977
Product: Diesel
Remove Date: Jun 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: Fiberglass reinforced plastic
Piping Type: Not reported
Constr Material: Asphalt Coated or Bare Steel,Cathodically Protected Steel
Impressed Device: No

Tank ID: 6
Tank Status: Removed from Ground
Capacity: 15000
Install Date: Apr 17 1977
Product: Diesel
Remove Date: Jun 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: Fiberglass reinforced plastic
Piping Type: Not reported
Constr Material: Asphalt Coated or Bare Steel,Cathodically Protected Steel
Impressed Device: No

Tank ID: 7
Tank Status: Removed from Ground
Capacity: 15000
Install Date: Apr 17 1977
Product: Diesel
Remove Date: Jun 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: Fiberglass reinforced plastic
Piping Type: Not reported
Constr Material: Asphalt Coated or Bare Steel,Cathodically Protected Steel
Impressed Device: No

Tank ID: 8
Tank Status: Removed from Ground
Capacity: 2000
Install Date: Apr 17 1977
Product: WATER/DIESEL,

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL (Continued) **U003324962**

Remove Date: Jun 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: Fiberglass reinforced plastic
Piping Type: Not reported
Constr Material: Asphalt Coated or Bare Steel,Cathodically Protected Steel
Impressed Device: No

Tank ID: 11
Tank Status: Removed from Ground
Capacity: 5000
Install Date: Apr 17 1981
Product: WASTE WATER
Remove Date: Sep 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: NO PIPING
Piping Type: Not reported
Constr Material: Fiberglass Reinforced plastic
Impressed Device: No

Tank ID: 12
Tank Status: Removed from Ground
Capacity: 2000
Install Date: Apr 17 1941
Product: Used Oil
Remove Date: Sep 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: NO PIPING
Piping Type: Not reported
Constr Material: Concrete
Impressed Device: No

Tank ID: 13
Tank Status: Removed from Ground
Capacity: 500
Install Date: Apr 17 1974
Product: Used Oil
Remove Date: Sep 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: Bare Steel
Piping Type: Not reported
Constr Material: Asphalt Coated or Bare Steel
Impressed Device: No

Tank ID: 23
Tank Status: Removed from Ground
Capacity: 500
Install Date: Apr 17 1956
Product: Used Oil
Remove Date: Sep 1 1989

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL (Continued) **U003324962**

Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: Galvanized Steel
Piping Type: Not reported
Constr Material: Asphalt Coated or Bare Steel
Impressed Device: No

Tank ID: 24
Tank Status: Removed from Ground
Capacity: 500
Install Date: Apr 17 1956
Product: Used Oil
Remove Date: Sep 1 1989
Tank Release Detection: Not reported
Pipe Realease Detection: Not reported
Piping Material: Galvanized Steel
Piping Type: Not reported
Constr Material: Asphalt Coated or Bare Steel
Impressed Device: No

Tank ID: 215
Tank Status: Closed in Ground
Capacity: 2000
Install Date: Apr 17 1985
Product: Used Oil
Remove Date: Aug 20 1998
Tank Release Detection: Tank Tightness Testing
Pipe Realease Detection: Not reported
Piping Material: Galvanized Steel
Piping Type: Gravity Fed?
Constr Material: Asphalt Coated or Bare Steel
Impressed Device: No

Tank ID: 2125
Tank Status: Removed from Ground
Capacity: 500
Install Date: Jan 1 1957
Product: Used Oil
Remove Date: Aug 27 1998
Tank Release Detection: Tank Tightness Testing
Pipe Realease Detection: Not reported
Piping Material: Galvanized Steel
Piping Type: Gravity Fed?
Constr Material: Asphalt Coated or Bare Steel
Impressed Device: No

Tank ID: 204-1
Tank Status: Removed from Ground
Capacity: 10000
Install Date: Apr 18 1975
Product: Diesel
Remove Date: Jan 13 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
	DETROIT ARSENAL (Continued)		**U003324962**

Pipe Realease Detection: Line Tightness Testing
Piping Material: Cathodically Protected
Piping Type: Suction: Valve at Tank
Constr Material: Cathodically Protected Steel,Lined Interier
Impressed Device: No

Tank ID: 204-2
Tank Status: Removed from Ground
Capacity: 20000
Install Date: Apr 18 1975
Product: JP-8
Remove Date: Jan 13 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection: Line Tightness Testing
Piping Material: Cathodically Protected
Piping Type: Suction: Valve at Tank
Constr Material: Cathodically Protected Steel,Lined Interier
Impressed Device: No

Tank ID: 204-3
Tank Status: Removed from Ground
Capacity: 20000
Install Date: Apr 18 1975
Product: Gasoline
Remove Date: Jan 13 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection: Line Tightness Testing
Piping Material: Cathodically Protected
Piping Type: Suction: Valve at Tank
Constr Material: Cathodically Protected Steel,Lined Interier
Impressed Device: No

Tank ID: 204-4
Tank Status: Removed from Ground
Capacity: 20000
Install Date: Apr 18 1975
Product: Diesel
Remove Date: Jan 13 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection: Line Tightness Testing
Piping Material: Cathodically Protected
Piping Type: Suction: Valve at Tank
Constr Material: Cathodically Protected Steel,Lined Interier
Impressed Device: No

Tank ID: 204-5
Tank Status: Removed from Ground
Capacity: 20000
Install Date: Apr 18 1975
Product: Diesel
Remove Date: Jan 13 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection: Line Tightness Testing

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL (Continued) **U003324962**

Piping Material: Cathodically Protected
Piping Type: Suction: Valve at Tank
Constr Material: Cathodically Protected Steel,Lined Interier
Impressed Device: No

Tank ID: 204-6
Tank Status: Removed from Ground
Capacity: 10000
Install Date: Apr 18 1975
Product: Diesel
Remove Date: Jan 13 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection: Line Tightness Testing
Piping Material: Cathodically Protected
Piping Type: Suction: Valve at Tank
Constr Material: Cathodically Protected Steel,Lined Interier
Impressed Device: No

Tank ID: 204-7
Tank Status: Removed from Ground
Capacity: 20000
Install Date: Apr 18 1975
Product: Diesel
Remove Date: Jan 13 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection: Line Tightness Testing
Piping Material: Cathodically Protected
Piping Type: Suction: Valve at Tank
Constr Material: Cathodically Protected Steel,Lined Interier
Impressed Device: No

Tank ID: 204-8
Tank Status: Removed from Ground
Capacity: 20000
Install Date: Apr 18 1975
Product: Diesel
Remove Date: Jan 13 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection: Line Tightness Testing
Piping Material: Cathodically Protected
Piping Type: Suction: Valve at Tank
Constr Material: Cathodically Protected Steel,Lined Interier
Impressed Device: No

Tank ID: GD26-1
Tank Status: Removed from Ground
Capacity: 15000
Install Date: Apr 17 1981
Product: USED/HYDRALIC
Remove Date: Mar 19 1998
Tank Release Detection: Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection: Line Tightness Testing
Piping Material: Cathodically Protected,PVC

Map ID Direction Distance Elevation	Site	MAP FINDINGS Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL (Continued) **U003324962**

Piping Type:	Gravity Fed?
Constr Material:	Cathodically Protected Steel,Fiberglass Reinforced plastic,Lined Interier
Impressed Device:	No

Tank ID:	GD26-2
Tank Status:	**Removed from Ground**
Capacity:	15000
Install Date:	Apr 17 1981
Product:	Diesel
Remove Date:	Mar 19 1998
Tank Release Detection:	Inventory Control,Manual Tank Gauging,Tank Tightness Testing
Pipe Realease Detection:	Line Tightness Testing
Piping Material:	Cathodically Protected,Fiberglass reinforced plastic
Piping Type:	Gravity Fed?
Constr Material:	Cathodically Protected Steel,Fiberglass Reinforced plastic
Impressed Device:	No

Tank ID:	UST-09
Tank Status:	**Currently In Use**
Capacity:	10000
Install Date:	Jul 25 1997
Product:	Diesel
Remove Date:	Not reported
Tank Release Detection:	Automatic Tank Gauging,Inter Monitoring Double Walled Tank,Manual Tank Gauging,Vapor Monitoring
Pipe Realease Detection:	Interstitial Monitoring Double Walled Piping,Line Tightness Testing,Vapor Monitoring
Piping Material:	GEOFLEX,Secondary Containment
Piping Type:	Pressure
Constr Material:	Cathodically Protected Steel,Composite(Steel w/Fiberglass),Double Walled,Lined Interier
Impressed Device:	Yes

Tank ID:	UST-10
Tank Status:	**Currently In Use**
Capacity:	10000
Install Date:	Jul 25 1997
Product:	JP-8
Remove Date:	Not reported
Tank Release Detection:	Automatic Tank Gauging,Inter Monitoring Double Walled Tank,Manual Tank Gauging,Vapor Monitoring
Pipe Realease Detection:	Interstitial Monitoring Double Walled Piping,Line Tightness Testing,Vapor Monitoring
Piping Material:	GEOFLEX,Secondary Containment
Piping Type:	Pressure
Constr Material:	Cathodically Protected Steel,Composite(Steel w/Fiberglass),Double Walled,Lined Interier
Impressed Device:	Yes

Tank ID:	UST-11
Tank Status:	**Currently In Use**
Capacity:	10000

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL (Continued) **U003324962**

Install Date: Jul 25 1997
Product: JET-A
Remove Date: Not reported
Tank Release Detection: Automatic Tank Gauging,Inter Monitoring Double Walled Tank,Manual Tank Gauging,Vapor Monitoring
Pipe Realease Detection: Interstitial Monitoring Double Walled Piping,Line Tightness Testing,Vapor Monitoring
Piping Material: GEOFLEX,Secondary Containment
Piping Type: Pressure
Constr Material: Cathodically Protected Steel,Composite(Steel w/Fiberglass),Double Walled,Lined Interier
Impressed Device: Yes

MI NPDES:
Permit Number: MIR111627
Permitee PO Box: N
Permitee Email: norman.waters@us.army.mil
Issue Date: 12/3/2010
Effective Date: 12/3/2010
Expiration Date: 2/22/2011
Permittee Name: Detroit Arsenal - Army Garrison Group
Permittee Address: 6501 East Eleven Mile Road
Permittee Addr2: Not reported
Permittee City,St,Zip: Warren, MI 48397
Permit Type: NOC
Facility Name 2: Not reported
Facility Name 3: Not reported
Facility Name 4: Not reported
Designed Name: Detroit Arsenal Comm Access
Latitude: 42.504399999999997
Lat Direction: N
Lat Type Code: LAT
Longitude: -83.044439999999994
Lon Direction: W
Lon Type Code: LON
Hydrologic Unit Code: Not reported

A6 Target Property **US ARMY TANK AUTOMOTIVE COMMAND** **RCRA-TSDF** **1000529952**
6501 EAST 11 MILE ROAD **CERCLIS** **MI5210022781**
WARREN, MI 48092 **CORRACTS**
RCRA-SQG
Site 6 of 15 in cluster A **FINDS**
MANIFEST

Actual: 619 ft.

RCRA-TSDF:
Date form received by agency: 02/09/2010
Facility name: US DEPT/DEFENSE
Facility address: 6501 E 11 MILE RD
WARREN, MI 48092
EPA ID: MI5210022781
Contact: MATTHEW P MILLER
Contact address: Not reported
Not reported
Contact country: Not reported
Contact telephone: (586) 574-7780
Contact email: Not reported
EPA Region: 05

Map ID Direction Distance Elevation	Site	MAP FINDINGS	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Land type:	Federal
Classification:	TSDF
Description:	Handler is engaged in the treatment, storage or disposal of hazardous waste
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	US DEPT/DEFENSE-TAC ATT STASA-X
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Federal
Owner/Operator Type:	Operator
Owner/Op start date:	02/08/1994
Owner/Op end date:	Not reported

Owner/operator name:	US DEPT/DEFENSE-TAC ATT STASA-X
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Federal
Owner/Operator Type:	Owner
Owner/Op start date:	02/08/1994
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Universal Waste Summary:

Waste type: Batteries
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: Lamps
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: Pesticides
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: Thermostats
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: MERCURY THERMOMETERS
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: MERCURY SWITCHES
Accumulated waste on-site: Yes
Generated waste on-site: No

Historical Generators:

Date form received by agency: 02/09/2010
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 07/07/2009
Facility name: US DEPT/DEFENSE
Classification: Small Quantity Generator

Date form received by agency: 05/04/2009
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 03/01/2008
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 02/21/2008
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 02/08/2007
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 03/01/2006
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 02/27/2006
Facility name: US DEPT/DEFENSE

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Classification: Large Quantity Generator

Date form received by agency: 03/16/2004
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 03/01/2004
Facility name: US DEPT/DEFENSE
Site name: DETROIT ARSENAL
Classification: Large Quantity Generator

Date form received by agency: 04/21/2003
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 03/01/2002
Facility name: US DEPT/DEFENSE
Site name: DETROIT ARSENAL
Classification: Large Quantity Generator

Date form received by agency: 02/15/2002
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 02/25/2000
Facility name: US DEPT/DEFENSE
Site name: DETROIT ARSENAL
Classification: Large Quantity Generator

Date form received by agency: 02/27/1998
Facility name: US DEPT/DEFENSE
Site name: US ARMY, TANK-AUTOMOTIVE & ARM.
Classification: Large Quantity Generator

Date form received by agency: 02/28/1996
Facility name: US DEPT/DEFENSE
Site name: US ARMY, TANK-AUTOMOTIVE & ARMAMENTS CMD
Classification: Large Quantity Generator

Date form received by agency: 07/28/1995
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

Date form received by agency: 03/14/1990
Facility name: US DEPT/DEFENSE
Site name: US ARMY TANK AUTOMOTIVE COMMAND
Classification: Large Quantity Generator

Date form received by agency: 11/19/1980
Facility name: US DEPT/DEFENSE
Classification: Not a generator, verified

Date form received by agency: 08/11/1980
Facility name: US DEPT/DEFENSE
Classification: Large Quantity Generator

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Hazardous Waste Summary:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D005
Waste name: BARIUM

Waste code: D006
Waste name: CADMIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D009
Waste name: MERCURY

Waste code: D011
Waste name: SILVER

Waste code: D012
Waste name: ENDRIN

Waste code: D013

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Waste name: LINDANE

Waste code: D014
Waste name: METHOXYCHLOR

Waste code: D015
Waste name: TOXAPHENE

Waste code: D018
Waste name: BENZENE

Waste code: D021
Waste name: CHLOROBENZENE

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: D039
Waste name: TETRACHLOROETHYLENE

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: P004
Waste name: ALDRIN

Waste code: U044
Waste name: CHLOROFORM

Waste code: U080
Waste name: METHANE, DICHLORO-

Waste code: U102
Waste name: 1,2-BENZENEDICARBOXYLIC ACID, DIMETHYL ESTER

Waste code: U138

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Waste name: METHANE, IODO-

Waste code: U154
Waste name: METHANOL (I)

Waste code: U180
Waste name: N-NITROSOPYRROLIDINE

Waste code: U220
Waste name: BENZENE, METHYL-

Waste code: U226
Waste name: ETHANE, 1,1,1-TRICHLORO-

Biennial Reports:

Last Biennial Reporting Year: 2011

Annual Waste Handled:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs): 9914.6

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Amount (Lbs): 3237.1

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Amount (Lbs): 41.5

Waste code: D005
Waste name: BARIUM
Amount (Lbs): 83

Waste code: D006
Waste name: CADMIUM
Amount (Lbs): 2.2

Waste code: D007
Waste name: CHROMIUM
Amount (Lbs): 9192.2

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
	US ARMY TANK AUTOMOTIVE COMMAND (Continued)		**1000529952**

Waste code: D008
Waste name: LEAD
Amount (Lbs): 10990.2

Waste code: D009
Waste name: MERCURY
Amount (Lbs): 1752.1

Waste code: D011
Waste name: SILVER
Amount (Lbs): 10.5

Waste code: D012
Waste name: ENDRIN
Amount (Lbs): 41.5

Waste code: D013
Waste name: LINDANE
Amount (Lbs): 41.5

Waste code: D014
Waste name: METHOXYCHLOR
Amount (Lbs): 41.5

Waste code: D015
Waste name: TOXAPHENE
Amount (Lbs): 41.5

Waste code: D018
Waste name: BENZENE
Amount (Lbs): 725.5

Waste code: D021
Waste name: CHLOROBENZENE
Amount (Lbs): 41.5

Waste code: D035
Waste name: METHYL ETHYL KETONE
Amount (Lbs): 7204.6

Waste code: D039
Waste name: TETRACHLOROETHYLENE
Amount (Lbs): 498

Waste code: D040
Waste name: TRICHLOROETHYLENE
Amount (Lbs): 498

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs): 3029.5

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs): 2898.5

Waste code: P004
Waste name: ALDRIN
Amount (Lbs): 41.5

Waste code: U044
Waste name: CHLOROFORM
Amount (Lbs): 58.5

Waste code: U080
Waste name: METHANE, DICHLORO-
Amount (Lbs): 58.5

Waste code: U102
Waste name: 1,2-BENZENEDICARBOXYLIC ACID, DIMETHYL ESTER
Amount (Lbs): 41.5

Waste code: U138
Waste name: METHANE, IODO-
Amount (Lbs): 17

Waste code: U154
Waste name: METHANOL (I)
Amount (Lbs): 17

Waste code: U180
Waste name: N-NITROSOPYRROLIDINE
Amount (Lbs): 41.5

Waste code: U220
Waste name: BENZENE, METHYL-
Amount (Lbs): 17

Waste code: U226
Waste name: ETHANE, 1,1,1-TRICHLORO-
Amount (Lbs): 41.5

Corrective Action Summary:
Event date: 01/02/1985
Event: RFA Completed

Event date: 03/31/1994
Event: CA Prioritization, Facility or area was assigned a medium corrective

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

action priority.

Event date: 08/16/1995
Event: CA Responsibility Referred To A Non-RCRA Federal Authority, Corrective Action at the facility or area referred to CERCLA.

Event date: 04/11/1997
Event: CA Responsibility Referred To A Non-RCRA Federal Authority, Corrective Action at the facility or area referred to CERCLA.

Facility Has Received Notices of Violations:

Regulation violated: Not reported
Area of violation: Generators - Pre-transport
Date violation determined: 09/14/2006
Date achieved compliance: 11/03/2006
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 09/19/2006
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Permits - Conditions
Date violation determined: 12/18/2001
Date achieved compliance: 09/11/2003
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 12/18/2001
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - Records/Reporting
Date violation determined: 01/22/1996
Date achieved compliance: 04/02/1996
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/22/1996
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - Pre-transport
Date violation determined: 01/22/1996
Date achieved compliance: 04/02/1996

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/22/1996
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 02/27/1990
Date achieved compliance: 10/23/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/05/1990
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 06/09/1988
Date achieved compliance: 11/01/1988
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 06/15/1988
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Closure/Post-Closure
Date violation determined: 06/09/1988
Date achieved compliance: 11/01/1988
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 06/15/1988
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: LDR - General
Date violation determined: 06/09/1988
Date achieved compliance: 11/01/1988
Violation lead agency: State

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Enforcement action: WRITTEN INFORMAL
Enforcement action date: 09/12/1988
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 06/09/1988
Date achieved compliance: 11/01/1988
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 09/12/1988
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Closure/Post-Closure
Date violation determined: 06/09/1988
Date achieved compliance: 11/01/1988
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 09/12/1988
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: LDR - General
Date violation determined: 06/09/1988
Date achieved compliance: 11/01/1988
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 06/15/1988
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 03/04/2009
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Evaluation date: 09/14/2006
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Pre-transport
Date achieved compliance: 11/03/2006
Evaluation lead agency: State

Evaluation date: 12/18/2001
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Permits - Conditions
Date achieved compliance: 09/11/2003
Evaluation lead agency: State

Evaluation date: 04/09/1997
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 01/17/1996
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Pre-transport
Date achieved compliance: 04/02/1996
Evaluation lead agency: State

Evaluation date: 01/17/1996
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Records/Reporting
Date achieved compliance: 04/02/1996
Evaluation lead agency: State

Evaluation date: 02/27/1990
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 10/23/1990
Evaluation lead agency: State

Evaluation date: 02/27/1990
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/27/1989
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 09/26/1988
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 06/09/1988
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 06/09/1988
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: LDR - General
Date achieved compliance: 11/01/1988
Evaluation lead agency: State

Evaluation date: 06/09/1988
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - Closure/Post-Closure
Date achieved compliance: 11/01/1988
Evaluation lead agency: State

Evaluation date: 06/09/1988
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 11/01/1988
Evaluation lead agency: State

CERCLIS:
Site ID: 0503674
EPA ID: MI5210022781
Facility County: MACOMB
Short Name: US ARMY TANK AUTOMOTIVE C
Congressional District: 18
IFMS ID: A516
SMSA Number: 2160
USGC Hydro Unit: 04090003
Federal Facility: Federal Facility
DMNSN Number: Not reported
Site Orphan Flag: N
RCRA ID: Y
USGS Quadrangle: Not reported
Site Init By Prog: Not reported
NFRAP Flag: Not reported
Parent ID: Not reported
RST Code: I
EPA Region: 05
Classification: Not reported
Site Settings Code: Not reported
NPL Status: Not on the NPL
DMNSN Unit Code: Not reported
RBRAC Code: Not reported
RResp Fed Agency Code: USAR
Non NPL Status: Other Cleanup Activity: Federal Facility-Lead Cleanup
Non NPL Status Date: 20000825
Site Fips Code: 26099
CC Concurrence Date: Not reported
CC Concurrence FY: Not reported
Alias EPA ID: Not reported
Site FUDS Flag: Not reported

CERCLIS Site Contact Name(s):
Contact ID: 5270051.00000
Contact Name: OWEN THOMPSON

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Contact Tel: (312) 886-4843
Contact Title: Remedial Project Manager (RPM)
Contact Email: thompson.owen@epa.gov

Contact ID: 5271043.00000
Contact Name: DON DE BLASIO
Contact Tel: (312) 886-9749
Contact Title: Community Involvement Coordinator
Contact Email: Not reported

CERCLIS Site Alias Name(s):
Alias ID: 101
Alias Name: US ARMY DETROIT ARSL CHRYSLER TEST TRACK
Alias Address: Not reported
MI
Alias ID: 301
Alias Name: US ARMY TANK AUTOMOTIVE COMMAND
Alias Address: Not reported
MACOMB, MI
Alias ID: 302
Alias Name: DETROIT ARSENAL TANK PLANT
Alias Address: Not reported
Not reported
Alias ID: 5270233
Alias Name: TANK AUTOMOTIVE COMMAND
Alias Address: 6501 E. 11 MILE RD MACOMB COUNTY
WARREN, MI 46744
Alias Comments: Not reported
Site Description: Currently one operable unit, divided into 40 Areas Requiring Environmental Evaluation (AREEs).

CERCLIS Assessment History:

Action Code: 001
Action: DISCOVERY
Date Started: Not reported
Date Completed: 08/01/1980
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: EPA Fund-Financed
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 001
Action: PRELIMINARY ASSESSMENT
Date Started: Not reported
Date Completed: 12/11/1987
Priority Level: Higher priority for further assessment
Operable Unit: SITEWIDE
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

For detailed financial records, contact EDR for a Site Report.:

Action Code:	003
Action:	FEDERAL FACILITY REMOVAL
Date Started:	11/01/1998
Date Completed:	09/27/2000
Priority Level:	Partially Cleaned up
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	FEDERAL FACILITY REMEDIAL ACTION
Date Started:	11/10/1998
Date Completed:	09/27/2000
Priority Level:	Not reported
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	FEDERAL FACILITY REMEDIAL INVESTIGATION
Date Started:	02/22/1996
Date Completed:	09/27/2000
Priority Level:	Not reported
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	002
Action:	FEDERAL FACILITY REMOVAL
Date Started:	11/01/1998
Date Completed:	09/27/2000
Priority Level:	Partially Cleaned up
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Action Code:	001
Action:	FEDERAL FACILITY REMOVAL
Date Started:	03/11/1998
Date Completed:	09/27/2000
Priority Level:	Partially Cleaned up
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Time Critical
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	004
Action:	FEDERAL FACILITY REMOVAL
Date Started:	11/01/1998
Date Completed:	09/27/2000
Priority Level:	Partially Cleaned up
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	FEDERAL FACILITY FIVE YEAR REVIEW
Date Started:	10/31/2004
Date Completed:	10/31/2004
Priority Level:	Not reported
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Click this hyperlink while viewing on your computer to access additional US CERCLIS Financial: detail in the EDR Site Report.

CORRACTS:

EPA ID:	MI5210022781
EPA Region:	5
Area Name:	ENTIRE FACILITY
Actual Date:	1/2/1985
Action:	CA050 - RFA Completed
NAICS Code(s):	92811 National Security
Original schedule date:	Not reported
Schedule end date:	Not reported

EPA ID:	MI5210022781

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

EPA Region: 5
Area Name: ENTIRE FACILITY
Actual Date: 3/31/1994
Action: CA075ME - CA Prioritization, Facility or area was assigned a medium corrective action priority
NAICS Code(s): 92811
National Security
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MI5210022781
EPA Region: 5
Area Name: ENTIRE FACILITY
Actual Date: 4/11/1997
Action: CA210SF - CA Responsibility Referred To A Non-RCRA Federal Authority, Corrective Action at the facility or area referred to CERCLA
NAICS Code(s): 92811
National Security
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: MI5210022781
EPA Region: 5
Area Name: ENTIRE FACILITY
Actual Date: 8/16/1995
Action: CA210SF - CA Responsibility Referred To A Non-RCRA Federal Authority, Corrective Action at the facility or area referred to CERCLA
NAICS Code(s): 92811
National Security
Original schedule date: Not reported
Schedule end date: Not reported

FINDS:

Registry ID: 110006393679

Environmental Interest/Information System

AFS (Aerometric Information Retrieval System (AIRS) Facility Subsystem) replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of Aerometric Data (SAROAD). AIRS is the national repository for information concerning airborne pollution in the United States. AFS is used to track emissions and compliance data from industrial plants. AFS data are utilized by states to prepare State Implementation Plans to comply with regulatory programs and by EPA as an input for the estimation of total national emissions. AFS is undergoing a major redesign to support facility operating permits required under Title V of the Clean Air Act.

NCDB (National Compliance Data Base) supports implementation of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA). The system tracks inspections in regions and states with cooperative agreements, enforcement actions, and settlements.

The NEI (National Emissions Inventory) database contains information on stationary and mobile sources that emit criteria air pollutants and

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

their precursors, as well as hazardous air pollutants (HAPs).

US EPA TRIS (Toxics Release Inventory System) contains information from facilities on the amounts of over 300 listed toxic chemicals that these facilities release directly to air, water, land, or that are transported off-site.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System) is the Superfund database that is used to support management in all phases of the Superfund program. The system contains information on all aspects of hazardous waste sites, including an inventory of sites, planned and actual site activities, and financial information.

NY MANIFEST:

EPA ID:	MI5210022781
Country:	USA
Mailing Name:	US ARMY AMSTA RM XEM
Mailing Contact:	RICHARD MOORE
Mailing Address:	TANK AUTOMOTIVE COMMAND
Mailing Address 2:	Not reported
Mailing City:	WARREN
Mailing State:	MI
Mailing Zip:	48092
Mailing Zip4:	Not reported
Mailing Country:	USA
Mailing Phone:	810-574-5154

Document ID:	NYB8965332
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/24/1998
Trans1 Recv Date:	09/24/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/25/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLH6393OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	22444
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965341
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/24/1998
Trans1 Recv Date:	09/24/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/25/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	T882WBOH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	22907
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965359
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/30/1998
Trans1 Recv Date:	09/30/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/01/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLA6394OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	22190
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965368
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/30/1998

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Trans1 Recv Date:	09/30/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/01/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLE4228OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	19614
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965377
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/30/1998
Trans1 Recv Date:	09/30/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/01/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	PATW13213
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	18897
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965386
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/30/1998
Trans1 Recv Date:	09/30/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/01/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	OHTLA6393

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	25683
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965395
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/30/1998
Trans1 Recv Date:	09/30/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/01/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	XA71741PA
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	21038
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965404
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/30/1998
Trans1 Recv Date:	09/30/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/01/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	NJ640TSS
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	24567
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
	US ARMY TANK AUTOMOTIVE COMMAND (Continued)		**1000529952**

Document ID:	NYB8965413
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	10/20/1998
Trans1 Recv Date:	10/20/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/21/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	OHTLE4424
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	22253
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965422
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	10/20/1998
Trans1 Recv Date:	10/20/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/21/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLA6394OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	25302
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965431
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	10/29/1998
Trans1 Recv Date:	10/29/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/30/1998
Part A Recv Date:	Not reported

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLE4378OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	27388
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965449
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	10/29/1998
Trans1 Recv Date:	10/29/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	10/30/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLA6394OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	22235
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965827
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/16/1998
Trans1 Recv Date:	09/16/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/17/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLE4376OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	21410
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US ARMY TANK AUTOMOTIVE COMMAND (Continued) **1000529952**

Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965836
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/16/1998
Trans1 Recv Date:	09/16/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/17/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLE4228OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	20000
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965845
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/16/1998
Trans1 Recv Date:	09/16/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/17/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	PA13213
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	17491
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965854
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
	US ARMY TANK AUTOMOTIVE COMMAND (Continued)		**1000529952**

Trans2 State ID:	Not reported
Generator Ship Date:	09/16/1998
Trans1 Recv Date:	09/16/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/17/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLG9258OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	22889
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965863
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/15/1998
Trans1 Recv Date:	09/15/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/16/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLA6393OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	22281
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965872
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/15/1998
Trans1 Recv Date:	09/15/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/16/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
	US ARMY TANK AUTOMOTIVE COMMAND (Continued)		**1000529952**

Trans2 EPA ID:	Not reported
TSDF ID:	T862WBOH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	22507
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965881
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/15/1998
Trans1 Recv Date:	09/15/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/16/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	TLE4378OH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	21609
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00
Year:	98

Document ID:	NYB8965899
Manifest Status:	Not reported
Trans1 State ID:	OHD009865825
Trans2 State ID:	Not reported
Generator Ship Date:	09/15/1998
Trans1 Recv Date:	09/15/1998
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	09/16/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	MI5210022781
Trans1 EPA ID:	NYD049836679
Trans2 EPA ID:	Not reported
TSDF ID:	T311YSOH
Waste Code:	B007 - OTHER MISCELLANEOUS PCB WASTES
Quantity:	19069
Units:	K - Kilograms (2.2 pounds)
Number of Containers:	001
Container Type:	DT - Dump trucks
Handling Method:	L Landfill.
Specific Gravity:	01.00

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
	US ARMY TANK AUTOMOTIVE COMMAND (Continued)		**1000529952**

Year: 98

Click this hyperlink while viewing on your computer to access
54 additional NY_MANIFEST: record(s) in the EDR Site Report.

A7 **Target** **Property**	**6501 EAST 11 MILE RD BUILDING 7 AIR LAB** **6501 EAST 11 MILE RD BUILDING 7 AIR LAB** **WARREN, MI 48397**	**ERNS**	**98433784** **N/A**

Site 7 of 15 in cluster A

Actual:
619 ft.

Click this hyperlink while viewing on your computer to access
additional ERNS detail in the EDR Site Report.

A8 **Target** **Property**	**U S ARMY GARRISON - MICHIGAN** **6501 E 11 MILE RD** **WARREN, MI 48397**	**AIRS**	**S110531763** **N/A**

Site 8 of 15 in cluster A

Actual:
619 ft.

AIRS:

State Registration Number:	B2763
Naics Code:	Not reported
Contact Name:	ROBERT RIPARIP
Contact Phone:	5865746308
Contact Address:	US ARMY GARRISON - MICHIGAN
Contact Address 2:	6501 E ELEVEN MILE ROAD
Contact City,St,Zip:	WARREN, MI 48397
Permit Number:	566-96B
Date Received:	2/24/2006
State Registration Number:	B2763
Country:	Not reported
Application Reason:	FUEL VARIETY, REMOVE EUWOODWORK
Record Type:	Not reported
State County FIPS:	Not reported
Facility Category:	Not reported
SIC Primary:	Not reported
Tribal Code:	Not reported
EI Year:	Not reported

Facility:

Facility Site(FS) Identifier:	B2763
FS Program System Code:	MIDEQ
State And County Fips Code:	26099
Tribal Code:	Not reported
State And Country FIPS Code:	Not reported
EIS FS Identifier:	13772
Effective Date:	Not reported
End Date:	Not reported
Organization Formal Name:	Not reported
Affiliation Type Code:	Not reported
Facility Category Code:	Not reported
FS Name:	U.S. Army Garrison-Detroit Arsenal
FS Description:	Not reported
FS Status Code:	OP
FS Status Code Year:	2008
FS Comment:	Not reported

MAP FINDINGS

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number

U S ARMY GARRISON - MICHIGAN (Continued) **S110531763**

NAICS Code:	928110
Location Address Text:	6501 E Eleven Mile Rd
Supplemental Location Text:	IMWE-MIG-PWE, MS#117
Locality Name:	WARREN
Location Address State Code:	MI
Location Address Postal Code:	48397
Location Address Country Code:	USA
Address Comment:	Not reported

A9 Target Property **ARMY, DEPARTMENT OF THE** **MLTS** **1006331027**
6501 EAST ELEVEN MILE ROAD **N/A**
WARREN, MI 48397

Site 9 of 15 in cluster A

Actual: 619 ft.

MLTS:

License Number:	21-01222-05
First License Date:	01/05/1976
License Date:	01/26/2004
Lic. Expiration Date:	09/30/2012
Contact Name:	KAREN LAPAJENKO MCQUIRE, RSO
Contact Phone:	586/574-7635
Institution Code:	1222
Primary Program:	Not reported
Department:	U.S. ARMY TANK AUTOMOTIVE COMMAND
Building:	ATTN: AMSTA-CS-CZ
States Allowing Use:	Not reported
License Use:	Not reported
Store Material Use:	No
Redistribution Use:	No
Incinerate Use:	No
Burial Use:	No
Last Inspection Date:	04/2008
Next Inspection Date:	04/2013
Inspector Name:	HAYS
Status:	Not reported

A10 Target Property **U S ARMY TANK-AUTO COMMAND** **AIRS** **S110531764**
6501 E 11 MILE RD **N/A**
WARREN, MI 48397

Site 10 of 15 in cluster A

Actual: 619 ft.

AIRS:

State Registration Number:	B2763
Naics Code:	Not reported
Contact Name:	JAMES PARK
Contact Phone:	5865746308
Contact Address:	U S ARMY TACOM, AMSTA-CM-XE
Contact Address 2:	MS#117, 6501 E 11 MILE ROAD
Contact City,St,Zip:	WARREN, MI 48397
Permit Number:	146-02
Date Received:	6/10/2002
State Registration Number:	B2763
Country:	Not reported

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

U S ARMY TANK-AUTO COMMAND (Continued) **S110531764**

Application Reason:	VENTILATION HOOD FOR CAN CRUSHING OPERATION
Record Type:	Not reported
State County FIPS:	Not reported
Facility Category:	Not reported
SIC Primary:	Not reported
Tribal Code:	Not reported
EI Year:	Not reported

Facility:

Facility Site(FS) Identifier:	B2763
FS Program System Code:	MIDEQ
State And County Fips Code:	26099
Tribal Code:	Not reported
State And Country FIPS Code:	Not reported
EIS FS Identifier:	13772
Effective Date:	Not reported
End Date:	Not reported
Organization Formal Name:	Not reported
Affiliation Type Code:	Not reported
Facility Category Code:	Not reported
FS Name:	U.S. Army Garrison-Detroit Arsenal
FS Description:	Not reported
FS Status Code:	OP
FS Status Code Year:	2008
FS Comment:	Not reported
NAICS Code:	928110
Location Address Text:	6501 E Eleven Mile Rd
Supplemental Location Text:	IMWE-MIG-PWE, MS#117
Locality Name:	WARREN
Location Address State Code:	MI
Location Address Postal Code:	48397
Location Address Country Code:	USA
Address Comment:	Not reported

A11 Target Property **US DEPT/DEFENSE** **RCRA-NonGen** **1000531295**
6400 E 11 MILE RD **MI8210090405**
WARREN, MI 48092

Site 11 of 15 in cluster A

Actual: 619 ft.

RCRA-NonGen:

Date form received by agency:	04/05/2001
Facility name:	US DEPT/DEFENSE
Facility address:	6400 E 11 MILE RD WARREN, MI 48092
EPA ID:	MI8210090405
Mailing address:	6501 E 11 MILE RD WARREN, MI 48092
Contact:	ROBERT FOREST
Contact address:	6400 E 11 MILE RD WARREN, MI 48092
Contact country:	US
Contact telephone:	(313) 574-6806
Contact email:	Not reported
EPA Region:	05
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

US DEPT/DEFENSE (Continued) **1000531295**

Owner/Operator Summary:

Owner/operator name:	NO ACTIVE O/OP AS NOT GENERATING WASTE
Owner/operator address:	Not reported
	Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	04/06/2001
Owner/Op end date:	Not reported

Owner/operator name:	NO ACTIVE O/OP AS NOT GENERATING WASTE
Owner/operator address:	Not reported
	Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	04/06/2001
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Historical Generators:

Date form received by agency:	11/12/1991
Facility name:	US DEPT/DEFENSE
Classification:	Not a generator, verified

Hazardous Waste Summary:

Waste code:	D001
Waste name:	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Violation Status:	No violations found

MAP FINDINGS

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
A12 Target Property	**ADMIN BLDG 270 / PARKING STRUCTURE BLDG 271 6501 E ELEVEN MILE ROAD WARREN, MI 48397**	**NPDES**	**S109685546 N/A**

Site 12 of 15 in cluster A

Actual: 619 ft.

MI NPDES:

Permit Number:	MIR111105
Permitee PO Box:	N
Permitee Email:	Not reported
Issue Date:	5/22/2009
Effective Date:	5/22/2009
Expiration Date:	5/19/2011
Permittee Name:	US Army - Detroit Arsenal
Permittee Address:	6501 E Eleven Mile Road
Permittee Addr2:	Not reported
Permittee City,St,Zip:	Warren, MI 48397
Permit Type:	NOC
Facility Name 2:	Not reported
Facility Name 3:	Not reported
Facility Name 4:	Not reported
Designed Name:	US Army-Bldg 270 & Bldg 271
Latitude:	42.493200000000002
Lat Direction:	N
Lat Type Code:	LAT
Longitude:	-83.044070000000005
Lon Direction:	W
Lon Type Code:	LON
Hydrologic Unit Code:	Not reported

A13 Target Property	**TANK-AUTOMOTIVE ARMAMENTS COMMAND 6501 EAST 11 MILE TANK-AUTOMOTIVE ARMAMENTS COMMAND 6501 EAST 11 MILE WARREN, MI 48397**	**ERNS**	**98433793 N/A**

Site 13 of 15 in cluster A

Actual: 619 ft.

Click this hyperlink while viewing on your computer to access additional ERNS detail in the EDR Site Report.

A14 Target Property	**DETROIT ARSENAL ARRA REPAIR ROADS IMA312958J 6501 EAST 11 MILE ROAD WARREN, MI 48397**	**NPDES**	**S110364317 N/A**

Site 14 of 15 in cluster A

Actual: 619 ft.

MI NPDES:

Permit Number:	MIR111478
Permitee PO Box:	N
Permitee Email:	Not reported
Issue Date:	7/9/2010
Effective Date:	7/9/2010
Expiration Date:	5/24/2011
Permittee Name:	US Army Garrison, Detroit Arsenal
Permittee Address:	6501 East Eleven Mile Road
Permittee Addr2:	Building 205
Permittee City,St,Zip:	Warren, MI 48397
Permit Type:	NOC
Facility Name 2:	Not reported
Facility Name 3:	Not reported

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT ARSENAL ARRA REPAIR ROADS IMA312958J (Continued) **S110364317**

Facility Name 4:	Not reported
Designed Name:	US Army-Dt Ars ARRA Repair Rds
Latitude:	42.504399999999997
Lat Direction:	N
Lat Type Code:	LAT
Longitude:	-83.044439999999994
Lon Direction:	W
Lon Type Code:	LON
Hydrologic Unit Code:	Not reported

A15 Target Property | **DETROIT ARSENAL COMMERCIAL VEHICLE ACCESS CONTROL** | **NPDES** | **S110301012**
6501 EAST 11 MILE ROAD | **N/A**
WARREN, MI 48397

Site 15 of 15 in cluster A

Actual: 619 ft.

MI NPDES:

Permit Number:	MIR111372
Permitee PO Box:	N
Permitee Email:	Not reported
Issue Date:	3/25/2010
Effective Date:	3/25/2010
Expiration Date:	8/3/2011
Permittee Name:	Detroit Arsenal
Permittee Address:	6501 East 11 Mile Road
Permittee Addr2:	Not reported
Permittee City,St,Zip:	Warren, MI 48397
Permit Type:	NOC
Facility Name 2:	Not reported
Facility Name 3:	Not reported
Facility Name 4:	Not reported
Designed Name:	Detroit Arsenal Comm Access
Latitude:	42.504399999999997
Lat Direction:	N
Lat Type Code:	LAT
Longitude:	-83.044439999999994
Lon Direction:	W
Lon Type Code:	LON
Hydrologic Unit Code:	Not reported

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16 South 1/8-1/4 0.198 mi. 1047 ft. | **MSP INDUSTRIES CORP DEL** | **RCRA-NonGen FINDS** | **1000119639**
6400 E 11 MILE RD | **MID005317060**
CENTER LINE, MI 48015

Relative: Higher

Actual: 620 ft.

RCRA-NonGen:

Date form received by agency:	07/15/1980
Facility name:	MSP INDUSTRIES CORP DEL
Facility address:	6400 E 11 MILE RD CENTER LINE, MI 48015
EPA ID:	MID005317060
Contact:	WILLIAM BUHLER
Contact address:	6400 E 11 MILE RD CENTER LINE, MI 48015
Contact country:	US

MAP FINDINGS

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number

MSP INDUSTRIES CORP DEL (Continued) **1000119639**

Contact telephone: (313) 754-2400
Contact email: Not reported
EPA Region: 05
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: NO ACTIVE O/OP AS NOT GENERATING WASTE
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/03/1970
Owner/Op end date: Not reported

Owner/operator name: NO ACTIVE O/OP AS NOT GENERATING WASTE
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/03/1970
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Violation Status: No violations found

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

MSP INDUSTRIES CORP DEL (Continued) **1000119639**

FINDS:

Registry ID: 110008443498

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

17
East
1/8-1/4
0.212 mi.
1120 ft.

DETROIT TESTING LABORATORY INC
27485 GEORGE MERRELLI DR
WARREN, MI 48092

RCRA-SQG **1010319529**
MIK219975562

Relative:
Higher

Actual:
620 ft.

RCRA-SQG:

Date form received by agency:	04/07/2010
Facility name:	DETROIT TESTING LABORATORY INC
Facility address:	27485 GEORGE MERRELLI DR WARREN, MI 48092
EPA ID:	MIK219975562
Contact:	ROBERT DISANTO
Contact address:	27485 GEORGE MERRELLI DR WARREN, MI 48092
Contact country:	US
Contact telephone:	(586) 754-9000
Contact email:	Not reported
EPA Region:	05
Land type:	Private
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	ALFREDO APOLLONI
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	09/10/2006
Owner/Op end date:	Not reported

Owner/operator name:	ALFREDO APOLLONI
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DETROIT TESTING LABORATORY INC (Continued) **1010319529**

Owner/Operator Type: Owner
Owner/Op start date: 09/10/2006
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 03/13/2009
Facility name: DETROIT TESTING LABORATORY INC
Classification: Small Quantity Generator

Date form received by agency: 03/02/2007
Facility name: DETROIT TESTING LABORATORY INC
Classification: Small Quantity Generator

Date form received by agency: 10/24/2006
Facility name: DETROIT TESTING LABORATORY INC
Classification: Small Quantity Generator

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Violation Status: No violations found

Evaluation Action Summary:
Evaluation date: 08/29/2007
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
18 SE 1/8-1/4 0.221 mi. 1167 ft.	**SCHWARTZ INDUSTRIES INC 6909 E 11 MILE RD WARREN, MI 48092**	**RCRA-CESQG FINDS**	**1000435258 MID005519764**

Relative:
Higher

Actual:
621 ft.

RCRA-CESQG:

Date form received by agency:	07/08/2004
Facility name:	SCHWARTZ INDUSTRIES INC
Facility address:	6909 E 11 MILE RD WARREN, MI 48092
EPA ID:	MID005519764
Contact:	MICHAEL RIEDEL
Contact address:	6909 E 11 MILE RD WARREN, MI 48092
Contact country:	US
Contact telephone:	(586) 759-1777
Contact email:	Not reported
EPA Region:	05
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	SCHWARTZ INDUSTRIES INC
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	01/01/1987
Owner/Op end date:	Not reported

Owner/operator name:	SCHWARTZ INDUSTRIES INC
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	01/01/1987
Owner/Op end date:	Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

SCHWARTZ INDUSTRIES INC (Continued) **1000435258**

Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Historical Generators:

Date form received by agency:	11/13/1984
Facility name:	SCHWARTZ INDUSTRIES INC
Classification:	Small Quantity Generator

Hazardous Waste Summary:

Waste code:	D001
Waste name:	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Violation Status:	No violations found

FINDS:

Registry ID: 110008444059

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

19
NNE
1/8-1/4
0.226 mi.
1192 ft.

DUCT CONNECTION & SHEET METAL ACQUISITION CO
28408 LORNA DR
WARREN, MI 48092

RCRA-CESQG **1007099139**
MIK628214843

Relative:
Higher

Actual:
620 ft.

RCRA-CESQG:

Date form received by agency:	12/12/2006
Facility name:	DUCT CONNECTION & SHEET METAL ACQUISITION CO
Facility address:	28408 LORNA DR WARREN, MI 48092
EPA ID:	MIK628214843

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

DUCT CONNECTION & SHEET METAL ACQUISITION CO (Continued) **1007099139**

Contact:	NATHAN DECKER
Contact address:	28408 LORNA DR WARREN, MI 48092
Contact country:	US
Contact telephone:	(248) 670-6352
Contact email:	Not reported
EPA Region:	05
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	DUCT CONNECTION & SHEET METAL ACQ.
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	11/30/2004
Owner/Op end date:	Not reported

Owner/operator name:	DUCT CONNECTION & SHEET METAL ACQ.
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	11/30/2004
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No

MAP FINDINGS

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number

DUCT CONNECTION & SHEET METAL ACQUISITION CO (Continued) **1007099139**

Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 09/23/2002
Facility name: DUCT CONNECTION & SHEET METAL ACQUISITION CO
Classification: Not a generator, verified

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Violation Status: No violations found

B20
NE
1/8-1/4
0.235 mi.
1243 ft.

BRIDGEWATER INTERIORS LLC
7500 TANK AVE
WARREN, MI 48092

RCRA-CESQG **1004725677**
FINDS **MIR000049247**

Site 1 of 3 in cluster B

Relative:
Higher

Actual:
620 ft.

RCRA-CESQG:
Date form received by agency: 11/24/2004
Facility name: BRIDGEWATER INTERIORS LLC
Facility address: 7500 TANK AVE
WARREN, MI 48092
EPA ID: MIR000049247
Contact: NANCY REZICH
Contact address: 7500 TANK AVE
WARREN, MI 48092
Contact country: US
Contact telephone: (586) 753-3000
Contact email: Not reported
EPA Region: 05
Land type: Private
Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

BRIDGEWATER INTERIORS LLC (Continued) **1004725677**

Owner/Operator Summary:

Owner/operator name:	BRIDGEWATER INTERIORS LLC
Owner/operator address:	Not reported
	Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	09/15/2003
Owner/Op end date:	Not reported

Owner/operator name:	BRIDGEWATER INTERIORS LLC
Owner/operator address:	Not reported
	Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	09/15/2003
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Universal Waste Summary:

Waste type:	Batteries
Accumulated waste on-site:	Yes
Generated waste on-site:	Yes

Waste type:	Lamps
Accumulated waste on-site:	Yes
Generated waste on-site:	Yes

Historical Generators:

Date form received by agency:	12/06/2001
Facility name:	BRIDGEWATER INTERIORS LLC
Classification:	Conditionally Exempt Small Quantity Generator

Date form received by agency:	08/03/2000
Facility name:	BRIDGEWATER INTERIORS LLC
Classification:	Small Quantity Generator

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

BRIDGEWATER INTERIORS LLC (Continued) **1004725677**

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Violation Status: No violations found

Evaluation Action Summary:
Evaluation date: 11/06/2001
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

FINDS:

Registry ID: 110003715613

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

B21 **COLLINS AND AIKMAN PRODUCTS CO** **RCRA-NonGen** **1007098887**
NE **7500 TANK AVE** **MIK581716347**
1/8-1/4 **WARREN, MI 48093**
0.235 mi.
1243 ft. **Site 2 of 3 in cluster B**

Relative: Higher

Actual: 620 ft.

RCRA-NonGen:
Date form received by agency: 10/31/2008
Facility name: COLLINS AND AIKMAN PRODUCTS CO
Facility address: 7500 TANK AVE
WARREN, MI 48093
EPA ID: MIK581716347
Contact: DAN YERT
Contact address: 7500 TANK AVE
WARREN, MI 48093
Contact country: US
Contact telephone: (810) 588-8230
Contact email: Not reported
EPA Region: 05
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: NO ACTIVE O/OP AS NOT GENERATING WASTE
Owner/operator address: Not reported

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

COLLINS AND AIKMAN PRODUCTS CO (Continued) **1007098887**

	Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	09/02/2003
Owner/Op end date:	Not reported

Owner/operator name:	NO ACTIVE O/OP AS NOT GENERATING WASTE
Owner/operator address:	Not reported
	Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	09/02/2003
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Historical Generators:

Date form received by agency:	07/31/2001
Facility name:	COLLINS AND AIKMAN PRODUCTS CO
Classification:	Conditionally Exempt Small Quantity Generator

Hazardous Waste Summary:

Waste code:	D001
Waste name:	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Violation Status:	No violations found

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
B22 NE 1/8-1/4 0.235 mi. 1243 ft.	**DETROIT ARSENAL PROPERTY (FORMER) 7500 TANK AVENUE WARREN, MI Site 3 of 3 in cluster B**	**BEA**	**S107466584 N/A**

Relative:
Higher

Actual:
620 ft.

BEA:

Secondary Address:	Not reported
BEA Number:	2987
District:	Southeast MI
Date Received:	2005-12-08 00:59:00
Submitter Name:	JC-Warren MI, LLC
Petition Determination:	Affirmed
Petition Disclosure:	1
Category:	Same Hazardous Substance(s)
Determination 20107A:	No Request
Reviewer:	ndukwee
Division Assigned:	Environmental Response Division

Secondary Address:	Not reported
BEA Number:	1226
District:	Southeast MI
Date Received:	2000-10-16 00:00:00
Submitter Name:	JOHNSON CONTROLS, INC.
Petition Determination:	No Request
Petition Disclosure:	0
Category:	Same Hazardous Substance(s)
Determination 20107A:	No Request
Reviewer:	temppm
Division Assigned:	Environmental Response Division

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23 SSW 1/8-1/4 0.237 mi. 1250 ft.	**MELROSE VARNEY 6200 E 11 MILE RD WARREN, MI 48091**	**UST**	**U003324436 N/A**

Relative:
Lower

Actual:
617 ft.

UST:

Facility ID:	00019590
Facility Type:	CLOSED
Latitude:	42.4910640000
Longitude:	-83.0422880000
Owner Name:	Melrose Varney
Owner Address:	6200 E 11 Mile Rd
Owner City,St,Zip:	Warren, MI 48091-1293
Owner Country:	USA
Owner Contact:	Not reported
Owner Phone:	(313) 749-3907
Contact:	WM. PIFER
Contact Phone:	(313) 756-2600
Date of Collection:	01-11-2001
Accuracy:	100
Accuracy Value Unit:	FEET
Horizontal Datum:	NAD83
Source:	STATE OF MICHIGAN
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Method of Collection:	Address Matching-House Number

Tank ID:	1

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

MELROSE VARNEY (Continued) **U003324436**

Tank Status:	**Removed from Ground**
Capacity:	6000
Install Date:	May 12 1968
Product:	Gasoline
Remove Date:	Dec 21 1988
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Galvanized Steel
Piping Type:	Not reported
Constr Material:	Asphalt Coated or Bare Steel
Impressed Device:	No

Tank ID:	2
Tank Status:	**Removed from Ground**
Capacity:	10000
Install Date:	May 12 1968
Product:	Gasoline
Remove Date:	Dec 21 1988
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Galvanized Steel
Piping Type:	Not reported
Constr Material:	Asphalt Coated or Bare Steel
Impressed Device:	No

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24 **VOLKSWAGEN OF AMERICA, INC** **LUST** **S105213498**
ESE **7111 E 11 MILE RD** **N/A**
1/4-1/2 **WARREN, MI 48092**
0.282 mi.
1487 ft.

Relative:
Higher

Actual:
623 ft.

LUST:

Facility ID:	00010856
Source:	STATE OF MICHIGAN
Owner Name:	Vorelco, Inc
Owner Address:	Po Box 70503800 Hamlin Rd #(4A01)
Owner City,St,Zip:	Auburn Hills, MI 48326
Owner Contact:	Not reported
Owner Phone:	(734) 362-7292
Country:	USA
District:	SE Michigan District Office
Site Name:	Volkswagen Of America, Inc
Latitude:	42.4918400000
Longitude:	-83.0362540000
Date of Collection:	01-11-2001
Method of Collection:	Address Matching-House Number
Accuracy:	100
Accuracy Value Unit:	FEET
Horizontal Data:	NAD83
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)

Leak Number:	C-1227-90
Release Date:	Jul 10 1990
Substance Released:	Not reported
Release Status:	Closed
Release Closed Date:	Jul 18 2005

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
C25 **West** **1/4-1/2** **0.309 mi.** **1634 ft.**	**FIRST STATE BANK PROPERTY** **27483 MOUND ROAD** **WARREN, MI** **Site 1 of 2 in cluster C**	**SHWS**	**S105144332** **N/A**

Relative:
Lower

Actual:
615 ft.

SHWS:

Facility ID:	50000109
Facility Status:	**Interim Response in progress**
Source:	Printing & Publishing
SAM Score:	26
SAM Score Date:	9/26/1991
Township:	01N
Range:	12E
Section:	17
Quarter:	SE
Quarter/Quarter:	SE
Pollutants:	Benzene; Ethylbenzene; Toluene; Xylenes

C26 **West** **1/4-1/2** **0.311 mi.** **1641 ft.**	**A & J INSULATION CORP** **27439 MOUND RD** **WARREN, MI 48092** **Site 2 of 2 in cluster C**	**LUST** **UST**	**U002302109** **N/A**

Relative:
Lower

Actual:
615 ft.

LUST:

Facility ID:	00038155
Source:	STATE OF MICHIGAN
Owner Name:	Hedy Jaracz
Owner Address:	5733 Main St Apt 10
Owner City,St,Zip:	Lexington, MI 48450-8868
Owner Contact:	Not reported
Owner Phone:	(810) 359-5318
Country:	USA
District:	SE Michigan District Office
Site Name:	A & J Insulation Company
Latitude:	42.4968580000
Longitude:	-83.0468450000
Date of Collection:	01-11-2001
Method of Collection:	Address Matching-House Number
Accuracy:	100
Accuracy Value Unit:	FEET
Horizontal Data:	NAD83
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Leak Number:	C-1155-94
Release Date:	Oct 5 1994
Substance Released:	Gasoline
Release Status:	Closed
Release Closed Date:	Jan 11 1995

UST:

Facility ID:	00038155
Facility Type:	CLOSED
Latitude:	42.4968580000
Longitude:	-83.0468450000
Owner Name:	Hedy Jaracz
Owner Address:	5733 Main St Apt 10
Owner City,St,Zip:	Lexington, MI 48450-8868

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

A & J INSULATION CORP (Continued) **U002302109**

Owner Country:	USA
Owner Contact:	Not reported
Owner Phone:	(810) 359-5318
Contact:	GLORIA JARACZ
Contact Phone:	(810) 751-4545
Date of Collection:	01-11-2001
Accuracy:	100
Accuracy Value Unit:	FEET
Horizontal Datum:	NAD83
Source:	STATE OF MICHIGAN
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Method of Collection:	Address Matching-House Number

Tank ID:	1
Tank Status:	**Removed from Ground**
Capacity:	2000
Install Date:	Jan 1 1970
Product:	Gasoline
Remove Date:	Oct 24 1994
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Unknown
Piping Type:	Not reported
Constr Material:	Unknown
Impressed Device:	No

D27 **INDUSTRIAL PROPERTY** **BEA** **S110142520**
West **27365 MOUND ROAD** **N/A**
1/4-1/2 **WARREN, MI 48092**
0.313 mi.
1652 ft. **Site 1 of 3 in cluster D**

Relative:
Lower

Actual:
615 ft.

BEA:

Secondary Address:	Not reported
BEA Number:	4367
District:	Southeast MI
Date Received:	2010-01-29 00:59:00
Submitter Name:	Comerica Bank
Petition Determination:	No Request
Petition Disclosure:	0
Category:	No Hazardous Substance(s)
Determination 20107A:	No Request
Reviewer:	ndukwee
Division Assigned:	Environmental Response Division

D28 **NORMAN WINSKY** **LUST** **1001155626**
West **27275 MOUND RD** **UST** **N/A**
1/4-1/2 **WARREN, MI 48092**
0.313 mi.
1654 ft. **Site 2 of 3 in cluster D**

Relative:
Lower

Actual:
618 ft.

LUST:

Facility ID:	00037052
Source:	STATE OF MICHIGAN
Owner Name:	Norman Winsky

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NORMAN WINSKY (Continued) **1001155626**

Owner Address:	27275 Mound Rd
Owner City,St,Zip:	Warren, MI 48092-4554
Owner Contact:	Not reported
Owner Phone:	(810) 751-4434
Country:	USA
District:	SE Michigan District Office
Site Name:	Norman Winsky
Latitude:	42.4959930000
Longitude:	-83.0468210000
Date of Collection:	01-11-2001
Method of Collection:	Address Matching-House Number
Accuracy:	100
Accuracy Value Unit:	FEET
Horizontal Data:	NAD83
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Leak Number:	C-0051-96
Release Date:	Jan 22 1996
Substance Released:	Diesel
Release Status:	Closed
Release Closed Date:	Feb 7 1996

UST:

Facility ID:	00037052
Facility Type:	CLOSED
Latitude:	42.4959930000
Longitude:	-83.0468210000
Owner Name:	Norman Winsky
Owner Address:	27275 Mound Rd
Owner City,St,Zip:	Warren, MI 48092-4554
Owner Country:	USA
Owner Contact:	Not reported
Owner Phone:	(810) 751-4434
Contact:	NORMAN WINSKY
Contact Phone:	(810) 751-3344
Date of Collection:	01-11-2001
Accuracy:	100
Accuracy Value Unit:	FEET
Horizontal Datum:	NAD83
Source:	STATE OF MICHIGAN
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Method of Collection:	Address Matching-House Number
Tank ID:	1
Tank Status:	**Removed from Ground**
Capacity:	2000
Install Date:	Jan 1 1971
Product:	Diesel
Remove Date:	Jan 10 1996
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Unknown
Piping Type:	Not reported
Constr Material:	Unknown
Impressed Device:	No

MAP FINDINGS

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number

NORMAN WINSKY (Continued) **1001155626**

Tank ID:	2
Tank Status:	**Removed from Ground**
Capacity:	8000
Install Date:	May 1 1979
Product:	Diesel
Remove Date:	Jan 10 1996
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Unknown
Piping Type:	Not reported
Constr Material:	Unknown
Impressed Device:	No

Tank ID:	3
Tank Status:	**Removed from Ground**
Capacity:	10000
Install Date:	May 1 1979
Product:	Diesel
Remove Date:	Jan 10 1996
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Unknown
Piping Type:	Not reported
Constr Material:	Unknown
Impressed Device:	No

D29 **WINSKY TRUCKING** **BEA** **S106521688**
West **27275 MOUND ROAD** **N/A**
1/4-1/2 **WARREN, MI**
0.313 mi.
1654 ft. **Site 3 of 3 in cluster D**

Relative:
Lower

Actual:
618 ft.

BEA:

Secondary Address:	Not reported
BEA Number:	2490
District:	Southeast MI
Date Received:	2004-08-11 00:59:00
Submitter Name:	Center Lane Investments, LLC
Petition Determination:	No Request
Petition Disclosure:	0
Category:	Same Hazardous Substance(s)
Determination 20107A:	No Request
Reviewer:	ndukwee
Division Assigned:	Environmental Response Division

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30 **NW CORNER 1696 & LAWRENCE AVE** **LUST** **U003330424**
SE **26829 LAWRENCE** **UST** **N/A**
1/4-1/2 **CENTER LINE, MI 48015**
0.392 mi.
2070 ft.

Relative:
Higher

Actual:
620 ft.

LUST:

Facility ID:	00039513
Source:	STATE OF MICHIGAN
Owner Name:	Binsons Hospital Supplies Inc

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NW CORNER 1696 & LAWRENCE AVE (Continued) **U003330424**

Owner Address:	26834 Lawrence
Owner City,St,Zip:	Center Line, MI 48015-1262
Owner Contact:	Not reported
Owner Phone:	(810) 755-2300
Country:	USA
District:	SE Michigan District Office
Site Name:	Nw Corner 1696 & Lawrence Ave
Latitude:	42.4908150000
Longitude:	-83.0328820000
Date of Collection:	08-03-2002
Method of Collection:	GPS Code Meas. Standard Positioning Service SA Off
Accuracy:	10
Accuracy Value Unit:	METERS
Horizontal Data:	NAD83
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Leak Number:	C-0807-97
Release Date:	Sep 24 1997
Substance Released:	Diesel,Unknown
Release Status:	Closed
Release Closed Date:	Feb 20 1998

UST:

Facility ID:	00039513
Facility Type:	CLOSED
Latitude:	42.4908150000
Longitude:	-83.0328820000
Owner Name:	Binsons Hospital Supplies Inc
Owner Address:	26834 Lawrence
Owner City,St,Zip:	Center Line, MI 48015-1262
Owner Country:	USA
Owner Contact:	Not reported
Owner Phone:	(810) 755-2300
Contact:	JAMES E BINSON
Contact Phone:	(810) 755-2300
Date of Collection:	08-03-2002
Accuracy:	10
Accuracy Value Unit:	METERS
Horizontal Datum:	NAD83
Source:	STATE OF MICHIGAN
Point Line Area:	POINT
Desc Category:	Plant Entrance (Freight)
Method of Collection:	GPS Code Meas. Standard Positioning Service SA Off
Tank ID:	1
Tank Status:	**Removed from Ground**
Capacity:	1000
Install Date:	Not reported
Product:	Diesel
Remove Date:	Sep 9 1997
Tank Release Detection:	Not reported
Pipe Realease Detection:	Not reported
Piping Material:	Unknown
Piping Type:	Not reported
Constr Material:	Asphalt Coated or Bare Steel
Impressed Device:	No

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
31 NNE 1/4-1/2 0.423 mi. 2234 ft.	**SENATE STEEL CORPORATION 28408 LORNA DRIVE WARREN, MI**	**BEA**	**S105541877 N/A**

Relative:
Lower

Actual:
616 ft.

BEA:

Secondary Address:	Not reported
BEA Number:	1800
District:	Southeast MI
Date Received:	2002-08-30 00:59:00
Submitter Name:	SENNETT STEEL CORPORATION
Petition Determination:	No Request
Petition Disclosure:	0
Category:	Same Hazardous Substance(s)
Determination 20107A:	No Request
Reviewer:	ndukwee
Division Assigned:	Environmental Response Division

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32 NNE 1/2-1 0.603 mi. 3182 ft.	**MOLD TECH 28750 LORNA WARREN, MI**	**SHWS**	**S108959516 N/A**

Relative:
Lower

Actual:
616 ft.

SHWS:

Facility ID:	50000620
Facility Status:	**Inactive - no actions taken to address contamination**
Source:	Fabricated Metal Products
SAM Score:	20
SAM Score Date:	12/23/2003
Township:	Not reported
Range:	Not reported
Section:	Not reported
Quarter:	Not reported
Quarter/Quarter:	Not reported
Pollutants:	Not reported

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33 ENE 1/2-1 0.621 mi. 3279 ft.	**DETROIT ARSENAL - BLDG 200C 28251 VAN DYKE WARREN, MI 48015**	**SHWS**	**S103095151 N/A**

Relative:
Higher

Actual:
620 ft.

SHWS:

Facility ID:	50000088
Facility Status:	**Interim Response in progress**
Source:	National Security
SAM Score:	26
SAM Score Date:	3/1/2004
Township:	01N
Range:	12E
Section:	16
Quarter:	Not reported
Quarter/Quarter:	Not reported
Pollutants:	1,1,1 TCA; 1,1 DCA; Pb

Count: 28 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
CENTER LINE	1014354882	CENTER LINE MS4-MACOMB	7070 E 10 MILE ROAD CTR	48015	ICIS
CENTER LINE	1008373383	CITY OF CENTER LINE	7070 E TEN MILE RD	48015	RCRA-CESQG
CENTER LINE	1012133656	CENTER LINE	7070 EAST TEN MILE ROAD	48015	FINDS
CENTER LINE	1010348623	CITY OF CENTER LINE	7070 E TEN MILE ROAD	48015	FINDS
CENTER LINE	S107791327	CITY OF CENTER LINE	7070 E TEN MILE RD	48015	NPDES
CENTER LINE	1001232632	MI DEPT/TRANSPORTATION	I-696 UNDER E BD 11 MILE RD	48015	RCRA-NonGen, FINDS
INDIAN RIVER	U003325819	PRIVATE RESIDENCE	7231 S STRAIGHTS HWY	48093	LUST, UST
MACOMB COUNTY	S110748336	INDUSTRIAL PROPERTY	35117 AUTOMATIVE DRIVE		BEA
MACOMB COUNTY	S110748378	SPECTRUM METALS	39200 GROESBECK HIGHWAY		BEA
MACOMB COUNTY	S110748392	TWGD., LLC	34977 GROESBECK HIGHWAY		BEA
MACOMB COUNTY	S110748396	VANDERBUSH INDUSTRIAL SITE (FORMER	39200 GROESBECK HIGHWAY		BEA
WARREN	S110483110	X-RAY INDUSTRIES/PPI SERVICES, LLC	23510TH & 23514 GROESBECK HWY		BEA
WARREN	S110300962	VILLAGE FAIR PLAZA SHOPPING CENTER	26688TH & 26708 RYAN RD	48091	DEL SHWS
WARREN	S105966508	FORMER VORELCO PROPERTY	7111TH & E 11 MILE RD		BEA
WARREN	S105541879	VORELCO PROPERTY	7111TH & E 11 MILE RD		BEA
WARREN	S105254574	WARREN CITY OF	1179 ACRES WEST INFIELD FOR DA	48093	BEA
WARREN	S109416764	SHERWOOD AVENUE INDUSTRIAL PROPERT	22100 AND 22200 SHERWOOD AVE	48091	BEA
WARREN	S103085412	VORELCO PROPERTY	7133 AND 7147 EAST ELEVEN MILE		SHWS
WARREN	S109416792	ZACK INVESTMENTS, LLC INDUSTRIAL P	22100 AND 22200 SHERWOOD		BEA
WARREN	8861979	IN BACK OF PROPERTY	IN BACK OF PROPERTY		ERNS
WARREN	S104912386	SYSTEM CAPITAL REAL PROPERTY CORP.	MC DONALD S CORPORATION		BEA
WARREN	S110142537	LEONARDO STRIP CENTER, LLC	7625 EIGHT MILE RD		BEA
WARREN	S110300636	SUNSHINE ALUMINUM PROPERTY	5127 EIGHT MILE RD	48091	SHWS
WARREN	S107812377	MOTION SAVERS PROPERTY	2667 E EIGHT MILE RD		BEA
WARREN	S107791255	CARBOLOY PROPERTY (FORMER)	11177 E EIGHT MILE RD		BEA
WARREN	1007100556	MODULAR TRANSPORTATION	11 MILR & BERNETT RD	48093	RCRA-NonGen
WARREN	S106096657	FORMER DATP PROPERTY	TRWY BAY 15	48093	BEA
WARREN	S109258691	POSS. GM TECH CENTER	VAN DYKE RD		SPILLS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 01/13/2011
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 15

Source: EPA
Telephone: N/A
Last EDR Contact: 04/13/2011
Next Scheduled EDR Contact: 07/25/2011
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 01/13/2011
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 15

Source: EPA
Telephone: N/A
Last EDR Contact: 04/13/2011
Next Scheduled EDR Contact: 07/25/2011
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 05/16/2011
Next Scheduled EDR Contact: 08/29/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 01/13/2011
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 15

Source: EPA
Telephone: N/A
Last EDR Contact: 04/13/2011
Next Scheduled EDR Contact: 07/25/2011
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/25/2011
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 06/03/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPAa??s Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 12/10/2010
Date Data Arrived at EDR: 01/11/2011
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/15/2011
Next Scheduled EDR Contact: 07/25/2011
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 02/25/2011
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 06/03/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 05/25/2010
Date Data Arrived at EDR: 06/02/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 124

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 05/16/2011
Next Scheduled EDR Contact: 08/29/2011
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/11/2011
Date Data Arrived at EDR: 04/05/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 04/05/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/11/2011
Date Data Arrived at EDR: 04/05/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 04/05/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/11/2011
Date Data Arrived at EDR: 04/05/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 04/05/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/11/2011
Date Data Arrived at EDR: 04/05/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 04/05/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 01/05/2011
Date Data Arrived at EDR: 01/14/2011
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/14/2011
Next Scheduled EDR Contact: 06/27/2011
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 01/05/2011
Date Data Arrived at EDR: 01/14/2011
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/14/2011
Next Scheduled EDR Contact: 06/27/2011
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 01/07/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 73

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 04/05/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Annually

State- and tribal - equivalent CERCLIS

SHWS: Contaminated Sites

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 05/02/2011
Date Data Arrived at EDR: 05/04/2011
Date Made Active in Reports: 05/25/2011
Number of Days to Update: 21

Source: Department of Natural Resources & Environment
Telephone: 517-373-9541
Last EDR Contact: 05/04/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Semi-Annually

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: Solid Waste Facilities Database

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 01/05/2011
Date Data Arrived at EDR: 01/07/2011
Date Made Active in Reports: 02/14/2011
Number of Days to Update: 38

Source: Department of Natural Resources & Environment
Telephone: 517-335-4035
Last EDR Contact: 04/04/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Semi-Annually

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank Sites
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 02/22/2011
Date Data Arrived at EDR: 02/23/2011
Date Made Active in Reports: 03/18/2011
Number of Days to Update: 23

Source: Department of Natural Resources & Environment
Telephone: 517-373-9837
Last EDR Contact: 05/24/2011
Next Scheduled EDR Contact: 09/05/2011
Data Release Frequency: Annually

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 11/04/2009
Date Data Arrived at EDR: 05/04/2010
Date Made Active in Reports: 07/07/2010
Number of Days to Update: 64

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 05/04/2010
Next Scheduled EDR Contact: 05/16/2011
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 02/03/2011
Date Data Arrived at EDR: 02/04/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 45

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 09/01/2010
Date Data Arrived at EDR: 11/05/2010
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 84

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/03/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/03/2011
Date Data Arrived at EDR: 02/04/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 45

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/31/2011
Date Data Arrived at EDR: 02/01/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 48

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 03/03/2011
Date Data Arrived at EDR: 03/18/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 45

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Semi-Annually

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 02/04/2011
Date Data Arrived at EDR: 02/04/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 45

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Quarterly

State and tribal registered storage tank lists

UST: Underground Storage Tank Facility List
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 02/22/2011
Date Data Arrived at EDR: 02/23/2011
Date Made Active in Reports: 03/22/2011
Number of Days to Update: 27

Source: Department of Natural Resources & Environment
Telephone: 517-335-4035
Last EDR Contact: 05/24/2011
Next Scheduled EDR Contact: 09/05/2011
Data Release Frequency: Annually

AST: Aboveground Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 03/21/2011
Date Data Arrived at EDR: 03/31/2011
Date Made Active in Reports: 05/11/2011
Number of Days to Update: 41

Source: Department of Natural Resources & Environment
Telephone: 517-373-8168
Last EDR Contact: 05/23/2011
Next Scheduled EDR Contact: 09/05/2011
Data Release Frequency: No Update Planned

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 02/03/2011
Date Data Arrived at EDR: 02/04/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 45

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 01/01/2011
Date Data Arrived at EDR: 02/23/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 68

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 03/03/2011
Date Data Arrived at EDR: 03/18/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 45

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Semi-Annually

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 01/31/2011
Date Data Arrived at EDR: 02/01/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 48

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 02/04/2011
Date Data Arrived at EDR: 02/04/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 45

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 11/01/2010
Date Data Arrived at EDR: 12/02/2010
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 57

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 02/03/2011
Next Scheduled EDR Contact: 05/16/2011
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/03/2011
Date Data Arrived at EDR: 02/04/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 45

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 09/01/2010
Date Data Arrived at EDR: 11/05/2010
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 84

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/03/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/18/2011
Next Scheduled EDR Contact: 08/01/2011
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

AUL: Engineering and Institutional Controls
A listing of sites with institutional and/or engineering controls in place.

Date of Government Version: 03/18/2011
Date Data Arrived at EDR: 03/18/2011
Date Made Active in Reports: 03/31/2011
Number of Days to Update: 13

Source: Department of Natural Resources & Environment
Telephone: 517-373-4828
Last EDR Contact: 06/06/2011
Next Scheduled EDR Contact: 09/19/2011
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/01/2010
Date Data Arrived at EDR: 01/05/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 75

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/05/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Brownfields and USTfield Site Database
All state funded Part 201 and 213 sites, as well as LUST sites that have been redeveloped by private entities using the BEA process. Be aware that this is not a list of all of the potential brownfield sites in Michigan.

Date of Government Version: 05/05/2011
Date Data Arrived at EDR: 05/05/2011
Date Made Active in Reports: 05/25/2011
Number of Days to Update: 20

Source: Department of Natural Resources & Environment
Telephone: 517-373-4805
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

BROWNFIELDS 2: Brownfields Building and Land Site Locations
A listing of brownfield building and land site locations. The listing is a collaborative effort of Michigan Economic Development Corporation, Michigan Economic Developers Association, Detrot Edison, Detroit Area Commercial Board of Realtors

Date of Government Version: 04/09/2007
Date Data Arrived at EDR: 04/10/2007
Date Made Active in Reports: 05/01/2007
Number of Days to Update: 21

Source: Economic Development Corporation
Telephone: 888-522-0103
Last EDR Contact: 06/06/2011
Next Scheduled EDR Contact: 09/19/2011
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 12/29/2010
Date Data Arrived at EDR: 12/30/2010
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/29/2011
Next Scheduled EDR Contact: 07/11/2011
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 03/28/2011
Next Scheduled EDR Contact: 07/11/2011
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWRCY: Recycling Facilities

A listing of recycling center locations.

Date of Government Version: 11/24/2009
Date Data Arrived at EDR: 09/30/2010
Date Made Active in Reports: 10/28/2010
Number of Days to Update: 28

Source: Department of Natural Resources & Environment
Telephone: 517-241-5719
Last EDR Contact: 04/07/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Varies

HIST LF: Inactive Solid Waste Facilities

The database contains historical information and is no longer updated.

Date of Government Version: 03/01/1997
Date Data Arrived at EDR: 02/28/2003
Date Made Active in Reports: 03/06/2003
Number of Days to Update: 6

Source: Department of Natural Resources & Environment
Telephone: 517-335-4034
Last EDR Contact: 02/28/2003
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/09/2011
Next Scheduled EDR Contact: 08/22/2011
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/02/2011
Date Data Arrived at EDR: 03/17/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 46

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 06/07/2011
Next Scheduled EDR Contact: 09/19/2011
Data Release Frequency: Quarterly

DEL SHWS: Delisted List of Contaminated Sites
Sites that have been delisted or deleted from the List of Contaminated Sites. The available documentation for the site does not support it's listing or the site no longer meets criteria specified in rules.

Date of Government Version: 05/05/2011
Date Data Arrived at EDR: 05/05/2011
Date Made Active in Reports: 05/25/2011
Number of Days to Update: 20

Source: Department of Natural Resources & Environment
Telephone: 517-373-9541
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

CDL: Clandestine Drug Lab Listing
A listing of clandestine drug lab locations.

Date of Government Version: 10/20/2008
Date Data Arrived at EDR: 11/18/2008
Date Made Active in Reports: 11/21/2008
Number of Days to Update: 3

Source: Department of Community Health
Telephone: 517-373-3740
Last EDR Contact: 05/03/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

Local Land Records

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 03/11/2011
Date Data Arrived at EDR: 04/05/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 04/05/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/12/2011
Date Data Arrived at EDR: 02/11/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/11/2011
Next Scheduled EDR Contact: 08/22/2011
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/21/2011
Next Scheduled EDR Contact: 08/01/2011
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 08/12/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 112

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/15/2011
Next Scheduled EDR Contact: 06/27/2011
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 10/01/2010
Date Data Arrived at EDR: 10/29/2010
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 91

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/04/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 02/25/2011
Date Data Arrived at EDR: 03/16/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 5

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/16/2011
Next Scheduled EDR Contact: 06/27/2011
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/21/2010
Date Made Active in Reports: 01/28/2011
Number of Days to Update: 99

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 06/02/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Varies

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/08/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/08/2011
Next Scheduled EDR Contact: 09/19/2011
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/17/2010
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 94

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/27/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/29/2011
Next Scheduled EDR Contact: 07/11/2011
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/27/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/27/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/07/2011
Date Data Arrived at EDR: 01/21/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 59

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 03/28/2011
Next Scheduled EDR Contact: 07/11/2011
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/01/2010
Date Data Arrived at EDR: 11/10/2010
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 98

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/22/2011
Next Scheduled EDR Contact: 08/01/2011
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/18/2010
Date Data Arrived at EDR: 04/06/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 51

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 03/14/2011
Next Scheduled EDR Contact: 06/27/2011
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/11/2011
Date Data Arrived at EDR: 01/13/2011
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/13/2011
Next Scheduled EDR Contact: 07/25/2011
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/14/2010
Date Data Arrived at EDR: 04/16/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 41

Source: EPA
Telephone: (312) 353-2000
Last EDR Contact: 03/14/2011
Next Scheduled EDR Contact: 06/27/2011
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/27/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Biennially

UIC: Underground Injection Wells Database

A listing of underground injection well locations. The UIC Program is responsible for regulating the construction, operation, permitting, and closure of injection wells that place fluids underground for storage or disposal.

Date of Government Version: 05/02/2011
Date Data Arrived at EDR: 05/04/2011
Date Made Active in Reports: 06/02/2011
Number of Days to Update: 29

Source: Department of Natural Resources & Environment
Telephone: 517-241-1515
Last EDR Contact: 05/02/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

WDS: Waste Data System

The Waste Data System (WDS) tracks activities at facilities regulated by the Solid Waste, Scrap Tire, Hazardous Waste, and Liquid Industrial Waste programs.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/28/2011
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 03/28/2011
Number of Days to Update: 27

Source: Department oF Natural Resources & Environment
Telephone: 517-373-9875
Last EDR Contact: 06/01/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Quarterly

DRYCLEANERS: Drycleaning Establishments
A listing of drycleaning facilities in Michigan.

Date of Government Version: 04/30/2011
Date Data Arrived at EDR: 05/04/2011
Date Made Active in Reports: 05/25/2011
Number of Days to Update: 21

Source: Department of Natural Resources & Environment
Telephone: 517-335-4586
Last EDR Contact: 04/25/2011
Next Scheduled EDR Contact: 08/08/2011
Data Release Frequency: Varies

NPDES: List of Active NPDES Permits
General information regarding NPDES (National Pollutant Discharge Elimination System) permits and NPDES Storm Water permits.

Date of Government Version: 04/12/2011
Date Data Arrived at EDR: 04/13/2011
Date Made Active in Reports: 05/13/2011
Number of Days to Update: 30

Source: Department of Natural Resources & Environment
Telephone: 517-241-1300
Last EDR Contact: 04/13/2011
Next Scheduled EDR Contact: 07/25/2011
Data Release Frequency: Varies

AIRS: Permit and Emissions Inventory Data
Permit and emissions inventory data.

Date of Government Version: 01/12/2011
Date Data Arrived at EDR: 01/14/2011
Date Made Active in Reports: 02/18/2011
Number of Days to Update: 35

Source: Department of Natural Resources & Environment
Telephone: 517-373-7074
Last EDR Contact: 03/31/2011
Next Scheduled EDR Contact: 07/11/2011
Data Release Frequency: Varies

BEA: BASELINE ENVIRONMENTAL ASSESSMENT DATABASE
A Baseline Environmental Assessment (BEA) allows people to purchase or begin operating at a facility without being held liable for existing contamination. BEAs are used to gather enough information about the property being transferred so that existing contamination can be distinguished from any new releases that might occur after the new owner or operator takes over the property.

Date of Government Version: 02/25/2011
Date Data Arrived at EDR: 02/25/2011
Date Made Active in Reports: 03/28/2011
Number of Days to Update: 31

Source: Department of Natural Resources & Environment
Telephone: 517-373-9541
Last EDR Contact: 05/23/2011
Next Scheduled EDR Contact: 09/05/2011
Data Release Frequency: Semi-Annually

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/21/2011
Next Scheduled EDR Contact: 08/01/2011
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 06/06/2011
Next Scheduled EDR Contact: 08/08/2011
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/19/2011
Next Scheduled EDR Contact: 08/01/2011
Data Release Frequency: Varies

FINANCIAL ASSURANCE 1: Financial Assurance Information Listing
Financial assurance information.

Date of Government Version: 01/13/2011
Date Data Arrived at EDR: 01/20/2011
Date Made Active in Reports: 02/14/2011
Number of Days to Update: 25

Source: Department of Natural Resources & Environment
Telephone: 517-335-6610
Last EDR Contact: 04/11/2011
Next Scheduled EDR Contact: 07/25/2011
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands
Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/21/2011
Next Scheduled EDR Contact: 08/01/2011
Data Release Frequency: N/A

FINANCIAL ASSURANCE 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 01/05/2011
Date Data Arrived at EDR: 01/07/2011
Date Made Active in Reports: 02/14/2011
Number of Days to Update: 38

Source: Department of Natural Resources & Environment
Telephone: 517-335-4034
Last EDR Contact: 04/04/2011
Next Scheduled EDR Contact: 07/18/2011
Data Release Frequency: Varies

COAL ASH: Coal Ash Disposal Sites
Coal fired power plants in Southeast Michigan that have coal ash handling on site.

Date of Government Version: 04/21/2011
Date Data Arrived at EDR: 04/21/2011
Date Made Active in Reports: 05/13/2011
Number of Days to Update: 22

Source: Department of Natural Resources & Environment
Telephone: 586-753-3754
Last EDR Contact: 04/11/2011
Next Scheduled EDR Contact: 07/25/2011
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 01/01/2008
Date Data Arrived at EDR: 02/18/2009
Date Made Active in Reports: 05/29/2009
Number of Days to Update: 100

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/05/2011
Next Scheduled EDR Contact: 08/15/2011
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/18/2011
Next Scheduled EDR Contact: 06/27/2011
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 08/26/2009
Date Made Active in Reports: 09/11/2009
Number of Days to Update: 16

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/26/2011
Next Scheduled EDR Contact: 09/05/2011
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 07/22/2010
Date Made Active in Reports: 08/26/2010
Number of Days to Update: 35

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/19/2011
Next Scheduled EDR Contact: 08/01/2011
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 05/12/2011
Date Made Active in Reports: 05/24/2011
Number of Days to Update: 12

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/12/2011
Next Scheduled EDR Contact: 08/22/2011
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 12/01/2009
Date Made Active in Reports: 12/14/2009
Number of Days to Update: 13

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/04/2011
Next Scheduled EDR Contact: 07/06/2011
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 07/19/2010
Date Made Active in Reports: 08/26/2010
Number of Days to Update: 38

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/31/2011
Next Scheduled EDR Contact: 09/12/2011
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 07/06/2010
Date Made Active in Reports: 07/26/2010
Number of Days to Update: 20

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/21/2011
Next Scheduled EDR Contact: 07/04/2011
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Day Care Centers, Group & Family Homes
Source: Bureau of REgulatory Services
Telephone: 517-373-8300

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Department of Natural Resources
Telephone: 517-241-2254

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

CHILD DEVELOPMENT CENTER ADDITION PROPERTY
6501 E. 11 MILE ROAD
WARREN, MI 48092

TARGET PROPERTY COORDINATES

Latitude (North):	42.49500 - 42˚ 29' 42.0''
Longitude (West):	83.0398 - 83˚ 2' 23.3''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	332376.3
UTM Y (Meters):	4706539.5
Elevation:	619 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	42083-D1 HIGHLAND PARK, MI
Most Recent Revision:	1983
North Map:	42083-E1 WARREN, MI
Most Recent Revision:	1980

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

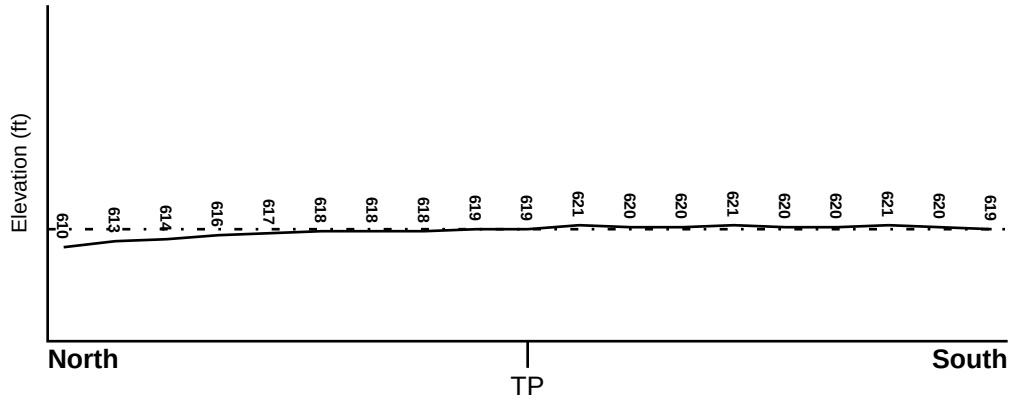
TOPOGRAPHIC INFORMATION

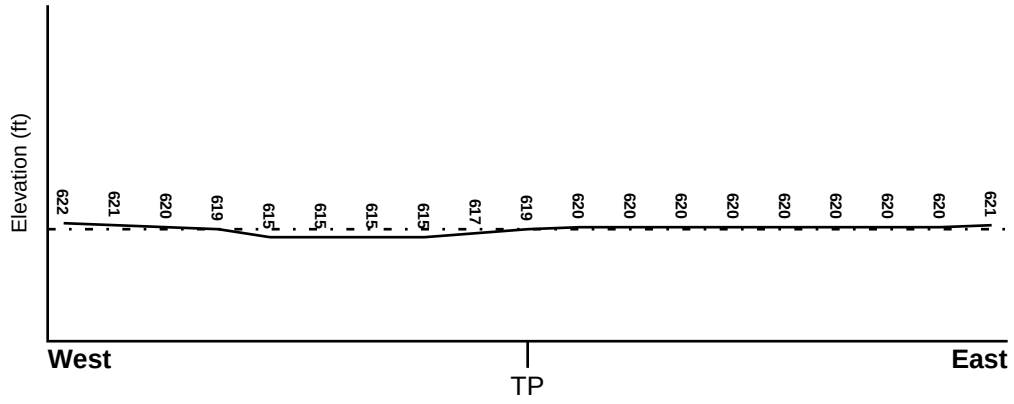
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General West

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 619 ft.

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
MACOMB, MI	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 26099C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
HIGHLAND PARK	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

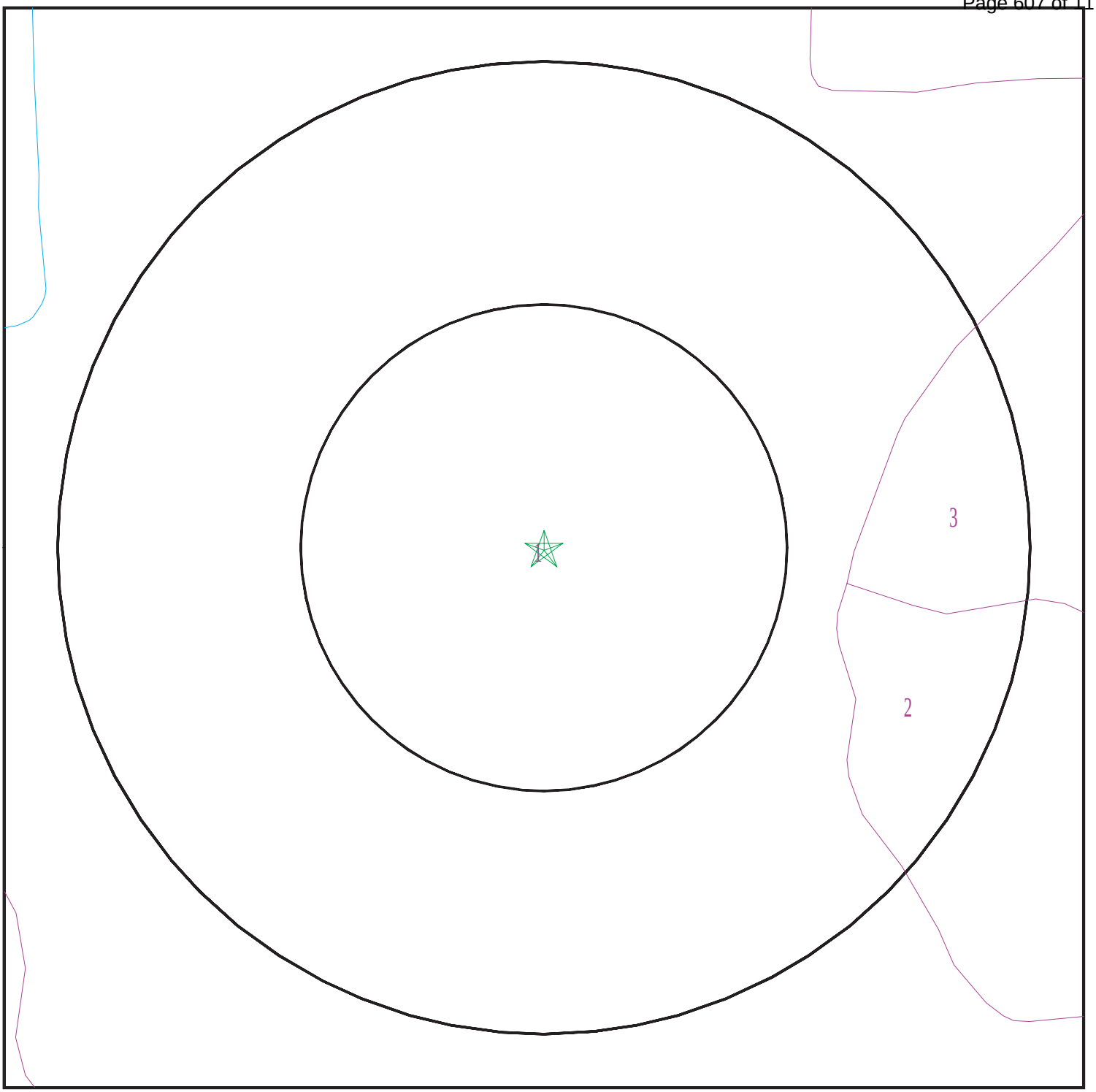
Era:	Paleozoic
System:	Devonian
Series:	Upper Devonian
Code:	D3 *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 3090255.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren MI 48092 LAT/LONG: 42.4950 / 83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY #: 3090255.2s DATE: June 08, 2011 4:16 pm

Monday, September 26, 2011

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Lenawee

Soil Surface Texture: clay loam

Hydrologic Group: Class B/D - Drained/undrained hydrology class of soils that can be drained and are classified.

Soil Drainage Class: Poorly drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
2	9 inches	31 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
3	31 inches	59 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Map ID: 2

Soil Component Name: Selfridge

Soil Surface Texture: fine sand

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Somewhat poorly drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 46 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	fine sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
2	9 inches	29 inches	fine sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
3	29 inches	59 inches	clay loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Map ID: 3

Soil Component Name: Toledo

Soil Surface Texture: silty clay loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Very poorly drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4
2	7 inches	29 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4
3	29 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

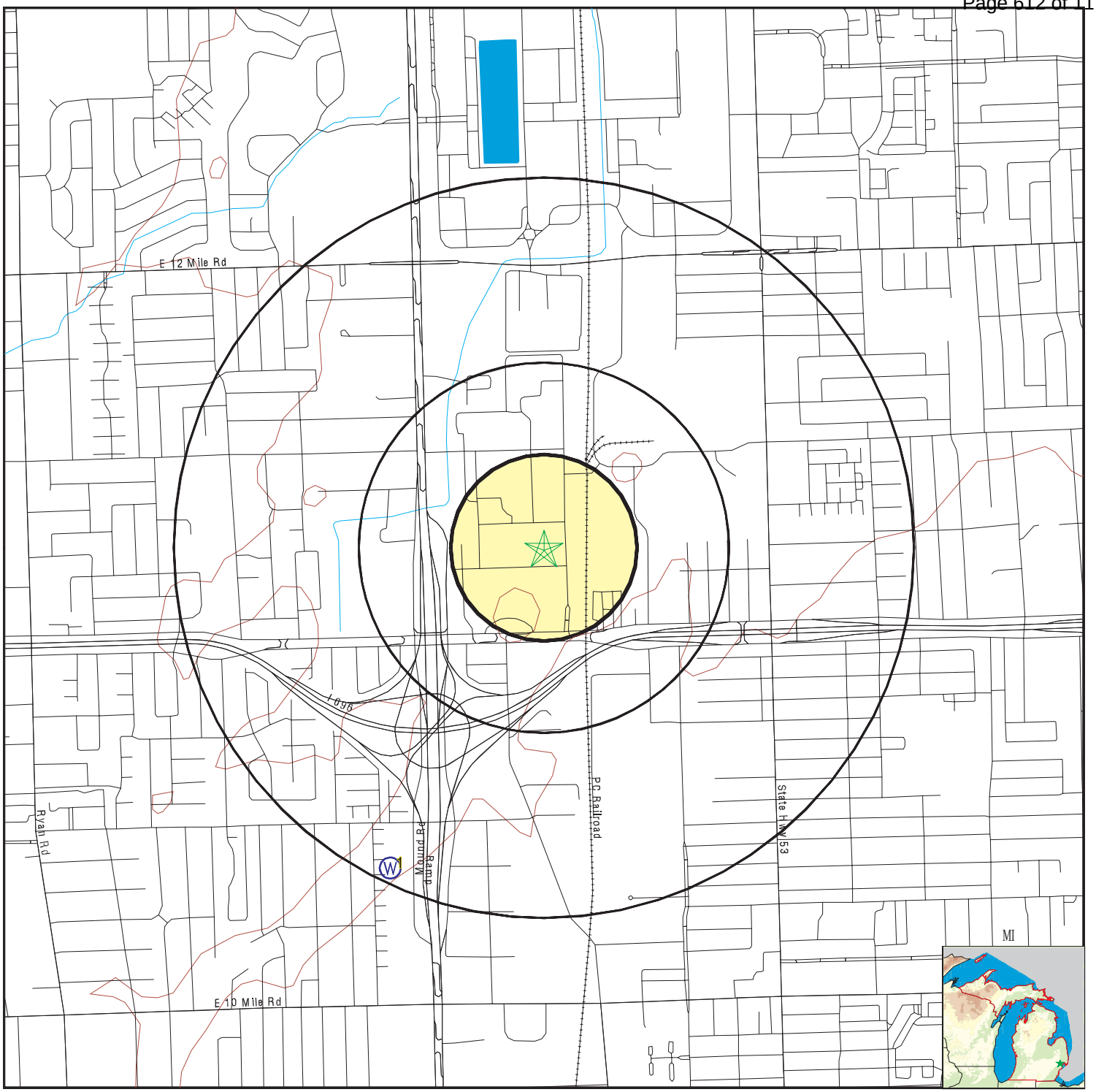
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	MI20187395	1/2 - 1 Mile SSW

PHYSICAL SETTING SOURCE MAP - 3090255.2s



County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

0 1/4 1/2 1 Miles

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location
HD Closest Hydrogeological Data
Oil, gas or related wells

N

SITE NAME: Child Development Center Addition Property ADDRESS: 6501 E. 11 Mile Road Warren MI 48092 LAT/LONG: 42.4950 / 83.0398	CLIENT: NTH Consultants Ltd. CONTACT: Cliff Andrews INQUIRY #: 3090255.2s DATE: June 08, 2011 4:16 pm

Monday, September 26, 2011

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation		Database	EDR ID Number
1 **SSW** **1/2 - 1 Mile** **Higher**		**MI WELLS**	**MI20187395**

Wellid:	50000000059	Import id:	50018220001
County:	Macomb	Township:	Warren
Town range:	01N 12E	Section:	20
Owner name:	ED. BERGMAN		
Well addr:	5777 10 MILE RD.		
Well depth:	112		
Well type:	Industrial		
Wssn:	0		
Well num:	Not Reported	Driller id:	753
Const date:	1968-08-28 00:00:00.000	Case type:	Steel-black
Case dia:	4		
Case depth:	112		
Screen frm:	107		
Screen to:	112		
Swl:	60		
Test depth:	60		
Test hours:	4		
Test rate:	20	Test methd:	Unknown
Grouted:	1	Pmp cpcity:	0
Latitude:	42.4824636654		
Longitude:	-83.0479169335		
Methd coll:	Interpolation-Map		
Elevation:	620		
Elev methd:	Topographoc Map Interpolation	Depth flag:	Not Reported
Elev flag:	Not Reported		
Swl flag:	Not Reported		
Elev dem:	620	Elev dif:	0
Elev miv:	620	Aq code:	Drift Well
Aq flag:	Not Reported	Pct aq:	28
Pct aq d:	28	Pct aq r:	0
Pct maq:	0	Pct maq d:	0
Pct maq r:	0	Pct cm:	71
Pct cm d:	71	Pct cm r:	0
Pct pcm:	0	Pct pcm d:	0
Pct pcm r:	0	Pct na:	1
Pct na d:	1	Pct na r:	0
Pct flag:	Not Reported	Rock top:	-1
D r type:	Not Reported	Spc cpcity:	0
A thicknes:	13	A pct aq:	100
A pct maq:	0	A pct pcm:	0
A pct cm:	0	A pct na:	0
A thickns2:	52	A pct aq2:	25
A pct maq2:	0	A pct pcm2:	0
A pct cm2:	75	A pct na2:	0
A hit swl:	F	A hit top:	F
A hit rock:	F	A sc lith1:	Sand
A sc lmod1:	Water Bearing	A sc lmaq1:	AQ
A sc lpct1:	100	A sc lith2:	Not Reported
A sc lmod2:	Not Reported	A sc lmaq2:	Not Reported
A sc lpct2:	0	Pct aq 1:	90
Pct maq 1:	0	Pct cm 1:	5
Pct pcm 1:	0	Pct na 1:	5

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Pct aq 2:	0	Pct maq 2:	0
Pct cm 2:	100	Pct pcm 2:	0
Pct na 2:	0	Pct aq 3:	0
Pct maq 3:	0	Pct cm 3:	100
Pct pcm 3:	0	Pct na 3:	0
Pct aq 4:	0	Pct maq 4:	0
Pct cm 4:	100	Pct pcm 4:	0
Pct na 4:	0	Pct aq 5:	5
Pct maq 5:	0	Pct cm 5:	95
Pct pcm 5:	0	Pct na 5:	0
Pct aq 6:	0	Pct maq 6:	0
Pct cm 6:	0	Pct pcm 6:	0
Pct na 6:	0	Pct aq 7:	0
Pct maq 7:	0	Pct cm 7:	0
Pct pcm 7:	0	Pct na 7:	0
Pct aq 8:	0	Pct maq 8:	0
Pct cm 8:	0	Pct pcm 8:	0
Pct na 8:	0	Pct aq 9:	0
Pct maq 9:	0	Pct cm 9:	0
Pct pcm 9:	0	Pct na 9:	0
Pct aq 10:	0	Pct maq 10:	0
Pct cm 10:	0	Pct pcm 10:	0
Pct na 10:	0	Pct aq 11:	0
Pct maq 11:	0	Pct cm 11:	0
Pct pcm 11:	0	Pct na 11:	0
Pct aq 12:	0	Pct maq 12:	0
Pct cm 12:	0	Pct pcm 12:	0
Pct na 12:	0	Pct aq 13:	0
Pct maq 13:	0	Pct cm 13:	0
Pct pcm 13:	0	Pct na 13:	0
Within sec:	Y	Loc match:	Y
Aq code 1:	D		
Hit swl:	F		
Athk2:	52		
Horiz Conduct:	.25075		
Vert Conduct:	.00133		
T2:	13.039		
D50plek:	1.53473		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: MI Radon

Radon Test Results

Zipcode	Test Date	LT Sign	Result
48092	11/9/2007		1.3
48092	2/1/2008		1.3
48092	2/25/2008		1.3
48092	4/16/2004		1.3
48092	1/12/2009		1.3
48092	3/21/2009		1.3
48092	2/3/1995		1.2
48092	1/19/2002		1.2
48092	3/29/1995		1.3
48092	8/5/2008		1.2
48092	1/26/2001		1.2
48092	2/17/2001		1.2
48092	2/28/2007		1.2
48092	10/19/2009		1.2
48092	10/29/2009		1.2
48092	2/17/1995		1.1
48092	3/28/1995		1.1
48092	3/29/1995		1.1
48092	2/23/2009		1.1
48092	4/26/2004		1.1
48092	10/14/2004		1.1
48092	4/19/2008		1.1
48092	11/12/2003		1.0
48092	10/19/2001		1.0
48092	2/1/2005		1.0
48092	3/4/2004		1.0
48092	3/12/2004		1.0
48092	2/10/2001		1.0
48092	2/12/2001		1.0
48092	4/27/2004		1.0
48092	3/30/2006	<	0.3
48092	3/3/2008	<	0.3
48092	12/12/2003	<	0.3
48092	1/22/2003		0.5
48092	12/21/2002		0.5
48092	5/6/2004		0.5
48092	2/16/2004	<	0.3
48092	11/2/2006	<	0.3
48092	3/2/2007		0.5
48092	11/12/2001	<	0.3
48092	1/15/2005	<	0.3
48092	3/19/2001		0.5
48092	3/31/1995		0.5
48092	10/19/2002	<	0.3
48092	1/28/2005	<	0.3
48092	4/7/1995		0.4
48092			

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

	1/29/2003	<	0.3
48092	3/28/2002		0.4
48092	3/31/2005	<	0.3
48092	3/15/2005	<	0.3
48092	11/22/1996	<	0.3
48092	4/30/2007	<	0.3
48092	11/10/2007	<	0.3
48092	11/17/2005	<	0.3
48092	2/21/2002		0.7
48092	3/12/2004		0.7
48092	2/13/2004		0.6
48092	5/17/2004		0.6
48092	1/29/2005		0.6
48092	1/31/2005		0.7
48092	1/28/2004		0.7
48092	11/9/2004		0.7
48092	3/14/1995		0.9
48092	3/11/2005		0.6
48092	4/16/2005		0.8
48092	11/1/2002		0.9
48092	1/28/2008		0.7
48092	2/25/2008		0.7
48092	3/6/2004		0.9
48092	3/8/2004		0.9
48092	2/18/2008		0.7
48092	3/20/2008		0.6
48092	3/1/2007		0.6
48092	5/12/2008		0.6
48092	3/12/2004		0.9
48092	3/16/2004		0.9
48092	2/12/2007		0.9
48092	2/5/2007		0.9
48092	3/17/2006		0.9
48092	1/20/2007		0.9
48092	2/9/2009		0.7
48092	2/22/2001		0.6
48092	2/17/2001		0.6
48092	1/29/2009		0.7
48092	3/7/1995		0.6
48092	12/22/1995		0.6
48092	3/19/2009		0.9
48092	5/15/2003		0.6
48092	9/29/2009		1.8
48092	11/13/2004		1.8
48092	11/14/2006		1.8
48092	2/12/2007		2.2
48092	12/3/2007		2.2
48092	4/2/2004		2.7
48092	4/7/2006		2.6
48092	10/19/2009		2.6
48092	11/20/2007		2.8
48092	2/23/2008		2.8
48092	10/29/2009		2.7
48092	2/3/2009	<	0.3
48092	2/10/2009	<	0.3
48092	3/3/1995	<	0.2
48092			

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

	2/18/2008	<	0.3
48092	2/28/2008	<	0.3
48092	12/16/1994	<	0.3
48092	3/23/2004		3.5
48092	8/16/2000	<	0.3
48092	3/5/2001	<	0.3
48092	1/9/2009	<	0.3
48092	10/22/2009	<	0.3
48092	10/19/2009	<	0.3
48092	6/29/2009	<	0.3
48092	1/16/2009	<	0.3
48092	10/22/2007		1.7
48092	11/9/2007		1.7
48092	11/14/2002		6.1
48092	7/8/2008		2.0
48092	11/4/2008		2.1
48092	2/5/2001		2.0
48092	12/14/1998		1.6
48092	5/10/2004		1.6
48092	9/25/2009		1.6
48092	11/20/2007		1.6
48092	11/9/2007		1.6
48092	12/10/2002		1.5
48092	10/14/2005		1.5
48092	3/21/2003		1.4
48092	3/13/2004		1.4
48092	11/19/2007		1.4

Federal EPA Radon Zone for MACOMB County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 48092

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	Not Reported	Not Reported	Not Reported	Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	0.975 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Department of Natural Resources
Telephone: 517-241-2254

HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Data
Source: Department of Environmental Quality
Telephone: 517-335-9218

OTHER STATE DATABASE INFORMATION

Michigan Oil and Gas Wells
Source: Department of Natural Resources and Environment
Locations of oil and gas wells are compiled from permit records on file at the Geological Survey Division (GSD), Michigan Department of Natural Resources.

RADON

State Database: MI Radon
Source: Department of Environmental Quality
Telephone: 517-335-9551
Radon Test Results

Michigan Radon Test Results
Source: Department of Environmental Quality
Telephone: 517-335-8037
These results are from test kits distributed by the local health departments and used by Michigan residents. There is no way of knowing whether the devices were used properly, whether there are duplicates (or repeat verification) test (i.e., more than one sample per home), etc.

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

STREET AND ADDRESS INFORMATION

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APPENDIX G

LOG OF GEOPROBES, FIGURE 4

PROJECT NO: 61-110632-00	NTH CONSULTANTS, LTD.	SHEET 1 OF 7

LOG OF GEOPROBES

PROBE NO.	GROUND SURFACE ELEV.	DEPTH (FT)	SOIL DESCRIPTION	DISCRETE SAMPLE INFO. SAMPLE NO.	DEPTH (FT) FROM	DEPTH (FT) TO	PID READING (PPM)
GP-1	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.5	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	2.0	3.0	<1
		3.5-16.0	BROWN AND GRAY **SILTY CLAY**	S-2	4.0	5.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-2	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	3.0	4.0	<1
				S-2*	4.0	5.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-3	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	3.0	4.0	<1
				--	4.0	6.0	<1
				S-2	6.0	7.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				

NOTES:

[1] GEOPROBES BACKFILLED WITH BENTONITE CHIPS AND SOIL CUTTINGS AFTER OBTAINING SAMPLES.
[2] GEOPROBE DRILLING INSPECTED BY E. SCHUPP OF NTH CONSULTANTS, LTD.
[3] SOIL CLASSIFICATION BASED SOLELY ON VISUAL OBSERVATION.
[4] * SAMPLE SUBMITTED FOR ANALYTICAL TESTING.

DRILLED BY: C. EDWARDS OF FIBERTEC ENVIRONMENTAL SERVICES **DATE:** 6/15/2011 **FIGURE NO:** 4

PROJECT NO: 61-110632-00	NTH CONSULTANTS, LTD.	SHEET 2 OF 7

LOG OF GEOPROBES

PROBE NO.	GROUND SURFACE ELEV.	DEPTH (FT)	SOIL DESCRIPTION	DISCRETE SAMPLE INFO. SAMPLE NO.	DEPTH (FT) FROM	DEPTH (FT) TO	PID READING (PPM)
GP-4	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-2.0	FILL: GRAY TO BLACK **SANDY CLAY**	--	2.0	3.0	<1
		2.0-4.0	FILL: GRAY **SILTY CLAY** WITH PIECES OF CONCRETE	S-1*	3.0	4.0	<1
		4.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	4.0	6.0	<1
				S-2	6.0	7.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-5	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.5	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	2.5	<1
		3.5-12.0	BROWN AND GRAY **SILTY CLAY**	S-1*	2.5	3.5	<1
				--	4.0	6.0	<1
				S-2	6.0	7.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
		12.0-16.0	GRAY **SILTY CLAY**	--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-6	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	3.0	4.0	<1
				--	4.0	6.0	<1
				S-2	6.0	7.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				

NOTES:

[1] GEOPROBES BACKFILLED WITH BENTONITE CHIPS AND SOIL CUTTINGS AFTER OBTAINING SAMPLES.
[1] GEOPROBE DRILLING INSPECTED BY E. SCHUPP OF NTH CONSULTANTS, LTD.
[2] SOIL CLASSIFICATION BASED SOLELY ON VISUAL OBSERVATION.
[3] * SAMPLE SUBMITTED FOR ANALYTICAL TESTING.

DRILLED BY: C. EDWARDS OF FIBERTEC ENVIRONMENTAL SERVICES **DATE:** 6/15/2011 **FIGURE NO:** 4

PROJECT NO: 61-110632-00	NTH CONSULTANTS, LTD.	SHEET 3 OF 7

LOG OF GEOPROBES

PROBE NO.	GROUND SURFACE ELEV.	DEPTH (FT)	SOIL DESCRIPTION	DISCRETE SAMPLE INFO. SAMPLE NO.	DEPTH (FT) FROM	DEPTH (FT) TO	PID READING (PPM)
GP-7	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-4.0	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	3.0	<1
				S-1*	3.0	4.0	<1
		4.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	4.0	6.0	<1
				S-2	6.0	7.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-8	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	2.0	<1
				S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	3.0	5.0	<1
				S-2	5.0	6.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-9	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	1.0	2.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	2.0	4.0	<1
				S-2	5.0	6.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				

NOTES:
[1] GEOPROBES BACKFILLED WITH BENTONITE CHIPS AND SOIL CUTTINGS AFTER OBTAINING SAMPLES.
[2] GEOPROBE DRILLING INSPECTED BY E. SCHUPP OF NTH CONSULTANTS, LTD.
[3] SOIL CLASSIFICATION BASED SOLELY ON VISUAL OBSERVATION.
[4] * SAMPLE SUBMITTED FOR ANALYTICAL TESTING.

DRILLED BY: C. EDWARDS OF FIBERTEC ENVIRONMENTAL SERVICES **DATE:** 6/15/2011 **FIGURE NO:** 4

PROJECT NO: 61-110632-00	NTH CONSULTANTS, LTD.	SHEET 4 OF 7

LOG OF GEOPROBES

PROBE NO.	GROUND SURFACE ELEV.	DEPTH (FT)	SOIL DESCRIPTION	DISCRETE SAMPLE INFO. SAMPLE NO.	DEPTH (FT) FROM	DEPTH (FT) TO	PID READING (PPM)
GP-10	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-4.0	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	3.0	<1
				S-1*	3.0	4.0	<1
		4.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	4.0	6.0	<1
				S-2	6.0	7.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-11	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	2.0	<1
				S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	3.0	5.0	<1
				S-2*	5.0	6.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-12	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-2.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	0.0	2.0	<1
		2.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	2.0	4.0	<1
				S-2	4.0	5.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				

NOTES:
[1] GEOPROBES BACKFILLED WITH BENTONITE CHIPS AND SOIL CUTTINGS AFTER OBTAINING SAMPLES.
[2] GEOPROBE DRILLING INSPECTED BY E. SCHUPP OF NTH CONSULTANTS, LTD.
[3] SOIL CLASSIFICATION BASED SOLELY ON VISUAL OBSERVATION.
[4] * SAMPLE SUBMITTED FOR ANALYTICAL TESTING.

DRILLED BY: C. EDWARDS OF FIBERTEC ENVIRONMENTAL SERVICES **DATE:** 6/15/2011 **FIGURE NO:** 4

PROJECT NO: 61-110632-00	NTH CONSULTANTS, LTD.	SHEET 5 OF 7

LOG OF GEOPROBES

PROBE NO.	GROUND SURFACE ELEV.	DEPTH (FT)	SOIL DESCRIPTION	DISCRETE SAMPLE INFO. SAMPLE NO.	DEPTH (FT) FROM	DEPTH (FT) TO	PID READING (PPM)
GP-13	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	2.0	<1
				S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	S-2	5.0	6.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-14	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	2.0	<1
				S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	3.0	5.0	<1
				S-2	5.0	6.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-15	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-2.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	0.0	2.0	<1
		2.0-13.0	BROWN AND GRAY **SILTY CLAY**	--	2.0	4.0	<1
				S-2	4.0	5.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	13.0	<1
		13.0-16.0	GRAY **SILTY CLAY**	--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				

NOTES:
[1] GEOPROBES BACKFILLED WITH BENTONITE CHIPS AND SOIL CUTTINGS AFTER OBTAINING SAMPLES.
[2] GEOPROBE DRILLING INSPECTED BY E. SCHUPP OF NTH CONSULTANTS, LTD.
[3] SOIL CLASSIFICATION BASED SOLELY ON VISUAL OBSERVATION.
[4] * SAMPLE SUBMITTED FOR ANALYTICAL TESTING.

DRILLED BY: C. EDWARDS OF FIBERTEC ENVIRONMENTAL SERVICES **DATE:** 6/15/2011 **FIGURE NO:** 4

PROJECT NO: 61-110632-00	NTH CONSULTANTS, LTD.	SHEET 6 OF 7

LOG OF GEOPROBES

PROBE NO.	GROUND SURFACE ELEV.	DEPTH (FT)	SOIL DESCRIPTION	DISCRETE SAMPLE INFO. SAMPLE NO.	DEPTH (FT) FROM	DEPTH (FT) TO	PID READING (PPM)
GP-16	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	2.0	<1
				S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	3.0	5.0	<1
				S-2	5.0	6.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-17	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-3.0	FILL: BROWN TO BLACK **SANDY CLAY**	--	1.0	2.0	<1
				S-1*	2.0	3.0	<1
		3.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	4.0	6.0	<1
				S-2	6.0	7.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-18	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-2.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	0.0	2.0	<1
		2.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	2.0	4.0	<1
				S-2	4.0	5.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
					14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				

NOTES:
[1] GEOPROBES BACKFILLED WITH BENTONITE CHIPS AND SOIL CUTTINGS AFTER OBTAINING SAMPLES.
[2] GEOPROBE DRILLING INSPECTED BY E. SCHUPP OF NTH CONSULTANTS, LTD.
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[4] * SAMPLE SUBMITTED FOR ANALYTICAL TESTING.

DRILLED BY: C. EDWARDS OF FIBERTEC ENVIRONMENTAL SERVICES **DATE:** 6/16/2011 **FIGURE NO:** 4

PROJECT NO: 61-110632-00	NTH CONSULTANTS, LTD.	SHEET 7 OF 7

LOG OF GEOPROBES

PROBE NO.	GROUND SURFACE ELEV.	DEPTH (FT)	SOIL DESCRIPTION	DISCRETE SAMPLE INFO. SAMPLE NO.	DEPTH (FT) FROM	DEPTH (FT) TO	PID READING (PPM)
GP-19	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-2.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	0.0	2.0	<1
		2.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	2.0	4.0	<1
				S-2	4.0	5.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-20	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-2.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	0.0	2.0	<1
		2.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	2.0	4.0	<1
				S-2*	4.0	5.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				
GP-21	N/A	0.0-0.25	TOPSOIL: BLACK **SANDY CLAY**	--	--	--	--
		0.25-2.0	FILL: BROWN TO BLACK **SANDY CLAY**	S-1*	0.0	2.0	<1
		2.0-16.0	BROWN AND GRAY **SILTY CLAY**	--	2.0	4.0	<1
				S-2	4.0	5.0	<1
				--	6.0	8.0	<1
				--	8.0	10.0	<1
				--	10.0	12.0	<1
				--	12.0	14.0	<1
				--	14.0	16.0	<1
			[NO GROUNDWATER ENCOUNTERED]				

NOTES:
[1] GEOPROBES BACKFILLED WITH BENTONITE CHIPS AND SOIL CUTTINGS AFTER OBTAINING SAMPLES.
[2] GEOPROBE DRILLING INSPECTED BY E. SCHUPP OF NTH CONSULTANTS, LTD.
[3] SOIL CLASSIFICATION BASED SOLELY ON VISUAL OBSERVATION.
[4] * SAMPLE SUBMITTED FOR ANALYTICAL TESTING.

DRILLED BY: C. EDWARDS OF FIBERTEC ENVIRONMENTAL SERVICES **DATE:** 6/16/2011 **FIGURE NO:** 4

TABLE 1: SUMMARY OF CHEMICAL ANALYSES

DETROIT ARSENAL – CHILD DEVELOPMENT CENTER
NTH PROJECT NO. 61-110632-00

SAMPLE DESIGNATION	SAMPLE DEPTH [FT]	PARAMETERS												
		METALS [MG/KG]										POLYCHLORINATED BIPHENYLS (PCBs) 1336363 [µG/KG]	SEMI-VOLATILE ORGANICS [µG/KG]	VOLATILE ORGANICS [µG/KG]
		ARSENIC 7440382	BARIUM 7440393	CADMIUM 7440439	CHROMIUM 7440473	COPPER 7440508	LEAD 7439921	MERCURY 7439976	SELENIUM 7782492	SILVER 7440224	ZINC 7440666			
SOIL SAMPLING:														
GP-1 : S-1	2.0 – 3.0	4.0	46	0.36	11	16	34	ND	0.45	ND	59	ND	ND	ND
GP-2 : S-1	2.0 – 3.0	3.8	90	0.41	19	21	21	ND	0.91	ND	76	ND	ND	ND
GP-2 : S-2	4.0 – 5.0	16	130	0.32	24	26	18	ND	0.35	ND	64	ND	ND	ND
GP-3 : S-1	2.0 – 3.0	3.8	70	0.17	14	16	8.6	ND	0.28	ND	44	ND	ND	ND
GP-4 : S-1	3.0 – 4.0	2.0	70	0.44	14	21	17	ND	0.83	ND	55	ND	ND	ND
DUPLICATE (GP-4 : S-1)	3.0 – 4.0	3.2	63	0.38	17	17	25	0.068	0.65	ND	64	ND	ND	ND
GP-5 : S-1	2.5 – 3.5	4.6	97	0.60	16	13	11	ND	0.28	ND	50	ND	ND	ND
GP-6 : S-1	2.5 – 3.5	3.5	50	0.37	13	17	18	ND	0.59	ND	53	ND	ND	ND
GP-7 : S-1	2.0 – 3.0	3.7	78	0.65	18	19	40	ND	0.62	ND	240	ND	ND	ND
GP-8 : S-1	3.0 – 4.0	2.4	75	0.40	14	20	15	ND	0.80	ND	53	ND	ND	ND
GP-9 : S-1	2.0 – 3.0	3.2	68	0.56	17	19	30	ND	0.55	ND	63	ND	ND	ND
GP-10 : S-1	3.0 – 4.0	2.8	77	0.40	16	21	21	ND	0.86	ND	63	ND	ND	ND
GP-11 : S-1	2.0 – 3.0	3.2	62	0.49	17	17	39	ND	0.58	0.11	63	ND	ND	ND
GP-11 : S-2	5.0 – 6.0	14	120	0.45	15	23	13	ND	0.46	ND	52	ND	ND	ND
GP-12 : S-1	1.0 – 2.0	3.9	79	0.29	16	17	12	ND	0.62	ND	54	ND	ND	ND
GP-13 : S-1	2.0 – 3.0	4.2	70	0.87	22	21	51	0.056	0.68	0.11	85	ND	ND	ND
GP-14 : S-1	2.0 – 3.0	3.6	69	0.24	16	14	12	ND	0.65	ND	60	ND	ND	ND
GP-15 : S-1	1.0 – 2.0	4.1	67	0.65	15	15	26	ND	0.51	ND	58	ND	ND	ND
GP-16 : S-1	2.0 – 3.0	3.2	81	0.31	19	18	14	0.052	0.86	ND	75	ND	ND	ND
DUPLICATE (GP-16 : S-1)	2.0 – 3.0	5.3	86	0.42	18	19	24	ND	0.64	ND	65	ND	ND	ND
GP-17 : S-1	2.0 – 3.0	3.6	67	0.23	17	15	11	ND	0.66	ND	55	ND	ND	ND
GP-18 : S-1	1.0 – 2.0	5.6	70	0.22	16	17	12	ND	0.32	ND	51	ND	ND	ND
GP-19 : S-1	1.0 – 2.0	4.0	80	0.43	18	24	19	ND	0.91	ND	67	ND	ND	ND
GP-20 : S-1	1.0 – 2.0	4.2	78	0.29	19	16	18	ND	0.63	ND	67	ND	ND	ND
GP-20 : S-2	4.0 – 5.0	7.7	170	0.63	26	30	17	ND	0.46	ND	78	ND	ND	ND
GP-21 : S-1	1.0 – 2.0	3.0	62	0.36	16	21	22	ND	0.86	ND	60	ND	ND	ND
PART 201 RESIDENTIAL SOIL CLEANUP CRITERIA	SWDB	5.8	75.0	1.2	18.0	32.0	21.0	0.13	0.41	1.0	47.0	N/A	N/A	N/A
	DC	7.6	37,000	550	2,500	20,000	400	160	2,600	2,500	170,000	4,000* (TSCA: 1,000)	VARIOUS	VARIOUS
	GCP	2,000	1,000,000	230,000	140,000	1,000,000	(ID)	47	78,000	200,000	1,000,000	NLL	VARIOUS	VARIOUS
	SVIIC	NLV	NLV	NLV	NLV	NLV	NLV	48	NLV	NLV	NLV	3,000,000	VARIOUS	VARIOUS
	VSIC	NLV	NLV	NLV	NLV	NLV	NLV	52	NLV	NLV	NLV	240,000	VARIOUS	VARIOUS
	PSIC	720	330,000	1,700	260	130,000	100,000	27,000	130,000	6,700	(ID)	5,200,000	VARIOUS	VARIOUS

NOTES:

[1] SAMPLES COLLECTED BY NTH CONSULTANTS PERSONNEL AND ANALYZED BY FIBERTEC ENVIRONMENTAL SERVICES OF HOLT, MI.
[2] MG/KG - MILLIGRAMS PER KILOGRAM (≈ PARTS PER MILLION).
[3] µG/KG - MICROGRAMS PER KILOGRAM (≈ PARTS PER BILLION).
[4] ND - NOT DETECTED AT OR ABOVE LABORATORY-REPORTED METHOD DETECTION LIMIT FOR INDICATED PARAMETER.
[5] (ID) - INADEQUATE DATA TO DEVELOP CRITERION.
[6] NLL - CHEMICAL IS NOT LIKELY TO LEACH UNDER MOST SOIL CONDITIONS.
[7] NLV - CHEMICAL IS NOT LIKELY TO VOLATILIZE UNDER MOST CONDITIONS.
[8] SWDB - STATE-WIDE DEFAULT BACKGROUND.
[9] DC - CONCENTRATION IN SOIL, IF NOT EXCEEDED, IS CONSIDERED SAFE FOR HUMAN EXPOSURE VIA DIRECT (ORAL AND DERMAL) CONTACT.
[10] GCP - GROUNDWATER CONTACT PROTECTION CRITERIA.
[11] SVIIC - SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA.
[12] VSIC - VOLATILE SOIL INHALATION CRITERIA (AMBIENT AIR; INFINITE SOURCE).
[13] PSIC - PARTICULATE SOIL INHALATION CRITERIA.
[14] * - HAZARDOUS SUBSTANCE MAY BE PRESENT IN SEVERAL ISOMER FORMS. ISOMER-SPECIFIC CONCENTRATIONS SHALL BE ADDED TOGETHER FOR COMPARISON TO CRITERIA. REFER TO THE FEDERAL TOXIC SUBSTANCES CONTROL ACT (TSCA), 40 CFR 761, D AND G SUBPARTS TO DETERMINE THE APPLICABILITY OF TSCA CLEANUP STANDARDS.
[15] - REPORTED CONCENTRATION EXCEEEDS ONE OR MORE APPLICABLE PART 201 CRITERIA.

APPENDIX H

SUMMARY OF CHEMICAL ANALYSES, TABLE 1; AND LABORATORY DATA SHEETS

TABLE 1: SUMMARY OF CHEMICAL ANALYSES

DETROIT ARSENAL – CHILD DEVELOPMENT CENTER
NTH PROJECT NO. 61-110632-00

SAMPLE DESIGNATION	SAMPLE DEPTH [FT]	PARAMETERS												
		METALS [MG/KG]										POLYCHLORINATED BIPHENYLS (PCBs) 1336363 [µG/KG]	SEMI-VOLATILE ORGANICS [µG/KG]	VOLATILE ORGANICS [µG/KG]
		ARSENIC 7440382	BARIUM 7440393	CADMIUM 7440439	CHROMIUM 7440473	COPPER 7440508	LEAD 7439921	MERCURY 7439976	SELENIUM 7782492	SILVER 7440224	ZINC 7440666			
SOIL SAMPLING:														
GP-1 : S-1	2.0 – 3.0	4.0	46	0.36	11	16	34	ND	0.45	ND	59	ND	ND	ND
GP-2 : S-1	2.0 – 3.0	3.8	90	0.41	19	21	21	ND	0.91	ND	76	ND	ND	ND
GP-2 : S-2	4.0 – 5.0	16	130	0.32	24	26	18	ND	0.35	ND	64	ND	ND	ND
GP-3 : S-1	2.0 – 3.0	3.8	70	0.17	14	16	8.6	ND	0.28	ND	44	ND	ND	ND
GP-4 : S-1	3.0 – 4.0	2.0	70	0.44	14	21	17	ND	0.83	ND	55	ND	ND	ND
DUPLICATE (GP-4 : S-1)	3.0 – 4.0	3.2	63	0.38	17	17	25	0.068	0.65	ND	64	ND	ND	ND
GP-5 : S-1	2.5 – 3.5	4.6	97	0.60	16	13	11	ND	0.28	ND	50	ND	ND	ND
GP-6 : S-1	2.5 – 3.5	3.5	50	0.37	13	17	18	ND	0.59	ND	53	ND	ND	ND
GP-7 : S-1	2.0 – 3.0	3.7	78	0.65	18	19	40	ND	0.62	ND	240	ND	ND	ND
GP-8 : S-1	3.0 – 4.0	2.4	75	0.40	14	20	15	ND	0.80	ND	53	ND	ND	ND
GP-9 : S-1	2.0 – 3.0	3.2	68	0.56	17	19	30	ND	0.55	ND	63	ND	ND	ND
GP-10 : S-1	3.0 – 4.0	2.8	77	0.40	16	21	21	ND	0.86	ND	63	ND	ND	ND
GP-11 : S-1	2.0 – 3.0	3.2	62	0.49	17	17	39	ND	0.58	0.11	63	ND	ND	ND
GP-11 : S-2	5.0 – 6.0	14	120	0.45	15	23	13	ND	0.46	ND	52	ND	ND	ND
GP-12 : S-1	1.0 – 2.0	3.9	79	0.29	16	17	12	ND	0.62	ND	54	ND	ND	ND
GP-13 : S-1	2.0 – 3.0	4.2	70	0.87	22	21	51	0.056	0.68	0.11	85	ND	ND	ND
GP-14 : S-1	2.0 – 3.0	3.6	69	0.24	16	14	12	ND	0.65	ND	60	ND	ND	ND
GP-15 : S-1	1.0 – 2.0	4.1	67	0.65	15	15	26	ND	0.51	ND	58	ND	ND	ND
GP-16 : S-1	2.0 – 3.0	3.2	81	0.31	19	18	14	0.052	0.86	ND	75	ND	ND	ND
DUPLICATE (GP-16 : S-1)	2.0 – 3.0	5.3	86	0.42	18	19	24	ND	0.64	ND	65	ND	ND	ND
GP-17 : S-1	2.0 – 3.0	3.6	67	0.23	17	15	11	ND	0.66	ND	55	ND	ND	ND
GP-18 : S-1	1.0 – 2.0	5.6	70	0.22	16	17	12	ND	0.32	ND	51	ND	ND	ND
GP-19 : S-1	1.0 – 2.0	4.0	80	0.43	18	24	19	ND	0.91	ND	67	ND	ND	ND
GP-20 : S-1	1.0 – 2.0	4.2	78	0.29	19	16	18	ND	0.63	ND	67	ND	ND	ND
GP-20 : S-2	4.0 – 5.0	7.7	170	0.63	26	30	17	ND	0.46	ND	78	ND	ND	ND
GP-21 : S-1	1.0 – 2.0	3.0	62	0.36	16	21	22	ND	0.86	ND	60	ND	ND	ND
PART 201 RESIDENTIAL SOIL CLEANUP CRITERIA	SWDB	5.8	75.0	1.2	18.0	32.0	21.0	0.13	0.41	1.0	47.0	N/A	N/A	N/A
	DC	7.6	37,000	550	2,500	20,000	400	160	2,600	2,500	170,000	4,000* (TSCA: 1,000)	VARIOUS	VARIOUS
	GCP	2,000	1,000,000	230,000	140,000	1,000,000	(ID)	47	78,000	200,000	1,000,000	NLL	VARIOUS	VARIOUS
	SVIIC	NLV	NLV	NLV	NLV	NLV	NLV	48	NLV	NLV	NLV	3,000,000	VARIOUS	VARIOUS
	VSIC	NLV	NLV	NLV	NLV	NLV	NLV	52	NLV	NLV	NLV	240,000	VARIOUS	VARIOUS
	PSIC	720	330,000	1,700	260	130,000	100,000	27,000	130,000	6,700	(ID)	5,200,000	VARIOUS	VARIOUS

NOTES:

[1] SAMPLES COLLECTED BY NTH CONSULTANTS PERSONNEL AND ANALYZED BY FIBERTEC ENVIRONMENTAL SERVICES OF HOLT, MI.
[2] MG/KG - MILLIGRAMS PER KILOGRAM (≈ PARTS PER MILLION).
[3] µG/KG - MICROGRAMS PER KILOGRAM (≈ PARTS PER BILLION).
[4] ND - NOT DETECTED AT OR ABOVE LABORATORY-REPORTED METHOD DETECTION LIMIT FOR INDICATED PARAMETER.
[5] (ID) - INADEQUATE DATA TO DEVELOP CRITERION.
[6] NLL - CHEMICAL IS NOT LIKELY TO LEACH UNDER MOST SOIL CONDITIONS.
[7] NLV - CHEMICAL IS NOT LIKELY TO VOLATILIZE UNDER MOST CONDITIONS.
[8] SWDB - STATE-WIDE DEFAULT BACKGROUND.
[9] DC - CONCENTRATION IN SOIL, IF NOT EXCEEDED, IS CONSIDERED SAFE FOR HUMAN EXPOSURE VIA DIRECT (ORAL AND DERMAL) CONTACT.
[10] GCP - GROUNDWATER CONTACT PROTECTION CRITERIA.
[11] SVIIC - SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA.
[12] VSIC - VOLATILE SOIL INHALATION CRITERIA (AMBIENT AIR; INFINITE SOURCE).
[13] PSIC - PARTICULATE SOIL INHALATION CRITERIA.
[14] * - HAZARDOUS SUBSTANCE MAY BE PRESENT IN SEVERAL ISOMER FORMS. ISOMER-SPECIFIC CONCENTRATIONS SHALL BE ADDED TOGETHER FOR COMPARISON TO CRITERIA. REFER TO THE FEDERAL TOXIC SUBSTANCES CONTROL ACT (TSCA), 40 CFR 761, D AND G SUBPARTS TO DETERMINE THE APPLICABILITY OF TSCA CLEANUP STANDARDS.
[15] - REPORTED CONCENTRATION EXCEEEDS ONE OR MORE APPLICABLE PART 201 CRITERIA.

Fibertec environmental services

Friday, June 24, 2011

Fibertec Project Number:	45031
Project Identification:	Detroit Arsenal-Child Development Center /61-110632-00
Submittal Date:	06/17/2011

Mr. Eric Schupp
NTH Consultants, Ltd. - Detroit
480 Ford Field (Gate G)
2000 Brush Street
Detroit, MI 48226

Dear Mr. Schupp,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note samples will be disposed of 30 days after reporting date.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

Daryl P. Strandbergh
Laboratory Director

DPS/kc

Enclosures

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-001

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-1/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-1**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-001A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**12**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-001A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**4000**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**46000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**360**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**11000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**16000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**34000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**450**		µg/kg	200	10	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	10	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**59000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-001A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-001A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	370	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-001** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-001

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-1/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-1**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-001** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	110	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-001

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-1/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-1**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-001** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-001A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
4. Anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-001

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-1/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-1**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-001A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	1900	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
35. Fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
36. Fluorene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
41. Isophorone	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	1900	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	1900	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
55. Pentachlorophenol	U		µg/kg	940	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
56. Phenanthrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
57. Phenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
58. Pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
59. Pyridine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-003

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-2/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-2**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-003A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**23**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-003A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3800**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**90000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**410**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**19000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**21000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**21000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**910**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**76000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-003A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-003A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-003** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-003

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-2/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-2**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-003** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	130	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-003

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-2/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-2**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-003** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-003A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-003

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-2/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-2**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-003A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-004

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-2/S-2 4-5'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-2**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-004A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**23**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-004A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**16000**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**130000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**320**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**24000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**26000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**18000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**350**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**64000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-004A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-004A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	430	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-004** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/20/11	V911F20B	06/21/11	V911F20B
2. Acrylonitrile	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
3. Benzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
4. Bromobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
5. Bromochloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-004

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-2/S-2 4-5'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-2**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-004** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
7. Bromoform	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
8. Bromomethane	U		µg/kg	200	1.0	06/20/11	V911F20B	06/21/11	V911F20B
9. 2-Butanone	U		µg/kg	750	1.0	06/20/11	V911F20B	06/21/11	V911F20B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
15. Chlorobenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
16. Chloroethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
17. Chloroform	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
18. Chloromethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	12	1.0	06/20/11	V911F20B	06/21/11	V911F20B
22. Dibromomethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
35. Ethylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/20/11	V911F20B	06/21/11	V911F20B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/20/11	V911F20B	06/21/11	V911F20B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
39. Methyl Iodide	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
40. Methylene Chloride	U		µg/kg	130	1.0	06/20/11	V911F20B	06/21/11	V911F20B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/20/11	V911F20B	06/21/11	V911F20B
42. MTBE	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
43. Naphthalene	U		µg/kg	330	1.0	06/20/11	V911F20B	06/21/11	V911F20B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
45. Styrene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-004

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-2/S-2 4-5'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-2**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-004** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
49. Toluene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/20/11	V911F20B	06/21/11	V911F20B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
53. Trichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/20/11	V911F20B	06/21/11	V911F20B
60. Xylenes	U		µg/kg	150	1.0	06/20/11	V911F20B	06/21/11	V911F20B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-004A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-004

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-2/S-2 4-5'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-2**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-004A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-005

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-3/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-3**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-005A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**16**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-005A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3800**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**70000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**170**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**14000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**16000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**8600**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**280**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**44000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-005A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-005A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-005** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Laboratory Project Number: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-3/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-3**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-005** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-005

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-3/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-3**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-005** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-005A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-005

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-3/S-1 2-3'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-3**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-005A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-007

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-4/S-1 3-4'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-4**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-007A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**18**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-007A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**2000**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**70000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**440**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**14000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**21000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**17000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**830**		µg/kg	200	10	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**55000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-007A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-007A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-007** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-007

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-4/S-1 3-4'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-4**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-007** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-007

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-4/S-1 3-4'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-4**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-007** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-007A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
9. Benzo(ghi)perylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-007

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-4/S-1 3-4'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-4**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-007A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-009

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-5/S-1 2.5-3.5'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-5**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-009A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**18**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-009A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**4600**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**97000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**600**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**16000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**13000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**11000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**280**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**50000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-009A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-009A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-009** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-009

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-5/S-1 2.5-3.5'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-5**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-009** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-009

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-5/S-1 2.5-3.5'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-5**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-009** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-009A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-009

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-5/S-1 2.5-3.5'**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-5**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-009A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-011

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**DUPLICATE**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**DUP**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-011A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**19**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-011A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3200**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**63000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**380**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**17000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**17000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**25000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**650**		µg/kg	200	10	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**64000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-011A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	**68**		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-011A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-011** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

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Laboratory Project Number: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**DUPLICATE**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**DUP**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-011** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-011

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**DUPLICATE**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**DUP**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-011** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-011A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
4. Anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-011

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**DUPLICATE**	Chain of Custody:	**103720**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**DUP**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-011A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	2000	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
35. Fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
36. Fluorene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
41. Isophorone	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	2000	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	2000	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
55. Pentachlorophenol	U		µg/kg	1000	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
56. Phenanthrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
57. Phenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
58. Pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
59. Pyridine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B

Fibertec environmental services

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Laboratory Sample Number: 45031-012

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-6/S-1 2.5-3.5'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-6**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-012A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**16**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-012A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3500**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**50000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**370**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**13000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**17000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**18000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**590**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**53000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-012A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-012A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-012** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-6/S-1 2.5-3.5'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-6**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-012** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-012

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-6/S-1 2.5-3.5'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-6**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-012** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-012A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-012

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-6/S-1 2.5-3.5'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-6**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-012A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-014

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-7/S-1 2-3'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-7**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-014A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**19**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-014A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3700**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**78000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**650**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**18000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**19000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**40000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**620**		µg/kg	200	10	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**240000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-014A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-014A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-014** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-014

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-7/S-1 2-3'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-7**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-014** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-014

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-7/S-1 2-3'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-7**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-014** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-014A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
4. Anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-014

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-7/S-1 2-3'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-7**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-014A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	2100	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
35. Fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
36. Fluorene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
41. Isophorone	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	2100	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	2100	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
55. Pentachlorophenol	U		µg/kg	1000	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
56. Phenanthrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
57. Phenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
58. Pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
59. Pyridine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F20B

Fibertec environmental services

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-016

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-8/S-1 3-4'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-8**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**11:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-016A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**17**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-016A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**2400**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**75000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**400**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**14000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**20000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**15000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**800**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**53000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-016A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-016A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-016** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-016

Order: 45031
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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-8/S-1 3-4'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-8**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**11:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-016** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-016

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-8/S-1 3-4'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-8**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**11:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-016** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-016A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-016

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-8/S-1 3-4'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-8**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**11:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-016A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-018

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-9/S-1 2-3'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-9**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**14:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-018A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**17**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-018A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3200**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**68000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**560**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**17000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**19000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**30000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**550**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**63000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-018A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-018A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-018** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-018

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-9/S-1 2-3'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-9**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**14:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-018** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-018

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-9/S-1 2-3'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-9**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**14:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-018** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-018A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-018

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-9/S-1 2-3'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-9**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**14:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-018A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-10/S-1 3-4'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-10**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-020A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**19**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-020A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**2800**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**77000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**400**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**16000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**21000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**21000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**860**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**63000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-020A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-020A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	410	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-020** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-020

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-10/S-1 3-4'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-10**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-020** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Laboratory Sample Number: 45031-020

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-10/S-1 3-4'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-10**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-020** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-020A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-020

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-10/S-1 3-4'**	Chain of Custody:	**103721**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-10**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-020A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-022

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-11/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-11**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-022A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**17**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-022A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3200**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**62000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**490**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**17000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**17000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**39000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**580**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	**110**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**63000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-022A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-022A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-022** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-022

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-11/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-11**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-022** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-022

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-11/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-11**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-022** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-022A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
2. Acenaphthylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
3. Aniline	U	J,V-	µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
4. Anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
5. Azobenzene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
6. Benzo(a)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
7. Benzo(a)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
9. Benzo(ghi)perylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
11. Benzyl Alcohol	U		µg/kg	3300	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
17. Butyl Benzyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
18. Carbazole (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
20. 2-Chloronaphthalene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
21. 2-Chlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A

Fibertec environmental services

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-022

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-11/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-11**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-022A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
25. Dibenzofuran	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
27. Diethyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
28. Dimethyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
31. 2,4-Dinitrophenol	U		µg/kg	2000	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
34. Di-n-octyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
35. Fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
36. Fluorene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
37. Hexachlorobenzene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
38. Hexachlorobutadiene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
39. Hexachlorocyclopentadiene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
41. Isophorone	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	2000	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
43. 2-Methylnaphthalene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
46. 2-Nitroaniline	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
47. 3-Nitroaniline	U		µg/kg	830	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
48. 4-Nitroaniline	U		µg/kg	830	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
49. Nitrobenzene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
50. 2-Nitrophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
51. 4-Nitrophenol	U		µg/kg	2000	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
52. N-Nitrosodimethylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
55. Pentachlorophenol	U		µg/kg	1000	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
56. Phenanthrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
57. Phenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
58. Pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
59. Pyridine	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-023

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-11/S-2 5-6'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-11**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-023A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**26**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-023A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**14000**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**120000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**450**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**15000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**23000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**13000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**460**		µg/kg	200	10	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**52000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-023A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-023A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	450	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-023** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/20/11	V911F20B	06/21/11	V911F20B
2. Acrylonitrile	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
3. Benzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
4. Bromobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
5. Bromochloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-023

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-11/S-2 5-6'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-11**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-023** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
7. Bromoform	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
8. Bromomethane	U		µg/kg	200	1.0	06/20/11	V911F20B	06/21/11	V911F20B
9. 2-Butanone	U		µg/kg	750	1.0	06/20/11	V911F20B	06/21/11	V911F20B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
15. Chlorobenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
16. Chloroethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
17. Chloroform	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
18. Chloromethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/20/11	V911F20B	06/21/11	V911F20B
22. Dibromomethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
35. Ethylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/20/11	V911F20B	06/21/11	V911F20B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/20/11	V911F20B	06/21/11	V911F20B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
39. Methyl Iodide	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
40. Methylene Chloride	U		µg/kg	140	1.0	06/20/11	V911F20B	06/21/11	V911F20B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/20/11	V911F20B	06/21/11	V911F20B
42. MTBE	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
43. Naphthalene	U		µg/kg	330	1.0	06/20/11	V911F20B	06/21/11	V911F20B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
45. Styrene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-023

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-11/S-2 5-6'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-11**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-023** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
49. Toluene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/20/11	V911F20B	06/21/11	V911F20B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
53. Trichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/20/11	V911F20B	06/21/11	V911F20B
60. Xylenes	U		µg/kg	150	1.0	06/20/11	V911F20B	06/21/11	V911F20B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-023A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A

Fibertec environmental services

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-023

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-11/S-2 5-6'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-11**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-023A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
31. 2,4-Dinitrophenol	U		µg/kg	900	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	900	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
51. 4-Nitrophenol	U		µg/kg	900	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-024

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-12/S-1 1-2'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-12**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-024A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**18**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-024A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3900**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**79000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**290**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**16000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**17000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**12000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**620**		µg/kg	200	20	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**54000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-024A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-024A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-024** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-024

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-12/S-1 1-2'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-12**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-024** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-024

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-12/S-1 1-2'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-12**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-024** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-024A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-024

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-12/S-1 1-2'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-12**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-024A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-026

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-13/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-13**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**16:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-026A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**18**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-026A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**4200**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**70000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**870**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**22000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**21000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**51000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**680**		µg/kg	200	10	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	**110**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**85000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-026A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	**56**		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-026A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-026** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Fibertec environmental services

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-026

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-13/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-13**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**16:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-026** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-026

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-13/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-13**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**16:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-026** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-026A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

Fibertec environmental services

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-026

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-13/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-13**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**16:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-026A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

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Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-028

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-14/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-14**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**16:35**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-028A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**18**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-028A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3600**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**69000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**240**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**16000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**14000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**12000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**650**		µg/kg	200	10	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**60000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-028A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-028A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-028** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18B	06/19/11	V911F18B
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-028

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-14/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-14**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**16:35**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-028** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18B	06/19/11	V911F18B
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18B	06/19/11	V911F18B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18B	06/19/11	V911F18B
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18B	06/19/11	V911F18B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18B	06/19/11	V911F18B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18B	06/19/11	V911F18B
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18B	06/19/11	V911F18B
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-14/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-14**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**16:35**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-028** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18B	06/19/11	V911F18B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18B	06/19/11	V911F18B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18B	06/19/11	V911F18B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18B	06/19/11	V911F18B
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18B	06/19/11	V911F18B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-028A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-028

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-14/S-1 2-3'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-14**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**16:35**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-028A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S311F20A

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Laboratory Project Number: 45031
Laboratory Sample Number: 45031-030

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-15/S-1 1-2'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-15**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**17:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45031-030A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**15**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45031-030A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**4100**		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
2. Barium	**67000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
3. Cadmium	**650**		µg/kg	50	20	06/21/11	PT11F21F	06/22/11	T211F22A
4. Chromium	**15000**		µg/kg	500	20	06/21/11	PT11F21F	06/22/11	T211F22A
5. Copper	**15000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
6. Lead	**26000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A
7. Selenium	**510**		µg/kg	200	10	06/21/11	PT11F21F	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21F	06/22/11	T211F22A
9. Zinc	**58000**		µg/kg	1000	20	06/21/11	PT11F21F	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45031-030A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45031-030A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
2. Aroclor-1221	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
3. Aroclor-1232	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
4. Aroclor-1242	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
5. Aroclor-1248	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
6. Aroclor-1254	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
7. Aroclor-1260	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
8. Aroclor-1262 (NN)	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B
9. Aroclor-1268 (NN)	U		µg/kg	390	1.0	06/20/11	PS11F20B	06/21/11	SB11F20B

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-030** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-15/S-1 1-2'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-15**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**17:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-030** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18C	06/19/11	V911F18C
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-15/S-1 1-2'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-15**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**17:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-030** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-030A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
2. Acenaphthylene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
3. Aniline	U	J,V-	µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
4. Anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
7. Benzo(a)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
9. Benzo(ghi)perylene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
14. Bis(2-chloroisopropyl) Ether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
18. Carbazole (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-030

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-15/S-1 1-2'**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-15**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**17:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45031-030A** **Matrix: Soil/Solid** **Analyst: TMC**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
24. Dibenzo(a,h)anthracene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
31. 2,4-Dinitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
34. Di-n-octyl Phthalate	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
36. Fluorene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	5.0	06/20/11	PS11F20B	06/21/11	S111F21A
41. Isophorone	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
42. 2-Methyl-4,6-dinitrophenol (NN)	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
49. Nitrobenzene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
55. Pentachlorophenol	U		µg/kg	800	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
56. Phenanthrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
57. Phenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
58. Pyrene	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
59. Pyridine	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/20/11	PS11F20B	06/20/11	S111F20B

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-032

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**FIELD BLANK**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**FIELD BLANK**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-032** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031
Laboratory Sample Number: 45031-032

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Date: 06/24/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**FIELD BLANK**	Chain of Custody:	**103722**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**FIELD BLANK**	Collect Date:	**06/15/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45031-032** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
41. 2-Methylnaphthalene (NN)	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
46. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
61. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45031

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Definitions/ Qualifiers:

A: Spike recovery or precision unusable due to dilution.
B: The analyte was detected in the associated method blank.
E: The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
J: The concentration is an estimated value.
M: Modified Method
U: The analyte was not detected at or above the reporting limit.
X: Matrix Interference has resulted in a raised reporting limit or distorted result.
W: Results reported on a wet-weight basis.
***:** Value reported is outside QA limits

Exception Summary:

V- : Recovery in the associated continuing calibration verification sample (CCV) exceeds the lower control limit. Results may be biased low.

ACCREDITED IN ACCORDANCE WITH nelac

Accreditation Number:

E-10395

Fibertec environmental services

Thursday, June 23, 2011

Fibertec Project Number:	45032
Project Identification:	Detroit Arsenal-Child Development Center /61-110632-00
Submittal Date:	06/17/2011

Mr. Eric Schupp
NTH Consultants, Ltd. - Detroit
480 Ford Field (Gate G)
2000 Brush Street
Detroit, MI 48226

Dear Mr. Schupp,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note samples will be disposed of 30 days after reporting date.

As discussed, no Field Blank #2 was received.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

Daryl P. Strandbergh
Laboratory Director

DPS/kc

Enclosures

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-001

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-16/S-1 2-3'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-16**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**07:35**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45032-001A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**21**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45032-001A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3200**		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
2. Barium	**81000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
3. Cadmium	**310**		µg/kg	50	20	06/21/11	PT11F21E	06/22/11	T211F22A
4. Chromium	**19000**		µg/kg	500	20	06/21/11	PT11F21E	06/22/11	T211F22A
5. Copper	**18000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
6. Lead	**14000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
7. Selenium	**860**		µg/kg	200	20	06/21/11	PT11F21E	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
9. Zinc	**75000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45032-001A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	**52**		µg/kg	50	10	06/20/11	PM11F20B	06/21/11	M411F21A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45032-001A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
2. Aroclor-1221	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
3. Aroclor-1232	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
4. Aroclor-1242	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
5. Aroclor-1248	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
6. Aroclor-1254	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
7. Aroclor-1260	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
8. Aroclor-1262 (NN)	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
9. Aroclor-1268 (NN)	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-001** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-001

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-16/S-1 2-3'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-16**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**07:35**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-001** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	130	1.0	06/18/11	V911F18C	06/19/11	V911F18C
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-001

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-16/S-1 2-3'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-16**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**07:35**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-001** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-001A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
2. Acenaphthylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
4. Anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
14. Bis(2-chloroisopropyl) Ether	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-001

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-16/S-1 2-3'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-16**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**07:35**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-001A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
31. 2,4-Dinitrophenol	U	J,V-	µg/kg	840	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
36. Fluorene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
41. Isophorone	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
49. Nitrobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
51. 4-Nitrophenol	U		µg/kg	840	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
55. Pentachlorophenol	U		µg/kg	840	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
56. Phenanthrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
57. Phenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
58. Pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
59. Pyridine	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-003

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-17/S-1 2-3'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-17**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45032-003A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**20**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45032-003A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3600**		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
2. Barium	**67000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
3. Cadmium	**230**		µg/kg	50	20	06/21/11	PT11F21E	06/22/11	T211F22A
4. Chromium	**17000**		µg/kg	500	20	06/21/11	PT11F21E	06/22/11	T211F22A
5. Copper	**15000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
6. Lead	**11000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
7. Selenium	**660**		µg/kg	200	20	06/21/11	PT11F21E	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
9. Zinc	**55000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45032-003A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/20/11	PM11F20B	06/21/11	M411F21A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45032-003A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
2. Aroclor-1221	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
3. Aroclor-1232	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
4. Aroclor-1242	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
5. Aroclor-1248	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
6. Aroclor-1254	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
7. Aroclor-1260	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
8. Aroclor-1262 (NN)	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
9. Aroclor-1268 (NN)	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-003** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-003

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-17/S-1 2-3'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-17**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-003** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18C	06/19/11	V911F18C
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-003

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-17/S-1 2-3'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-17**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-003** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-003A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
2. Acenaphthylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
4. Anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
14. Bis(2-chloroisopropyl) Ether	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-003

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-17/S-1 2-3'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-17**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-003A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
31. 2,4-Dinitrophenol	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
36. Fluorene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
41. Isophorone	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
49. Nitrobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
55. Pentachlorophenol	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
56. Phenanthrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
57. Phenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
58. Pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
59. Pyridine	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-005

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-18/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-18**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45032-005A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**19**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45032-005A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**5600**		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
2. Barium	**70000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
3. Cadmium	**220**		µg/kg	50	20	06/21/11	PT11F21E	06/22/11	T211F22A
4. Chromium	**16000**		µg/kg	500	20	06/21/11	PT11F21E	06/22/11	T211F22A
5. Copper	**17000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
6. Lead	**12000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
7. Selenium	**320**		µg/kg	200	20	06/21/11	PT11F21E	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
9. Zinc	**51000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45032-005A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/20/11	PM11F20B	06/21/11	M411F21A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45032-005A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
2. Aroclor-1221	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
3. Aroclor-1232	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
4. Aroclor-1242	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
5. Aroclor-1248	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
6. Aroclor-1254	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
7. Aroclor-1260	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
8. Aroclor-1262 (NN)	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
9. Aroclor-1268 (NN)	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-005** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-005

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-18/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-18**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-005** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18C	06/19/11	V911F18C
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-005

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-18/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-18**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-005** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-005A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
2. Acenaphthylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
4. Anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
14. Bis(2-chloroisopropyl) Ether	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-005

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-18/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-18**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**08:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-005A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
31. 2,4-Dinitrophenol	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
36. Fluorene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
41. Isophorone	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
49. Nitrobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
55. Pentachlorophenol	U		µg/kg	820	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
56. Phenanthrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
57. Phenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
58. Pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
59. Pyridine	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-007

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-19/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-19**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45032-007A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**22**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45032-007A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**4000**		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
2. Barium	**80000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
3. Cadmium	**430**		µg/kg	50	20	06/21/11	PT11F21E	06/22/11	T211F22A
4. Chromium	**18000**		µg/kg	500	20	06/21/11	PT11F21E	06/22/11	T211F22A
5. Copper	**24000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
6. Lead	**19000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
7. Selenium	**910**		µg/kg	200	20	06/21/11	PT11F21E	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
9. Zinc	**67000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45032-007A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/20/11	PM11F20B	06/21/11	M411F21A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45032-007A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
2. Aroclor-1221	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
3. Aroclor-1232	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
4. Aroclor-1242	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
5. Aroclor-1248	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
6. Aroclor-1254	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
7. Aroclor-1260	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
8. Aroclor-1262 (NN)	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
9. Aroclor-1268 (NN)	U		µg/kg	420	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-007** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-007

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-19/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-19**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-007** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	130	1.0	06/18/11	V911F18C	06/19/11	V911F18C
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-007

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-19/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-19**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-007** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-007A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
2. Acenaphthylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
4. Anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
14. Bis(2-chloroisopropyl) Ether	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-007

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-19/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-19**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-007A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
31. 2,4-Dinitrophenol	U	J,V-	µg/kg	860	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
36. Fluorene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
41. Isophorone	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
49. Nitrobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
51. 4-Nitrophenol	U		µg/kg	860	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
55. Pentachlorophenol	U		µg/kg	860	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
56. Phenanthrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
57. Phenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
58. Pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
59. Pyridine	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-009

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-20/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-20**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45032-009A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**17**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45032-009A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**4200**		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
2. Barium	**78000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
3. Cadmium	**290**		µg/kg	50	20	06/21/11	PT11F21E	06/22/11	T211F22A
4. Chromium	**19000**		µg/kg	500	20	06/21/11	PT11F21E	06/22/11	T211F22A
5. Copper	**16000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
6. Lead	**18000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
7. Selenium	**630**		µg/kg	200	20	06/21/11	PT11F21E	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
9. Zinc	**67000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45032-009A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/20/11	PM11F20B	06/21/11	M411F21A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45032-009A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
2. Aroclor-1221	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
3. Aroclor-1232	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
4. Aroclor-1242	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
5. Aroclor-1248	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
6. Aroclor-1254	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
7. Aroclor-1260	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
8. Aroclor-1262 (NN)	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
9. Aroclor-1268 (NN)	U		µg/kg	400	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-009** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Fibertec environmental services

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-009

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-20/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-20**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-009** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18C	06/19/11	V911F18C
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-009

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-20/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-20**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-009** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-009A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
2. Acenaphthylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
4. Anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
14. Bis(2-chloroisopropyl) Ether	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-009

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-20/S-1 1-2'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-20**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:40**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-009A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
31. 2,4-Dinitrophenol	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
36. Fluorene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
41. Isophorone	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
49. Nitrobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
55. Pentachlorophenol	U		µg/kg	800	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
56. Phenanthrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
57. Phenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
58. Pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
59. Pyridine	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-010

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-20/S-2 4-5'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-20**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45032-010A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**25**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45032-010A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**7700**		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
2. Barium	**170000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
3. Cadmium	**630**		µg/kg	50	20	06/21/11	PT11F21E	06/22/11	T211F22A
4. Chromium	**26000**		µg/kg	500	20	06/21/11	PT11F21E	06/22/11	T211F22A
5. Copper	**30000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
6. Lead	**17000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
7. Selenium	**460**		µg/kg	200	10	06/21/11	PT11F21E	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
9. Zinc	**78000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45032-010A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/21/11	PM11F21A	06/22/11	M411F22A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45032-010A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
2. Aroclor-1221	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
3. Aroclor-1232	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
4. Aroclor-1242	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
5. Aroclor-1248	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
6. Aroclor-1254	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
7. Aroclor-1260	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
8. Aroclor-1262 (NN)	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A
9. Aroclor-1268 (NN)	U		µg/kg	440	1.0	06/21/11	PS11F21B	06/21/11	SB11F21A

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-010** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/20/11	V911F20B	06/21/11	V911F20B
2. Acrylonitrile	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
3. Benzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
4. Bromobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
5. Bromochloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B

Fibertec environmental services

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-010

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-20/S-2 4-5'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-20**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-010** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
7. Bromoform	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
8. Bromomethane	U		µg/kg	200	1.0	06/20/11	V911F20B	06/21/11	V911F20B
9. 2-Butanone	U		µg/kg	750	1.0	06/20/11	V911F20B	06/21/11	V911F20B
10. n-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
13. Carbon Disulfide	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
15. Chlorobenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
16. Chloroethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
17. Chloroform	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
18. Chloromethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
20. Dibromochloromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/20/11	V911F20B	06/21/11	V911F20B
22. Dibromomethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
35. Ethylbenzene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/20/11	V911F20B	06/21/11	V911F20B
37. 2-Hexanone	U		µg/kg	2500	1.0	06/20/11	V911F20B	06/21/11	V911F20B
38. Isopropylbenzene	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
39. Methyl Iodide	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
40. Methylene Chloride	U		µg/kg	130	1.0	06/20/11	V911F20B	06/21/11	V911F20B
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/20/11	V911F20B	06/21/11	V911F20B
42. MTBE	U		µg/kg	250	1.0	06/20/11	V911F20B	06/21/11	V911F20B
43. Naphthalene	U		µg/kg	330	1.0	06/20/11	V911F20B	06/21/11	V911F20B
44. n-Propylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
45. Styrene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-010

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-20/S-2 4-5'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-20**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-010** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
48. Tetrachloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
49. Toluene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/20/11	V911F20B	06/21/11	V911F20B
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
53. Trichloroethene	U		µg/kg	50	1.0	06/20/11	V911F20B	06/21/11	V911F20B
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/20/11	V911F20B	06/21/11	V911F20B
59. Vinyl Chloride	U		µg/kg	40	1.0	06/20/11	V911F20B	06/21/11	V911F20B
60. Xylenes	U		µg/kg	150	1.0	06/20/11	V911F20B	06/21/11	V911F20B

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-010A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
2. Acenaphthylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
4. Anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
14. Bis(2-chloroisopropyl) Ether	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-010

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-20/S-2 4-5'**	Chain of Custody:	**103723**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-20**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-010A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
31. 2,4-Dinitrophenol	U	J,V-	µg/kg	890	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
36. Fluorene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
41. Isophorone	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
49. Nitrobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
51. 4-Nitrophenol	U		µg/kg	890	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
55. Pentachlorophenol	U		µg/kg	890	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
56. Phenanthrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
57. Phenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
58. Pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
59. Pyridine	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-011

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-21/S-1 1-2'**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-21**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45032-011A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**19**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45032-011A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**3000**		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
2. Barium	**62000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
3. Cadmium	**360**		µg/kg	50	20	06/21/11	PT11F21E	06/22/11	T211F22A
4. Chromium	**16000**		µg/kg	500	20	06/21/11	PT11F21E	06/22/11	T211F22A
5. Copper	**21000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
6. Lead	**22000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A
7. Selenium	**860**		µg/kg	200	20	06/21/11	PT11F21E	06/22/11	T211F22A
8. Silver	U		µg/kg	100	20	06/21/11	PT11F21E	06/22/11	T211F22A
9. Zinc	**60000**		µg/kg	1000	20	06/21/11	PT11F21E	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45032-011A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/20/11	PM11F20B	06/21/11	M411F21A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45032-011A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
2. Aroclor-1221	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
3. Aroclor-1232	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
4. Aroclor-1242	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
5. Aroclor-1248	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
6. Aroclor-1254	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
7. Aroclor-1260	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
8. Aroclor-1262 (NN)	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
9. Aroclor-1268 (NN)	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-011** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-011

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-21/S-1 1-2'**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-21**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-011** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18C	06/19/11	V911F18C
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-011

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-21/S-1 1-2'**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-21**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-011** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-011A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
2. Acenaphthylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
3. Aniline	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
4. Anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
5. Azobenzene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
6. Benzo(a)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
7. Benzo(a)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
9. Benzo(ghi)perylene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
11. Benzyl Alcohol	U		µg/kg	3300	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
14. Bis(2-chloroisopropyl) Ether	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
17. Butyl Benzyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
18. Carbazole (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
20. 2-Chloronaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
21. 2-Chlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-011

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**GP-21/S-1 1-2'**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**GP-21**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-011A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
25. Dibenzofuran	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
27. Diethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
28. Dimethyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
31. 2,4-Dinitrophenol	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
34. Di-n-octyl Phthalate	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
35. Fluoranthene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
36. Fluorene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
37. Hexachlorobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
38. Hexachlorobutadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
39. Hexachlorocyclopentadiene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
41. Isophorone	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U	J,V-	µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
43. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
46. 2-Nitroaniline	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
47. 3-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
48. 4-Nitroaniline	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
49. Nitrobenzene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
50. 2-Nitrophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
51. 4-Nitrophenol	U		µg/kg	830	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
52. N-Nitrosodimethylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
55. Pentachlorophenol	U		µg/kg	820	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
56. Phenanthrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
57. Phenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
58. Pyrene	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
59. Pyridine	U	J,V-	µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	330	1.0	06/21/11	PS11F21B	06/21/11	S711F21A

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Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-013

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Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**Duplicate**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**DUP**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Dry Weight Determination (ASTM D 2974-87) **Aliquot ID: 45032-013A** **Matrix: Soil/Solid** **Analyst: BMG**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Percent Moisture (Water Content) (NN)	**20**		%	0.1	1.0	06/20/11	MC110620	06/21/11	MC110620

Michigan 10 Elements by ICP/MS (EPA 0200.2-M/EPA 6020A) **Aliquot ID: 45032-013A** **Matrix: Soil/Solid** **Analyst: JLH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Arsenic	**5300**		µg/kg	100	10	06/21/11	PT11F21E	06/22/11	T211F22A
2. Barium	**86000**		µg/kg	1000	10	06/21/11	PT11F21E	06/22/11	T211F22A
3. Cadmium	**420**		µg/kg	50	10	06/21/11	PT11F21E	06/22/11	T211F22A
4. Chromium	**18000**		µg/kg	500	10	06/21/11	PT11F21E	06/22/11	T211F22A
5. Copper	**19000**		µg/kg	1000	10	06/21/11	PT11F21E	06/22/11	T211F22A
6. Lead	**24000**		µg/kg	1000	10	06/21/11	PT11F21E	06/22/11	T211F22A
7. Selenium	**640**		µg/kg	200	10	06/21/11	PT11F21E	06/22/11	T211F22A
8. Silver	U		µg/kg	100	10	06/21/11	PT11F21E	06/22/11	T211F22A
9. Zinc	**65000**		µg/kg	1000	10	06/21/11	PT11F21E	06/22/11	T211F22A

Mercury by CVAAS (EPA 7471B) **Aliquot ID: 45032-013A** **Matrix: Soil/Solid** **Analyst: MAP**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Mercury	U		µg/kg	50	10	06/20/11	PM11F20B	06/21/11	M411F21A

Polychlorinated Biphenyls (PCBs) (EPA 3550C/EPA 8082A) **Aliquot ID: 45032-013A** **Matrix: Soil/Solid** **Analyst: BDA**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Aroclor-1016	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
2. Aroclor-1221	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
3. Aroclor-1232	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
4. Aroclor-1242	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
5. Aroclor-1248	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
6. Aroclor-1254	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
7. Aroclor-1260	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
8. Aroclor-1262 (NN)	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A
9. Aroclor-1268 (NN)	U		µg/kg	410	1.0	06/21/11	PS11F21B	06/22/11	SB11F21A

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-013** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/kg	1000	1.0	06/18/11	V911F18C	06/19/11	V911F18C
2. Acrylonitrile	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
3. Benzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
4. Bromobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
5. Bromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-013

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**Duplicate**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**DUP**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-013** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
6. Bromodichloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
7. Bromoform	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
8. Bromomethane	U		µg/kg	200	1.0	06/18/11	V911F18C	06/19/11	V911F18C
9. 2-Butanone	U		µg/kg	750	1.0	06/18/11	V911F18C	06/19/11	V911F18C
10. n-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
13. Carbon Disulfide	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
15. Chlorobenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
16. Chloroethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
17. Chloroform	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
18. Chloromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
20. Dibromochloromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/kg	10	1.0	06/18/11	V911F18C	06/19/11	V911F18C
22. Dibromomethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
35. Ethylbenzene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
36. Ethylene Dibromide	U		µg/kg	20	1.0	06/18/11	V911F18C	06/19/11	V911F18C
37. 2-Hexanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
38. Isopropylbenzene	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
39. Methyl Iodide	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
40. Methylene Chloride	U		µg/kg	120	1.0	06/18/11	V911F18C	06/19/11	V911F18C
41. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	06/18/11	V911F18C	06/19/11	V911F18C
42. MTBE	U		µg/kg	250	1.0	06/18/11	V911F18C	06/19/11	V911F18C
43. Naphthalene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
44. n-Propylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
45. Styrene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C

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Laboratory Project Number: 45032
Laboratory Sample Number: 45032-013

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**Duplicate**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**DUP**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 (EPA 5035/EPA 8260B) **Aliquot ID: 45032-013** **Matrix: Soil/Solid** **Analyst: JAS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
48. Tetrachloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
49. Toluene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
50. 1,2,4-Trichlorobenzene	U		µg/kg	330	1.0	06/18/11	V911F18C	06/19/11	V911F18C
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
53. Trichloroethene	U		µg/kg	50	1.0	06/18/11	V911F18C	06/19/11	V911F18C
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
56. 1,2,3-Trimethylbenzene (NN)	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/18/11	V911F18C	06/19/11	V911F18C
59. Vinyl Chloride	U		µg/kg	40	1.0	06/18/11	V911F18C	06/19/11	V911F18C
60. Xylenes	U		µg/kg	150	1.0	06/18/11	V911F18C	06/19/11	V911F18C

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-013A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acenaphthene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
2. Acenaphthylene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
3. Aniline	U	J,V-	µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
4. Anthracene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
5. Azobenzene (NN)	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
6. Benzo(a)anthracene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
7. Benzo(a)pyrene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
8. Benzo(b)fluoranthene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
9. Benzo(ghi)perylene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
10. Benzo(k)fluoranthene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
11. Benzyl Alcohol	U		µg/kg	3300	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
12. Bis(2-chloroethoxy)methane	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
13. Bis(2-chloroethyl)ether	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
14. Bis(2-chloroisopropyl) Ether	U	J,V-	µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
15. Bis(2-ethylhexyl)phthalate (NN)	U		µg/kg	410	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
16. 4-Bromophenyl Phenylether (NN)	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
17. Butyl Benzyl Phthalate	U		µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
18. Carbazole (NN)	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
19. 4-Chloro-3-methylphenol	U		µg/kg	280	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
20. 2-Chloronaphthalene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
21. 2-Chlorophenol	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
22. 4-Chlorophenyl Phenylether	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-013

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Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**Duplicate**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**DUP**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Soil/Solid**	Collect Time:	**NA**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Base/Neutral/Acid Semivolatiles by GC/MS (EPA 3550C/EPA 8270C) **Aliquot ID: 45032-013A** **Matrix: Soil/Solid** **Analyst: HLS**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
23. Chrysene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
24. Dibenzo(a,h)anthracene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
25. Dibenzofuran	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
26. 2,4-Dichlorophenol	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
27. Diethyl Phthalate	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
28. Dimethyl Phthalate	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
29. 2,4-Dimethylphenol	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
30. Di-n-butyl Phthalate	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
31. 2,4-Dinitrophenol	U	J,V-	µg/kg	4100	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
32. 2,4-Dinitrotoluene (NN)	U		µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
33. 2,6-Dinitrotoluene (NN)	U		µg/kg	410	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
34. Di-n-octyl Phthalate	U		µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
35. Fluoranthene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
36. Fluorene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
37. Hexachlorobenzene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
38. Hexachlorobutadiene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
39. Hexachlorocyclopentadiene	U		µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
40. Indeno(1,2,3-cd)pyrene	U		µg/kg	410	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
41. Isophorone	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
42. 2-Methyl-4,6-dinitrophenol (NN)	U	J,V-	µg/kg	2100	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
43. 2-Methylnaphthalene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
44. 2-Methylphenol (NN)	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
45. 3&4-Methylphenol (NN)	U		µg/kg	660	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
46. 2-Nitroaniline	U		µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
47. 3-Nitroaniline	U		µg/kg	830	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
48. 4-Nitroaniline	U		µg/kg	830	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
49. Nitrobenzene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
50. 2-Nitrophenol	U		µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
51. 4-Nitrophenol	U		µg/kg	4100	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
52. N-Nitrosodimethylamine	U		µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
53. N-Nitrosodi-n-propylamine	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
54. N-Nitrosodiphenylamine	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
55. Pentachlorophenol	U		µg/kg	4100	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
56. Phenanthrene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
57. Phenol	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
58. Pyrene	U		µg/kg	330	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
59. Pyridine	U	J,V-	µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
60. 2,4,5-Trichlorophenol	U		µg/kg	1000	5.0	06/21/11	PS11F21B	06/21/11	S711F21A
61. 2,4,6-Trichlorophenol	U		µg/kg	410	5.0	06/21/11	PS11F21B	06/21/11	S711F21A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-015

Order: 45032
Page: 34 of 36
Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**Trip Blank**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**TB**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Ground Water**	Collect Time:	**NA**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS (EPA 5030B/EPA 8260B) **Aliquot ID: 45032-015** **Matrix: Ground Water** **Analyst: CDH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
1. Acetone	U		µg/L	50	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
2. Acrylonitrile	U		µg/L	2.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
3. Benzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
4. Bromobenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
5. Bromochloromethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
6. Bromodichloromethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
7. Bromoform	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
8. Bromomethane	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
9. 2-Butanone	U		µg/L	25	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
10. n-Butylbenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
11. sec-Butylbenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
12. tert-Butylbenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
13. Carbon Disulfide	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
14. Carbon Tetrachloride	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
15. Chlorobenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
16. Chloroethane	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
17. Chloroform	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
18. Chloromethane	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
19. 2-Chlorotoluene	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
20. Dibromochloromethane	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
21. 1,2-Dibromo-3-chloropropane (NN)	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
22. Dibromomethane	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
27. 1,1-Dichloroethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
30. cis-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
33. cis-1,3-Dichloropropene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
34. trans-1,3-Dichloropropene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
35. Ethylbenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
36. Ethylene Dibromide	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
37. 2-Hexanone	U		µg/L	50	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
38. Isopropylbenzene	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
39. Methyl Iodide	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
40. Methylene Chloride	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032
Laboratory Sample Number: 45032-015

Order: 45032
Page: 35 of 36
Date: 06/23/11

Client Identification:	**NTH Consultants, Ltd. - Detroit**	Sample Description:	**Trip Blank**	Chain of Custody:	**103731**
Client Project Name:	**Detroit Arsenal-Child Development Center**	Sample No:	**TB**	Collect Date:	**06/16/11**
Client Project No:	**61-110632-00**	Sample Matrix:	**Ground Water**	Collect Time:	**NA**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable NN: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS (EPA 5030B/EPA 8260B) **Aliquot ID: 45032-015** **Matrix: Ground Water** **Analyst: CDH**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Prep Date	Prep Batch	Analysis Date	Analysis Batch
41. 2-Methylnaphthalene (NN)	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
42. 4-Methyl-2-pentanone	U		µg/L	50	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
43. MTBE	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
44. Naphthalene	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
45. n-Propylbenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
46. Styrene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
47. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
48. 1,1,2,2-Tetrachloroethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
49. Tetrachloroethene	U		µg/L	3.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
50. Toluene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
51. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
52. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
53. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
54. Trichloroethene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
55. Trichlorofluoromethane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
56. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
57. 1,2,3-Trimethylbenzene (NN)	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
58. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
59. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
60. Vinyl Chloride	U		µg/L	1.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A
61. Xylenes	U		µg/L	3.0	1.0	06/18/11	VH11F18A	06/18/11	VH11F18A

Fibertec environmental services

Analytical Laboratory Report
Laboratory Project Number: 45032

Order: 45032
Page: 36 of 36
Date: 06/23/11

Definitions/ Qualifiers:

A: Spike recovery or precision unusable due to dilution.
B: The analyte was detected in the associated method blank.
E: The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
J: The concentration is an estimated value.
M: Modified Method
U: The analyte was not detected at or above the reporting limit.
X: Matrix Interference has resulted in a raised reporting limit or distorted result.
W: Results reported on a wet-weight basis.
***:** Value reported is outside QA limits

Exception Summary:

V- : Recovery in the associated continuing calibration verification sample (CCV) exceeds the lower control limit. Results may be biased low.

ACCREDITED IN ACCORDANCE WITH nelac

Accreditation Number:

E-10395

Revised, emailed 6/20

Fibertec environmental services

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Chain of Custody # 103720

PAGE 1 of 3

Client Name: NTH Consultants

Contact Person: Eric Schupp

Project Name/ Number: Detroit Arsenal - Child Development Center

61-11-6232-00

Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (see legend codes for codes)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 Metals							Remarks:
	6-15-11	9:00A	GP-1	GP-1/S-1 2-3'	S	3	Y	/	/	/	/							
		9:15A	GP-1	GP-1/S-2 4.5'														Hold
		1:30P	GP-2	GP-2/S-1 2-3'				/	/	/	/							
		1:45P	GP-2	GP-2/S-2 4-5'				/	/	/	/							~~Hold~~
		2:00P	GP-3	GP-3/S-1 2-3'				/	/	/	/							
		9:00A	GP-3	GP-3/S-2 6-7'														Hold
			GP-4	GP-4/S-1 3-4'				/	/	/	/							
			GP-4	GP-4/S-2 6-7'														Hold
		2:45P	GP-5	GP-5/S-1 2.5-3.5'				/	/	/	/							
			GP-5	GP-5/S-2 6-7'														Hold
				Duplicate	S	3	Y	/	/	/	/							

Comments:

Turnaround: 24 hour RUSH (surcharge applies); 48 hour RUSH (surcharge applies); 72 hour RUSH (surcharge applies); X Standard (5-7 bus. days); Other: Specify

Matrix Code: S Soil; W Water; A Air; O Oil; P Wipe; GW Ground Water; SW Surface Water; WW Waste Water; X Other: Specify

Relinquished By:	Date/ Time	Received By:
Eric Schupp	6-15-11 5:45	[illegible]
Relinquished By:	Date/ Time	Received By:
Relinquished By:	Date/ Time	Received By Laboratory:

LAB USE ONLY:
Fibertec project number:
Laboratory Tracking:
Temperature at Receipt:

COC Revision: April 2006

TERMS & CONDITIONS ON BACK

Send Results to Cliff Andrews

emailed 6/17

Fibertec environmental services

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Brighton, MI 48116
Phone: 810 220 3300
Fax: 810 220 3311

Chain of Custody #
103721
PAGE 2 of 3

Client Name: NTH Consultants
Contact Person:
Project Name/ Number: Detroit Arsenal - Child Development Center
14-110623.00
Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Description	MATRIX	# OF CONTAINERS	PRESERVED (Y/N)	VOCs	SVOC	PCB	10 RCRA Metals							Turnaround	Matrix Code
12	[illegible]	[illegible]	[illegible]	GP [illegible]/S-1 2.5-3.5'	S	[illegible]	Y	/	/	/	/								
13			[illegible]	GP 6/S-1 6-7'														Hold	
14		[illegible]	[illegible]	GP 7/S-1 2-3'				/	/	/	/								
15		[illegible]	[illegible]	GP 7/S-2 6-7'														Hold	
16		11:15	[illegible]	GP-8/S-1 3-4'				/	/	/	/								
17		[illegible]	[illegible]	GP [illegible]/S-2 6-7'														Hold	
18		[illegible]	GP 9	GP 9/S-1 2-3'				/	/	/	/								
19		2:45p	GP 9	GP 9/S-2 5-6'														Hold	
20		3 [illegible]	GP 10	GP 10/S-1 3-4'				/	/	/	/								
21		3:15p	GP 10	GP 10/S-2 6-7'														Hold	

Turnaround: 24 hour RUSH (surcharge applies); 48 hour RUSH (surcharge applies); 72 hour RUSH (surcharge applies); Standard (5-7 bus. days); Other: Specify

Matrix Code: S Soil; W Water; A Air; O Oil; P Wipe; GW Ground Water; SW Surface Water; WW Waste Water; X Other: Specify

Remarks:

Comments:

Relinquished By:	Date/ Time: 6/16 5:40	Received By:
Relinquished By:	Date/ Time:	Received By:
Relinquished By:	Date/ Time:	Received By Laboratory:

LAB USE ONLY:
Fibertec project number:
Laboratory tracking:
Temperature of Receipt:

COC Revision: April, 2006

TERMS & CONDITIONS ON BACK

Revised emailed 6/20

Fibertec environmental services

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Chain of Custody #
103722
PAGE 3 of 3

Client Name: NTH Consultants
Contact Person: Eric Schupp
Project Name/ Number: Detroit Arsenal - Child Development Center
61-110632.00
Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (see right corner for code)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 metals	Remarks
	6-15-11	3:34p	GP-11	GP-11/S-1 2-3'	S	3	Y	/	/	/	/	
		3:40p	GP-11	GP-11/S-2 5-6'				/	/	/	/	Hold
		3:50p	GP-12	GP-12/S-1 1-2'				/	/	/	/	
		4:05p	GP-12	GP-12/S-2 4-5'								Hold
		4:15p	GP-13	GP-13/S-1 2-3'				/	/	/	/	
		4:25p	GP-13	GP-13/S-2 5-6'								Hold
		4:35p	GP-14	GP-14/S-1 2-3'				/	/	/	/	
		4:45p	GP-14	GP-14/S-2 5-6'								Hold
		5:00p	GP-15	GP-15/S-1 1-2'				/	/	/	/	
		5:15p	GP-15	GP-15/S-2 4-5'								Hold
				Field Blank	-	1	Y	/	/	/	/	

PARAMETERS

Turnaround
- 24 hour RUSH (surcharge applies)
- 48 hour RUSH (surcharge applies)
- 72 hour RUSH (surcharge applies)
- X Standard (5-7 bus. days)
- Other: Specify

Matrix Code
- S Soil
- W Water
- A Air
- O Oil
- P Wipe
- GW Ground Water
- SW Surface Water
- WW Waste Water
- X Other: Specify

Comments:

Relinquished By:	Date/ Time	Received By:
Eric Schupp	6-15-11 5:45p	[illegible]
Relinquished By:	Date/ Time	Received By:
Relinquished By:	Date/ Time	Received By Laboratory:

LAB USE ONLY:
Fibertec project number:
Laboratory tracking:
Temperature at Receipt:

COC Revision: April, 2006

TERMS & CONDITIONS ON BACK

Fibertec environmental services

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email: lab@fibertec.us

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Geoprobe
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Brighton, MI 48116
Phone: 810 220 3300
Fax: 810 220 3311

Chain of Custody # 103720

PAGE 1 of 3

Client Name: NTH Consultants

Contact Person: Eric Schupp

Project Name/ Number: Detroit Arsenal-Child Development Center

61-110632-00

Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 mi metals							Remarks:
	6-15-11	8:00A	GP-1	GP-1 / S-1 2-3'	S	3	Y											
		8:15A	GP-1	GP-1 / S-2 4-5'														
		8:30A	GP-2	GP-2 / S-1 2-3'														
		8:40A	GP-2	GP-2 / S-2 4-5'														
		8:50A	GP-3	GP-3 / S-1 2-3'														
		9:00A	GP-3	GP-3 / S-2 6-7'														
		9:15A	GP-4	GP-4 / S-1 3-4'														
		9:30A	GP-4	GP-4 / S-2 6-7'														
		9:45A	GP-5	GP-5 / S-1 2.5-3.5'														
		10:00A	GP-5	GP-5 / S-2 6-7'														
				Duplicate	S	3	Y											

Turnaround:
- 24 hour RUSH (surcharge applies)
- 48 hour RUSH (surcharge applies)
- 72 hour RUSH (surcharge applies)
- [X] Standard (5-7 bus. days)
- Other: Specify

Matrix Code:
- S Soil
- W Water
- A Air
- O Oil
- P Wipe
- GW Ground Water
- SW Surface Water
- WW Waste Water
- X Other: Specify

Comments:

Relinquished By: Eric Schupp	Date/ Time 6-15-11 5:45p	Received By:
Relinquished By: Dale A. Shrode	Date/ Time 6/16/11 1:26	Received By:
Relinquished By:	Date/ Time	Received By Laboratory:

LAB USE ONLY:
Fibertec project number: 45031
Laboratory Tracking:
Temperature at Receipt:

RCV'D ICE

COC Revision: April, 2006

TERMS & CONDITIONS ON BACK

3c

Fibertec environmental services

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Brighton, MI 48116
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Fax: 810 220 3311

Chain of Custody # 103721

PAGE 2 of 3

Client Name: NTH Consultants

Contact Person:

Project Name/ Number: Detroit Arsenal - Child Development Center 61-110632-00

Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 mi metals							Remarks:
	6-15-11	10:15	GP-6	GP-6/S-1 2.5-3.5'	S	3	Y											
		10:30	GP-6	GP-6/S-2 6-7'														
		10:45	GP-7	GP-7/S-1 2-3'														
		11:00	GP-7	GP-7/S-2 6-7'														
		11:15	GP-8	GP-8/S-1 3-4'														
		11:30	GP-8	GP-8/S-2 6-7'														
		2:30p	GP-9	GP-9/S-1 2-3'														
		2:45p	GP-9	GP-9/S-2 5-6'														
		3:00p	GP-10	GP-10/S-1 3-4'														
		3:15p	GP-10	GP-10/S-2 6-7'														

Turnaround:
- 24 hour RUSH (surcharge applies)
- 48 hour RUSH (surcharge applies)
- 72 hour RUSH (surcharge applies)
- [X] Standard (5-7 bus. days)
- Other: Specify

Matrix Code:
- S Soil
- W Water
- A Air
- O Oil
- P Wipe
- GW Ground Water
- SW Surface Water
- WW Waste Water
- X Other: Specify

Comments:

Relinquished By:	Date/ Time	Received By:
Eric Schupp	6-15-11 5:45p	
Dale A. Shah	6/16/11 1:26	
Relinquished By:	Date/ Time	Received By Laboratory:

LAB USE ONLY:
Fibertec project number:
Laboratory Tracking:
Temperature at Receipt:

RCV'D ON ICE

COC Revision: April, 2006

TERMS & CONDITIONS ON BACK

3c

Fibertec environmental services

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Chain of Custody # 103722

PAGE 3 of 3

Client Name: NTH Consultants

Contact Person: Eric Schupp

Project Name/ Number: Detroit Arsenal - Child Development Center 61-110632-00

Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 mi metals
	6-15-11	3:30p	GP-11	GP-11/S-1 2-3'	S	3	Y				
		3:40p	GP-11	GP-11/S-2 5-6'							
		3:50p	GP-12	GP-12/S-1 1-2'							
		4:05p	GP-12	GP-12/S-2 4-5'							
		4:15p	GP-13	GP-13/S-1 2-3'							
		4:25p	GP-13	GP-13/S-2 5-6'							
		4:35p	GP-14	GP-14/S-1 2-3'							
		4:45p	GP-14	GP-14/S-2 5-6'							
		5:00p	GP-15	GP-15/S-1 1-2'							
		5:15p	GP-15	GP-15/S-2 4-5'							
				Field Blank	-	1	Y				

Turnaround:
- [ ] 24 hour RUSH (surcharge applies)
- [ ] 48 hour RUSH (surcharge applies)
- [ ] 72 hour RUSH (surcharge applies)
- [x] Standard (5-7 bus. days)
- [ ] Other: Specify

Matrix Code: S Soil; GW Ground Water; W Water; SW Surface Water; A Air; WW Waste Water; O Oil; X Other: Specify; P Wipe

Remarks:

Comments:

Relinquished By:	Date/ Time	Received By:
Eric Schupp	6-15-11 5:45p	
	6/16/11 1:26	

Relinquished By:

Date/ Time

Received By Laboratory:

LAB USE ONLY:
Fibertec project number:
Laboratory Tracking:
Temperature at Receipt:

COC Revision: April, 2006

RCV'D ON ICE

TERMS & CONDITIONS ON BACK

Fibertec environmental services

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Phone: 810 220 3300
Fax: 810 220 3311

Chain of Custody # 103723

Client Name: NTH Consultants

Contact Person: Eric Schupp

Project Name/ Number: Detroit Arsenal - Child Development Center 61-110632-00

Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 Metals
	6-16-11	7:35	GP-16	GP-16/S-1 2-3'	S	3	Y				
		7:45	GP-16	GP-16/S-2 5-6'							
		8:00	GP-17	GP-17/S-1 2-3							
		8:15	GP-17	GP-17/S-2 6-7'							
		8:30	GP-18	GP-18/S-1 1-2'							
		8:45	GP-18	GP-18/S-2 4-5'							
		9:00	GP-19	GP-19/S-1 1-2'							
		9:30	GP-19	GP-19/S-2 4-5'							
		9:40	GP-20	GP-20/S-1 1-2'							
		9:50	GP-20	GP-20/S-2 4-5'							

Turnaround:
- 24 hour RUSH (surcharge applies)
- 48 hour RUSH (surcharge applies)
- 72 hour RUSH (surcharge applies)
- X Standard (5-7 bus. days)
- Other: Specify

Matrix Code: S Soil; GW Ground Water; W Water; SW Surface Water; A Air; WW Waste Water; O Oil; X Other: Specify; P Wipe

Remarks:

Comments:

Relinquished By:	Date/ Time	Received By:
Eric Schupp	6-16-11 10:45a	[illegible]
[illegible]	6/16/11 1126	[illegible]

Relinquished By: / Date/ Time / Received By Laboratory:

LAB USE ONLY:
Fibertec project number: 45032
Laboratory Tracking:
Temperature at Receipt:

RCV'D ON ICE

COC Revision: April, 2006

TERMS & CONDITIONS ON BACK

3c

Fibertec environmental services

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Geoprobe
11766 E. Grand River
Brighton, MI 48116
Phone: 810 220 3300
Fax: 810 220 3311

Chain of Custody # 103731

Client Name: NTH Consultants

Contact Person: Eric Schupp

Project Name/ Number: Detroit Arsenal - Child Development Center 61-110632-00

Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 mi metal
	6-16-11	10:00	GP-21	GP-21/S-1 1-2'	S	3	Y				
		10:15	GP-21	GP-21/S-2 4-5'	S	3	Y				
		—	Dupe	Duplicate	S	3	Y				
		—	FB-2	Field Blank #2	-	1	Y				
		—	TB	Trip Blank	-	1	Y				

Turnaround:
- 24 hour RUSH (surcharge applies)
- 48 hour RUSH (surcharge applies)
- 72 hour RUSH (surcharge applies)
- X Standard (5-7 bus. days)
- Other: Specify

Remarks:

Matrix Code:
- S Soil
- W Water
- A Air
- O Oil
- P Wipe
- GW Ground Water
- SW Surface Water
- WW Waste Water
- X Other: Specify

Comments:

Relinquished By:	Date/ Time	Received By:
Eric Schupp	6-16-11 10:45A	[illegible]
[illegible]	6/16/11 1:26	[illegible]
	Date/ Time	Received By Laboratory:

LAB USE ONLY:
Fibertec project number:
Laboratory Tracking:
Temperature at Receipt:

RCV'D ON ICE

COC Revision: April, 2008

TERMS & CONDITIONS ON BACK

3C

Revised, emailed 6/20

Fibertec environmental services

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Chain of Custody #
103723
PAGE 1 of 2

Client Name: NTH Consultants
Contact Person: Eric Schupp
Project Name/ Number: Detroit Arsenal - Child Development Center
Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (see matrix codes for code)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 Analytes							Remarks:
	6-16-11	7:35	CP-16	CP-16/S-1 2-3'	S	1	Y	/	/	/	/							
		7:45	CP-16	CP-16/S-2 5-6'														Hold
		8:00	CP-17	CP-17/S-1 2-3				/	/	/	/							
		8:15	CP-17	GP-17/S-2 6-7'														Hold
		8:30	CP-18	GP-18/S-1 1-2'				/	/	/	/							
		8:45	CP-18	GP-18/S-2 4-5'														Hold
		9:00	CP-19	CP-19/S-1 1-2'				/	/	/	/							
		9:30	CP-19	CP-19/S-2 4-5'														Hold
		9:40	CP-20	CP-20/S-1 1-2'				/	/	/	/							
		9:50	CP-20	CP-20/S-2 4-5'				/	/	/	/							~~Hold~~

Comments:

Turnaround:
- 24 hour RUSH (surcharge applies)
- 48 hour RUSH (surcharge applies)
- 72 hour RUSH (surcharge applies)
- [X] Standard (5-7 bus. days)
- Other: Specify

Matrix Code:
- S Soil
- W Water
- A Air
- O Oil
- P Wipe
- GW Ground Water
- SW Surface Water
- WW Waste Water
- X Other: Specify

Relinquished By:	Date/ Time	Received By:
Eric Schupp	6-16-11 11:45a	[illegible]

Relinquished By:	Date/ Time	Received By:

Relinquished By:	Date/ Time	Received By Laboratory:

LAB USE ONLY:
Fibertec project number:
Laboratory Tracking:
Temperature at Receipt:

COC Revision: April, 2006

TERMS & CONDITIONS ON BACK

Revised, emailed 6/20

Fibertec environmental services

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Fax: 810 220 3311

Chain of Custody #
103731
PAGE 2 of 2

Client Name: NTH Consultants
Contact Person: Eric Schupp
Project Name/ Number: Detroit Arsenal - Child Development Center
61-110632-00
Purchase Order#

Lab Sample #	Date	Time	Client Sample #	Client Sample Descriptor	MATRIX (see right corner for code)	# OF CONTAINERS	PRESERVED (Y/N)	VOC	SVOC	PCB	10 mi metal							
	6-16-11	1600	CP21	CP 21/C-1 1-2'	S	3	Y	/	/	/	/							
		10.15	CP21	CP 21/C-2 4-5'	S	3	Y											
		—	Dup	Duplicate	S	3	Y	/	/	/	/							
		—	FB2	Field Blank #2	-	1	Y	/										
		—	TB2	Trip Blank	-	1	Y	/										

PARAMETERS

Turnaround
- 24 hour RUSH (surcharge applies)
- 48 hour RUSH (surcharge applies)
- 72 hour RUSH (surcharge applies)
- [X] Standard (5-7 bus. days)
- Other: Specify

Remarks: Hold

Matrix Code
S Soil, GW Ground Water, W Water, SW Surface Water, A Air, WW Waste Water, O Oil, X Other: Specify, P Wipe

Comments:

Relinquished By:	Date/ Time	Received By:
Eric Schupp	6-16-11 1645	[illegible]
Relinquished By:	Date/ Time	Received By:
Relinquished By:	Date/ Time	Received By Laboratory:

LAB USE ONLY:
Fibertec project number:
Laboratory Tracking:
Temperature at Receipt:

COC Revision: April, 2006

TERMS & CONDITIONS ON BACK

Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18C
Page: 1 of 3
Date: 06/20/11

Preparation Batch: V911F18C **Preparation Date: 06/18/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Acetone	U	315		6320	5000	126	40 - 207		119	6	20		MB-1	LCS-1	LCD-1
2. Acrylonitrile	U	25.0		6330	5000	127	45 - 180		118	7	20		MB-1	LCS-1	LCD-1
3. Allyl Chloride	U	10.0		5280	5000	106	70 - 130		108	3	20		MB-1	LCS-1	LCD-1
4. Benzene	U	10.0		5630	5000	113	63 - 141		112	1	20		MB-1	LCS-1	LCD-1
5. Bromobenzene	14.6	10.0	*	4510	5000	90	70 - 144		90	1	20		MB-1	LCS-1	LCD-1
6. Bromochloromethane	U	10.0		5420	5000	108	42 - 161		106	3	20		MB-1	LCS-1	LCD-1
7. Bromodichloromethane	U	10.0		6130	5000	123	60 - 150		121	2	20		MB-1	LCS-1	LCD-1
8. Bromoform	U	25.0		5910	5000	118	50 - 117	*	114	4	20		MB-1	LCS-1	LCD-1
9. Bromomethane	62.1	25.0	*	5830	5000	117	58 - 217		115	1	20		MB-1	LCS-1	LCD-1
10. 2-Butanone	U	50.0		6770	5000	135	42 - 193		116	15	20		MB-1	LCS-1	LCD-1
11. tert-Butyl Alcohol	U	250		5610	5000	112	42 - 156		106	6	20		MB-1	LCS-1	LCD-1
12. n-Butylbenzene	U	10.0		4820	5000	96	65 - 151		94	2	20		MB-1	LCS-1	LCD-1
13. sec-Butylbenzene	U	10.0		4840	5000	97	68 - 147		96	1	20		MB-1	LCS-1	LCD-1
14. tert-Butylbenzene	U	10.0		5140	5000	103	68 - 140		101	2	20		MB-1	LCS-1	LCD-1
15. Carbon Disulfide	11.6	10.0	*	5340	5000	107	36 - 143		97	10	20		MB-1	LCS-1	LCD-1
16. Carbon Tetrachloride	18.1	10.0	*	6570	5000	131	50 - 159		129	2	20		MB-1	LCS-1	LCD-1
17. Chlorobenzene	U	10.0		4810	5000	96	72 - 135		95	1	20		MB-1	LCS-1	LCD-1
18. Chloroethane	U	25.0		5450	5000	109	16 - 207		107	2	20		MB-1	LCS-1	LCD-1
19. Chloroform	U	10.0		5790	5000	116	47 - 159		114	2	20		MB-1	LCS-1	LCD-1
20. Chloromethane	U	25.0		5420	5000	108	14 - 185		107	1	20		MB-1	LCS-1	LCD-1
21. 2-Chlorotoluene	U	10.0		4560	5000	91	73 - 141		90	2	20		MB-1	LCS-1	LCD-1
22. 4-Chlorotoluene	U	10.0		4670	5000	93	82 - 137		92	1	20		MB-1	LCS-1	LCD-1
23. Dibromochloromethane	U	25.0		5640	5000	113	59 - 130		110	2	20		MB-1	LCS-1	LCD-1
24. 1,2-Dibromo-3-chloropropane	13.5	5.00	*	6110	5000	122	34 - 164		104	16	20		MB-1	LCS-1	LCD-1
25. Dibromomethane	U	10.0		5810	5000	116	66 - 134		113	2	20		MB-1	LCS-1	LCD-1
26. 1,2-Dichlorobenzene	U	10.0		4660	5000	93	76 - 128		90	3	20		MB-1	LCS-1	LCD-1
27. 1,3-Dichlorobenzene	U	10.0		4540	5000	91	72 - 136		89	2	20		MB-1	LCS-1	LCD-1
28. 1,4-Dichlorobenzene	U	10.0		4210	5000	84	74 - 127		83	2	20		MB-1	LCS-1	LCD-1
29. trans-1,4-Dichloro-2-butene	U	50.0		4310	5000	86	56 - 153		82	5	20		MB-1	LCS-1	LCD-1
30. Dichlorodifluoromethane	U	10.0		5080	5000	102	10 - 207		100	1	20		MB-1	LCS-1	LCD-1
31. 1,1-Dichloroethane	U	10.0		5560	5000	111	42 - 157		110	1	20		MB-1	LCS-1	LCD-1
32. 1,2-Dichloroethane	U	20.0		11200	10000	112	56 - 146		109	3	20		MB-1	LCS-1	LCD-1
33. 1,1-Dichloroethene	U	10.0		6040	5000	121	34 - 165		108	11	20		MB-1	LCS-1	LCD-1
34. cis-1,2-Dichloroethene	U	10.0		6740	5000	135	43 - 170		133	1	20		MB-1	LCS-1	LCD-1
35. trans-1,2-Dichloroethene	U	10.0		4650	5000	93	49 - 162		93	0	20		MB-1	LCS-1	LCD-1
36. 1,2-Dichloropropane	U	10.0		5870	5000	117	62 - 151		114	3	20		MB-1	LCS-1	LCD-1
37. 1,3-Dichloropropane	U	10.0		5170	5000	103	77 - 132		100	3	20		MB-1	LCS-1	LCD-1
38. 2,2-Dichloropropane	U	25.0		4430	5000	89	52 - 169		84	5	20		MB-1	LCS-1	LCD-1
39. 1,1-Dichloropropene	U	10.0		5870	5000	117	52 - 153		116	1	20		MB-1	LCS-1	LCD-1
40. cis-1,3-Dichloropropene	U	10.0		5780	5000	116	45 - 156		114	1	20		MB-1	LCS-1	LCD-1
41. trans-1,3-Dichloropropene	U	10.0		5780	5000	116	40 - 157		114	1	20		MB-1	LCS-1	LCD-1
42. Diethyl Ether	U	25.0		6420	5000	128	30 - 167		117	9	20		MB-1	LCS-1	LCD-1
43. Ethyl Methacrylate	U	250		5610	5000	112	80 - 132		110	2	20		MB-1	LCS-1	LCD-1
44. Ethylbenzene	U	10.0		4960	5000	99	76 - 137		98	1	20		MB-1	LCS-1	LCD-1
45. Ethylene Dibromide	U	10.0		10700	10000	107	71 - 133		104	3	20		MB-1	LCS-1	LCD-1
46. Hexachlorobutadiene	69.4	29.5	*	4680	5000	94	79 - 142		90	4	20		MB-1	LCS-1	LCD-1
47. Hexachloroethane	U	50.0		6250	5000	125	42 - 151		122	2	20		MB-1	LCS-1	LCD-1
48. 2-Hexanone	U	50.0		5530	5000	111	29 - 211		107	3	20		MB-1	LCS-1	LCD-1
49. Isopropylbenzene	U	10.0		5240	5000	105	68 - 153		103	2	20		MB-1	LCS-1	LCD-1
50. p-Isopropyltoluene	U	10.0		5040	5000	101	75 - 139		99	1	20		MB-1	LCS-1	LCD-1
51. Methacrylonitrile	U	25.0		5640	5000	113	70 - 130		108	4	20		MB-1	LCS-1	LCD-1
52. Methyl Iodide	46.6	25.0	*	5780	5000	116	17 - 150		104	11	20		MB-1	LCS-1	LCD-1

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18C
Page: 2 of 3
Date: 06/20/11

Preparation Batch: V911F18C **Preparation Date: 06/18/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
53. Methyl Methacrylate	U	25.0		5560	5000	111	70 - 130		107	4	20		MB-1	LCS-1	LCD-1
54. Methylene Chloride	U	100		5140	5000	103	38 - 180		102	1	20		MB-1	LCS-1	LCD-1
55. 2-Methylnaphthalene	U	100		4020	5000	80	42 - 202		75	6	20		MB-1	LCS-1	LCD-1
56. 4-Methyl-2-pentanone	U	100		6050	5000	121	55 - 161		115	5	20		MB-1	LCS-1	LCD-1
57. MTBE	U	20.0		12400	10000	124	58 - 147		120	4	20		MB-1	LCS-1	LCD-1
58. Naphthalene	16.7	10.0	*	4450	5000	89	45 - 180		85	5	20		MB-1	LCS-1	LCD-1
59. 2-Nitropropane	U	50.0		6810	5000	136	80 - 132	*	129	5	20		MB-1	LCS-1	LCD-1
60. Propionitrile	U	250		6080	5000	122	70 - 130		109	10	20		MB-1	LCS-1	LCD-1
61. n-Propylbenzene	U	10.0		4680	5000	94	71 - 146		93	0	20		MB-1	LCS-1	LCD-1
62. Styrene	U	10.0		5260	5000	105	72 - 138		103	2	20		MB-1	LCS-1	LCD-1
63. 1,1,1,2-Tetrachloroethane	U	10.0		5730	5000	115	61 - 131		113	1	20		MB-1	LCS-1	LCD-1
64. 1,1,2,2-Tetrachloroethane	U	10.0		4730	5000	95	72 - 145		90	5	20		MB-1	LCS-1	LCD-1
65. Tetrachloroethene	U	10.0		4890	5000	98	50 - 151		96	1	20		MB-1	LCS-1	LCD-1
66. Tetrahydrofuran	U	250		5320	5000	106	28 - 169		104	3	20		MB-1	LCS-1	LCD-1
67. Toluene	U	10.0		5690	5000	114	65 - 144		112	2	20		MB-1	LCS-1	LCD-1
68. 1,2,3-Trichlorobenzene	18.6	10.0	*	4080	5000	82	50 - 161		79	3	20		MB-1	LCS-1	LCD-1
69. 1,2,4-Trichlorobenzene	17.3	10.0	*	4430	5000	89	54 - 152		86	3	20		MB-1	LCS-1	LCD-1
70. 1,1,1-Trichloroethane	U	10.0		6080	5000	122	46 - 156		120	1	20		MB-1	LCS-1	LCD-1
71. 1,1,2-Trichloroethane	U	10.0		5110	5000	102	80 - 129		99	3	20		MB-1	LCS-1	LCD-1
72. Trichloroethene	U	10.0		5970	5000	119	65 - 144		119	1	20		MB-1	LCS-1	LCD-1
73. Trichlorofluoromethane	U	16.6		5900	5000	118	31 - 226		117	1	20		MB-1	LCS-1	LCD-1
74. 1,2,3-Trichloropropane	U	25.0		4760	5000	95	74 - 139		92	3	20		MB-1	LCS-1	LCD-1
75. 1,1,2-Trichloro-1,2,2-trifluoroethane	U	25.0		6440	5000	129	52 - 156		113	13	20		MB-1	LCS-1	LCD-1
76. 1,2,3-Trimethylbenzene	U	10.0		4750	5000	95	77 - 133		93	3	20		MB-1	LCS-1	LCD-1
77. 1,2,4-Trimethylbenzene	U	10.0		4820	5000	96	71 - 139		94	2	20		MB-1	LCS-1	LCD-1
78. 1,3,5-Trimethylbenzene	U	10.0		4910	5000	98	71 - 138		96	2	20		MB-1	LCS-1	LCD-1
79. Vinyl Chloride	U	10.0		5590	5000	112	25 - 189		111	0	20		MB-1	LCS-1	LCD-1
80. m&p-Xylene	U	20.0		9750	10000	97	69 - 134		96	2	20		MB-1	LCS-1	LCD-1
81. o-Xylene	U	10.0		5210	5000	104	69 - 134		102	2	20		MB-1	LCS-1	LCD-1

System Monitoring Compounds (Surrogates):	Method Blank (MB) Result µg/kg	Spike µg/kg	Rec. %	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Dibromofluoromethane(S)	3890	3750	104		3780	3750	101	53 - 139		99	2	20		MB-1	LCS-1	LCD-1
2. 1,2-Dichloroethane-d4(S)	3570	3750	95		3610	3750	96	64 - 135		94	2	20		MB-1	LCS-1	LCD-1
3. Toluene-d8(S)	3730	3750	100		3780	3750	101	70 - 130		101	0	20		MB-1	LCS-1	LCD-1
4. 4-Bromofluorobenzene(S)	3550	3750	95		3770	3750	101	71 - 129		99	2	20		MB-1	LCS-1	LCD-1

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	V911F18C	06/19/11 14:52
LCS-1	V911F18C	06/19/11 13:30
LCD-1	V911F18C	06/19/11 13:57

1914 Holloway Drive
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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18C
Page: 3 of 3
Date: 06/20/11

Preparation Batch: V911F18C **Preparation Date: 06/18/11**

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Jennifer Smith
Group Leader, Volatile Organics
Monday, June 20, 2011
12:01:41 PM

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F20B
Page: 1 of 3
Date: 06/21/11

Preparation Batch: V911F20B **Preparation Date: 06/20/11**

	Method Blank (MB)			Laboratory Control Sample (LCS)					LCS Duplicate (LCD)				Run Code		
arameter	Result µg/kg	PQL µg/kg	Q	Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	Rec. %	RPD %	UCL %	Q	MB	LCS	LCD
Acetone	U	315		5730	5000	115	40 - 207		128	11	20		MB-1	LCS-1	LCD-1
Acrylonitrile	U	25.0		6270	5000	125	45 - 180		142	13	20		MB-1	LCS-1	LCD-1
. Allyl Chloride	U	10.0		5830	5000	117	70 - 130		98	17	20		MB-1	LCS-1	LCD-1
,. Benzene	U	10.0		5670	5000	113	63 - 141		110	3	20		MB-1	LCS-1	LCD-1
5. Bromobenzene	16.0	10.0	*	4420	5000	88	70 - 144		86	2	20		MB-1	LCS-1	LCD-1
6. Bromochloromethane	U	10.0		5600	5000	112	42 - 161		106	6	20		MB-1	LCS-1	LCD-1
7. Bromodichloromethane	U	10.0		6270	5000	125	60 - 150		121	3	20		MB-1	LCS-1	LCD-1
8. Bromoform	U	25.0		5780	5000	116	50 - 117		121	4	20		MB-1	LCS-1	LCD-1
9. Bromomethane	59.8	25.0	*	6070	5000	121	58 - 217		113	7	20		MB-1	LCS-1	LCD-1
10. 2-Butanone	U	50.0		8170	5000	163	42 - 193		176	7	20		MB-1	LCS-1	LCD-1
11. tert-Butyl Alcohol	U	250		5650	5000	113	42 - 156		145	25	20	*	MB-1	LCS-1	LCD-1
12. n-Butylbenzene	13.2	10.0	*	4910	5000	98	65 - 151		95	3	20		MB-1	LCS-1	LCD-1
13. sec-Butylbenzene	U	10.0		4750	5000	95	68 - 147		93	2	20		MB-1	LCS-1	LCD-1
14. tert-Butylbenzene	U	10.0		5010	5000	100	68 - 140		98	3	20		MB-1	LCS-1	LCD-1
15. Carbon Disulfide	13.4	10.0	*	5570	5000	111	36 - 143		92	19	20		MB-1	LCS-1	LCD-1
16. Carbon Tetrachloride	16.3	10.0	*	6660	5000	133	50 - 159		129	3	20		MB-1	LCS-1	LCD-1
17. Chlorobenzene	U	10.0		4710	5000	94	72 - 135		93	2	20		MB-1	LCS-1	LCD-1
18. Chloroethane	U	25.0		5560	5000	111	16 - 207		104	7	20		MB-1	LCS-1	LCD-1
19. Chloroform	U	10.0		6070	5000	121	47 - 159		116	4	20		MB-1	LCS-1	LCD-1
20. Chloromethane	U	25.0		5420	5000	108	14 - 185		111	2	20		MB-1	LCS-1	LCD-1
21. 2-Chlorotoluene	U	10.0		4470	5000	89	73 - 141		87	2	20		MB-1	LCS-1	LCD-1
22. 4-Chlorotoluene	U	10.0		4600	5000	92	82 - 137		90	2	20		MB-1	LCS-1	LCD-1
23. Dibromochloromethane	U	25.0		5570	5000	111	59 - 130		112	1	20		MB-1	LCS-1	LCD-1
24. 1,2-Dibromo-3-chloropropane	12.0	5.00	*	5710	5000	114	34 - 164		118	4	20		MB-1	LCS-1	LCD-1
25. Dibromomethane	U	10.0		5810	5000	116	66 - 134		116	0	20		MB-1	LCS-1	LCD-1
26. 1,2-Dichlorobenzene	U	10.0		4610	5000	92	76 - 128		91	2	20		MB-1	LCS-1	LCD-1
27. 1,3-Dichlorobenzene	U	10.0		4430	5000	89	72 - 136		87	2	20		MB-1	LCS-1	LCD-1
28. 1,4-Dichlorobenzene	U	10.0		4220	5000	84	74 - 127		81	4	20		MB-1	LCS-1	LCD-1
29. trans-1,4-Dichloro-2-butene	U	50.0		4890	5000	98	56 - 153		106	8	20		MB-1	LCS-1	LCD-1
30. Dichlorodifluoromethane	U	10.0		5060	5000	101	10 - 207		99	2	20		MB-1	LCS-1	LCD-1
31. 1,1-Dichloroethane	U	10.0		5770	5000	115	42 - 157		112	3	20		MB-1	LCS-1	LCD-1
32. 1,2-Dichloroethane	U	20.0		11100	10000	111	56 - 146		111	1	20		MB-1	LCS-1	LCD-1
33. 1,1-Dichloroethene	U	10.0		6260	5000	125	34 - 165		110	13	20		MB-1	LCS-1	LCD-1
34. cis-1,2-Dichloroethene	U	10.0		7040	5000	141	43 - 170		136	4	20		MB-1	LCS-1	LCD-1
35. trans-1,2-Dichloroethene	U	10.0		4840	5000	97	49 - 162		93	4	20		MB-1	LCS-1	LCD-1
36. 1,2-Dichloropropane	U	10.0		5900	5000	118	62 - 151		116	2	20		MB-1	LCS-1	LCD-1
37. 1,3-Dichloropropane	U	10.0		5020	5000	100	77 - 132		102	2	20		MB-1	LCS-1	LCD-1
38. 2,2-Dichloropropane	U	25.0		6550	5000	131	52 - 169		129	2	20		MB-1	LCS-1	LCD-1
39. 1,1-Dichloropropene	U	10.0		6040	5000	121	52 - 153		118	2	20		MB-1	LCS-1	LCD-1
40. cis-1,3-Dichloropropene	U	10.0		6240	5000	125	45 - 156		123	2	20		MB-1	LCS-1	LCD-1
41. trans-1,3-Dichloropropene	U	10.0		6240	5000	125	40 - 157		123	2	20		MB-1	LCS-1	LCD-1
42. Diethyl Ether	U	25.0		6940	5000	139	30 - 167		129	7	20		MB-1	LCS-1	LCD-1
43. Ethyl Methacrylate	U	250		5630	5000	113	80 - 132		118	5	20		MB-1	LCS-1	LCD-1
44. Ethylbenzene	U	10.0		4890	5000	98	76 - 137		96	2	20		MB-1	LCS-1	LCD-1
45. Ethylene Dibromide	U	10.0		10300	10000	103	71 - 133		106	3	20		MB-1	LCS-1	LCD-1
46. Hexachlorobutadiene	73.0	29.5	*	4790	5000	96	79 - 142		96	0	20		MB-1	LCS-1	LCD-1
47. Hexachloroethane	U	50.0		6130	5000	123	42 - 151		123	0	20		MB-1	LCS-1	LCD-1
48. 2-Hexanone	U	50.0		5640	5000	113	29 - 211		130	14	20		MB-1	LCS-1	LCD-1
49. Isopropylbenzene	U	10.0		5210	5000	104	68 - 153		102	2	20		MB-1	LCS-1	LCD-1
50. p-Isopropyltoluene	U	10.0		5020	5000	100	75 - 139		98	3	20		MB-1	LCS-1	LCD-1
51. Methacrylonitrile	U	25.0		5750	5000	115	70 - 130		125	9	20		MB-1	LCS-1	LCD-1
52. Methyl Iodide	48.2	25.0	*	7270	5000	145	17 - 150		123	16	20		MB-1	LCS-1	LCD-1

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F20B
Page: 2 of 3
Date: 06/21/11

Preparation Batch: V911F20B **Preparation Date: 06/20/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
53. Methyl Methacrylate	U	25.0		5550	5000	111	70 - 130		125	12	20		MB-1	LCS-1	LCD-1
54. Methylene Chloride	U	100		5340	5000	107	38 - 180		104	3	20		MB-1	LCS-1	LCD-1
55. 2-Methylnaphthalene	U	100		3810	5000	76	42 - 202		105	32	20	*	MB-1	LCS-1	LCD-1
56. 4-Methyl-2-pentanone	U	100		6180	5000	124	55 - 161		137	10	20		MB-1	LCS-1	LCD-1
57. MTBE	U	20.0		12900	10000	129	58 - 147		133	3	20		MB-1	LCS-1	LCD-1
58. Naphthalene	17.9	10.0	*	4220	5000	84	45 - 180		96	12	20		MB-1	LCS-1	LCD-1
59. 2-Nitropropane	U	50.0		7420	5000	148	80 - 132	*	166	11	20		MB-1	LCS-1	LCD-1
60. Propionitrile	U	250		5230	5000	105	70 - 130		138	28	20	*	MB-1	LCS-1	LCD-1
61. n-Propylbenzene	U	10.0		4580	5000	92	71 - 146		90	2	20		MB-1	LCS-1	LCD-1
62. Styrene	U	10.0		5220	5000	104	72 - 138		102	3	20		MB-1	LCS-1	LCD-1
63. 1,1,1,2-Tetrachloroethane	U	10.0		5690	5000	114	61 - 131		111	2	20		MB-1	LCS-1	LCD-1
64. 1,1,2,2-Tetrachloroethane	U	10.0		4550	5000	91	72 - 145		97	6	20		MB-1	LCS-1	LCD-1
65. Tetrachloroethene	U	10.0		4810	5000	96	50 - 151		94	2	20		MB-1	LCS-1	LCD-1
66. Tetrahydrofuran	U	250		5450	5000	109	28 - 169		121	11	20		MB-1	LCS-1	LCD-1
67. Toluene	U	10.0		5730	5000	115	65 - 144		111	3	20		MB-1	LCS-1	LCD-1
68. 1,2,3-Trichlorobenzene	16.9	10.0	*	3890	5000	78	50 - 161		87	11	20		MB-1	LCS-1	LCD-1
69. 1,2,4-Trichlorobenzene	14.0	10.0	*	4310	5000	86	54 - 152		91	5	20		MB-1	LCS-1	LCD-1
70. 1,1,1-Trichloroethane	U	10.0		6390	5000	128	46 - 156		122	5	20		MB-1	LCS-1	LCD-1
71. 1,1,2-Trichloroethane	U	10.0		4990	5000	100	80 - 129		101	2	20		MB-1	LCS-1	LCD-1
72. Trichloroethene	U	10.0		6070	5000	121	65 - 144		118	3	20		MB-1	LCS-1	LCD-1
73. Trichlorofluoromethane	U	16.6		5990	5000	120	31 - 226		115	4	20		MB-1	LCS-1	LCD-1
74. 1,2,3-Trichloropropane	U	25.0		4560	5000	91	74 - 139		99	8	20		MB-1	LCS-1	LCD-1
75. 1,1,2-Trichloro-1,2,2-trifluoroethane	U	25.0		8220	5000	164	52 - 156	*	120	31	20	*	MB-1	LCS-1	LCD-1
76. 1,2,3-Trimethylbenzene	U	10.0		4620	5000	92	77 - 133		91	1	20		MB-1	LCS-1	LCD-1
77. 1,2,4-Trimethylbenzene	U	10.0		4770	5000	95	71 - 139		93	3	20		MB-1	LCS-1	LCD-1
78. 1,3,5-Trimethylbenzene	U	10.0		4790	5000	96	71 - 138		94	2	20		MB-1	LCS-1	LCD-1
79. Vinyl Chloride	U	10.0		5670	5000	113	25 - 189		107	6	20		MB-1	LCS-1	LCD-1
80. m&p-Xylene	U	20.0		9630	10000	96	69 - 134		94	3	20		MB-1	LCS-1	LCD-1
81. o-Xylene	U	10.0		5160	5000	103	69 - 134		101	3	20		MB-1	LCS-1	LCD-1

System Monitoring Compounds (Surrogates):	Method Blank (MB) Result µg/kg	Spike µg/kg	Rec. %	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Dibromofluoromethane(S)	3770	3750	101		3820	3750	102	53 - 139		99	2	20		MB-1	LCS-1	LCD-1
2. 1,2-Dichloroethane-d4(S)	3420	3750	91		3460	3750	92	64 - 135		92	0	20		MB-1	LCS-1	LCD-1
3. Toluene-d8(S)	3690	3750	98		3700	3750	99	70 - 130		97	1	20		MB-1	LCS-1	LCD-1
4. 4-Bromofluorobenzene(S)	3600	3750	96		3730	3750	99	71 - 129		98	1	20		MB-1	LCS-1	LCD-1

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	V911F20B	06/20/11 23:44
LCS-1	V911F20B	06/20/11 22:21
LCD-1	V911F20B	06/20/11 22:49

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F20B
Page: 3 of 3
Date: 06/21/11

Preparation Batch: V911F20B **Preparation Date: 06/20/11**

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Jennifer Smith
Group Leader, Volatile Organics
Tuesday, June 21, 2011
11:31:09 AM

Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Aqueous

Batch ID: VH11F18A
Page: 1 of 2
Date: 06/20/11

Preparation Batch: VH11F18A **Preparation Date: 06/18/11**

	Method Blank (MB)			Laboratory Control Sample (LCS)					LCS Duplicate (LCD)				Run Code		
Parameter	Result µg/L	PQL µg/L	Q	Result µg/L	Spike µg/L	Rec. %	LCL - UCL %	Q	Rec. %	RPD %	UCL %	Q	MB	LCS	LCD
1. Acetone	5.27	5.00	*	81.7	100	82	19 - 165		86	5	20		MB-1	LCS-1	LCD-1
2. Acrylonitrile	U	0.500		98.0	100	98	43 - 155		106	8	20		MB-1	LCS-1	LCD-1
3. Benzene	U	0.200		111	100	111	69 - 137		115	4	20		MB-1	LCS-1	LCD-1
4. Bromobenzene	0.651	0.500	*	306	100	306	65 - 140	*	317	4	20		MB-1	LCS-1	LCD-1
5. Bromochloromethane	U	0.200		102	100	102	33 - 141		107	5	20		MB-1	LCS-1	LCD-1
6. Bromodichloromethane	U	0.200		105	100	105	84 - 144		109	4	20		MB-1	LCS-1	LCD-1
7. Bromoform	U	0.500		118	100	118	66 - 136		121	3	20		MB-1	LCS-1	LCD-1
8. Bromomethane	U	1.00		102	100	102	56 - 172		110	8	20		MB-1	LCS-1	LCD-1
9. 2-Butanone	U	5.00		101	100	101	28 - 176		107	5	20		MB-1	LCS-1	LCD-1
10. tert-Butyl Alcohol	U	5.00		92.5	100	93	25 - 157		99	7	20		MB-1	LCS-1	LCD-1
11. n-Butylbenzene	U	0.500		126	100	125	63 - 149		128	2	20		MB-1	LCS-1	LCD-1
12. sec-Butylbenzene	U	0.500		120	100	121	61 - 143		123	2	20		MB-1	LCS-1	LCD-1
13. tert-Butylbenzene	U	0.500		116	100	116	70 - 139		119	3	20		MB-1	LCS-1	LCD-1
14. Carbon Disulfide	U	1.00		118	100	118	27 - 166		121	3	20		MB-1	LCS-1	LCD-1
15. Carbon Tetrachloride	0.412	0.200	*	114	100	114	70 - 140		118	3	20		MB-1	LCS-1	LCD-1
16. Chlorobenzene	U	0.500		97.2	100	97	88 - 126		101	4	20		MB-1	LCS-1	LCD-1
17. Chloroethane	U	1.00		114	100	114	33 - 172		121	6	20		MB-1	LCS-1	LCD-1
18. Chloroform	U	0.200		105	100	105	66 - 138		109	4	20		MB-1	LCS-1	LCD-1
19. Chloromethane	U	1.00		108	100	108	45 - 153		124	14	20		MB-1	LCS-1	LCD-1
20. 2-Chlorotoluene	U	0.500		112	100	112	75 - 137		115	3	20		MB-1	LCS-1	LCD-1
21. 4-Chlorotoluene	U	0.500		115	100	115	79 - 137		119	3	20		MB-1	LCS-1	LCD-1
22. Dibromochloromethane	U	0.500		108	100	108	83 - 127		111	3	20		MB-1	LCS-1	LCD-1
23. 1,2-Dibromo-3-chloropropane	U	0.500		111	100	111	66 - 134		115	4	20		MB-1	LCS-1	LCD-1
24. Dibromomethane	0.420	0.200	*	97.2	100	97	67 - 148		101	4	20		MB-1	LCS-1	LCD-1
25. 1,2-Dichlorobenzene	U	0.500		106	100	106	71 - 154		109	3	20		MB-1	LCS-1	LCD-1
26. 1,3-Dichlorobenzene	U	0.500		106	100	106	74 - 156		109	3	20		MB-1	LCS-1	LCD-1
27. 1,4-Dichlorobenzene	U	0.500		98.6	100	99	89 - 121		101	2	20		MB-1	LCS-1	LCD-1
28. trans-1,4-Dichloro-2-butene	U	0.500		105	100	105	47 - 164		106	1	20		MB-1	LCS-1	LCD-1
29. Dichlorodifluoromethane	U	1.00		143	100	143	44 - 188		155	8	20		MB-1	LCS-1	LCD-1
30. 1,1-Dichloroethane	U	0.200		101	100	101	59 - 145		108	6	20		MB-1	LCS-1	LCD-1
31. 1,2-Dichloroethane	U	0.400		209	200	105	68 - 143		110	5	20		MB-1	LCS-1	LCD-1
32. 1,1-Dichloroethene	U	0.200		111	100	111	56 - 163		115	3	20		MB-1	LCS-1	LCD-1
33. cis-1,2-Dichloroethene	0.220	0.200	*	106	100	107	54 - 161		113	6	20		MB-1	LCS-1	LCD-1
34. trans-1,2-Dichloroethene	U	0.200		102	100	102	56 - 153		109	6	20		MB-1	LCS-1	LCD-1
35. 1,2-Dichloropropane	U	0.200		95.6	100	96	66 - 135		101	5	20		MB-1	LCS-1	LCD-1
36. 1,3-Dichloropropane	U	0.500		100	100	100	75 - 136		103	3	20		MB-1	LCS-1	LCD-1
37. 2,2-Dichloropropane	U	0.200		113	100	113	53 - 176		111	2	20		MB-1	LCS-1	LCD-1
38. 1,1-Dichloropropene	U	0.200		115	100	115	62 - 152		120	4	20		MB-1	LCS-1	LCD-1
39. cis-1,3-Dichloropropene	U	0.200		108	100	108	81 - 144		112	4	20		MB-1	LCS-1	LCD-1
40. trans-1,3-Dichloropropene	U	0.500		116	100	116	66 - 150		119	3	20		MB-1	LCS-1	LCD-1
41. Diethyl Ether	U	1.00		107	100	107	37 - 153		116	7	20		MB-1	LCS-1	LCD-1
42. Ethylbenzene	U	0.500		105	100	105	88 - 131		109	4	20		MB-1	LCS-1	LCD-1
43. Ethylene Dibromide	0.179	0.0500	*	183	200	92	86 - 131		104	13	20		MB-1	LCS-1	LCD-1
44. Hexachloroethane	U	0.500		111	100	111	37 - 171		114	3	20		MB-1	LCS-1	LCD-1
45. 2-Hexanone	U	1.00		81.0	100	81	37 - 183		84	4	20		MB-1	LCS-1	LCD-1
46. Isopropylbenzene	U	0.500		111	100	111	89 - 148		115	3	20		MB-1	LCS-1	LCD-1
47. p-Isopropyltoluene	U	0.500		114	100	115	86 - 142		117	2	20		MB-1	LCS-1	LCD-1
48. Methyl Iodide	U	1.00		101	100	101	38 - 159		105	4	20		MB-1	LCS-1	LCD-1
49. Methylene Chloride	U	1.00		99.7	100	100	38 - 149		107	7	20		MB-1	LCS-1	LCD-1
50. 2-Methylnaphthalene	1.01	1.00	*	110	100	110	49 - 157		113	2	20		MB-1	LCS-1	LCD-1
51. 4-Methyl-2-pentanone	U	1.00		84.1	100	84	60 - 152		88	5	20		MB-1	LCS-1	LCD-1
52. MTBE	U	0.400		211	200	105	54 - 144		113	7	20		MB-1	LCS-1	LCD-1

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Aqueous

Batch ID: VH11F18A
Page: 2 of 2
Date: 06/20/11

Preparation Batch: VH11F18A **Preparation Date: 06/18/11**

Parameter	Method Blank (MB) Result µg/L	PQL µg/L	Q	Laboratory Control Sample (LCS) Result µg/L	Spike µg/L	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
53. Naphthalene	0.567	0.500	*	112	100	112	64 - 158		116	4	20		MB-1	LCS-1	LCD-1
54. n-Propylbenzene	U	0.500		116	100	116	64 - 146		119	3	20		MB-1	LCS-1	LCD-1
55. Styrene	U	0.500		114	100	114	79 - 129		115	1	20		MB-1	LCS-1	LCD-1
56. 1,1,1,2-Tetrachloroethane	U	0.500		107	100	107	84 - 135		109	1	20		MB-1	LCS-1	LCD-1
57. 1,1,2,2-Tetrachloroethane	0.623	0.500	*	279	100	279	69 - 141	*	289	4	20		MB-1	LCS-1	LCD-1
58. Tetrachloroethene	U	0.500		96.1	100	96	81 - 145		99	3	20		MB-1	LCS-1	LCD-1
59. Tetrahydrofuran	U	2.00		95.1	100	95	33 - 148		101	6	20		MB-1	LCS-1	LCD-1
60. Toluene	U	0.200		101	100	101	77 - 135		104	3	20		MB-1	LCS-1	LCD-1
61. 1,2,3-Trichlorobenzene	0.614	0.500	*	114	100	114	74 - 147		117	2	20		MB-1	LCS-1	LCD-1
62. 1,2,4-Trichlorobenzene	0.561	0.500	*	116	100	116	73 - 152		117	1	20		MB-1	LCS-1	LCD-1
63. 1,1,1-Trichloroethane	U	0.200		105	100	105	69 - 143		110	5	20		MB-1	LCS-1	LCD-1
64. 1,1,2-Trichloroethane	U	0.500		95.6	100	96	84 - 122		99	3	20		MB-1	LCS-1	LCD-1
65. Trichloroethene	U	0.200		100	100	100	72 - 143		104	4	20		MB-1	LCS-1	LCD-1
66. Trichlorofluoromethane	U	1.00		115	100	115	41 - 181		120	4	20		MB-1	LCS-1	LCD-1
67. 1,2,3-Trichloropropane	U	0.500		93.8	100	94	82 - 127		98	4	20		MB-1	LCS-1	LCD-1
68. 1,1,2-Trichloro-1,2,2-trifluoroethane	U	1.00		115	100	115	58 - 161		119	3	20		MB-1	LCS-1	LCD-1
69. 1,2,3-Trimethylbenzene	U	0.500		104	100	104	80 - 133		108	3	20		MB-1	LCS-1	LCD-1
70. 1,2,4-Trimethylbenzene	U	0.500		115	100	115	81 - 140		118	3	20		MB-1	LCS-1	LCD-1
71. 1,3,5-Trimethylbenzene	U	0.500		110	100	110	82 - 140		114	4	20		MB-1	LCS-1	LCD-1
72. Vinyl Chloride	U	0.200		110	100	110	40 - 174		120	8	20		MB-1	LCS-1	LCD-1
73. m&p-Xylene	U	0.400		222	200	111	86 - 133		115	4	20		MB-1	LCS-1	LCD-1
74. o-Xylene	U	0.500		107	100	107	85 - 131		112	4	20		MB-1	LCS-1	LCD-1

System Monitoring Compounds (Surrogates):	Method Blank (MB) Result µg/L	Spike µg/L	Rec. %	Q	Laboratory Control Sample (LCS) Result µg/L	Spike µg/L	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Dibromofluoromethane(S)	68.0	55.7	122		57.1	55.7	102	67 - 130		106	3	20		MB-1	LCS-1	LCD-1
2. 1,2-Dichloroethane-d4(S)	58.6	55.7	105		53.3	55.7	96	58 - 133		99	3	20		MB-1	LCS-1	LCD-1
3. Toluene-d8(S)	51.5	55.7	92		51.1	55.7	92	77 - 114		94	3	20		MB-1	LCS-1	LCD-1
4. 4-Bromofluorobenzene(S)	58.1	55.7	104		52.2	55.7	94	65 - 115		96	3	20		MB-1	LCS-1	LCD-1

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	VH11F18A	06/18/11 14:08
LCS-1	VH11F18A	06/18/11 12:46
LCD-1	VH11F18A	06/18/11 13:14

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Heather Beiter
Chemist, Volatile Organics
Monday, June 20, 2011
11:50:56 AM

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Quality Control Report
Preparation Batch QC Summary
Mercury by CVAAS
Soil/Solid

Batch ID: PM11F20
Page: 1 of 1
Date: 06/21/11

Preparation Batch: PM11F20B **Preparation Date: 06/20/11**

	Method Blank (MB)			Laboratory Control Sample (LCS)					LCS Duplicate (LCD)				Run Code		
Parameter	Result µg/kg	PQL µg/kg	Q	Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	Rec. %	RPD %	UCL %	Q	MB	LCS	LCD
1. Mercury	U	20.0		190	200	95	85 - 115						MB-2	LCS-2	

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-2	M411F21A	06/21/11 10:00
LCS-2	M411F21A	06/21/11 10:02

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Michaelia Papranec

Michaelia Papranec
Chemist, Trace Metals
Tuesday, June 21, 2011
11:04:33 AM

Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Mercury by CVAAS
Soil/Solid

Batch ID: PM11F21
Page: 1 of 1
Date: 06/22/11

Preparation Batch: PM11F21A **Preparation Date: 06/21/11**

	Method Blank (MB)			Laboratory Control Sample (LCS)					LCS Duplicate (LCD)				Run Code		
Parameter	Result µg/kg	PQL µg/kg	Q	Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	Rec. %	RPD %	UCL %	Q	MB	LCS	LCD
1. Mercury	U	20.0		199	143	139	85 - 115	*					MB-1	LCS-1	

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
***:** Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	M411F22A	06/22/11 10:54
LCS-1	M411F22A	06/22/11 10:56

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Michaelia Papranec

Michaelia Papranec
Chemist, Trace Metals
Wednesday, June 22, 2011
1:57:38 PM

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Fibertec Environmental Services

QUALITY ASSURANCE REPORT
for
LABORATORY BATCH NUMBER

PS11F21B

SEMI-VOLATILES

Sample Matrix :	SOIL/SOLID	Preparation Method :	SW-846 3550B	Analytical Method :	SW-846 8270D - BNA
Inclusive Projects :	VARIOUS	Preparation Date :	6/21/2011	Analysis Date :	6/21/2011
		Preparer(s) Initials:	TC	Analyst(s) Initials :	HS

Analyte	RL	Units	Matrix Blank Conc. (mg/Kg)	Matrix Blank Flag	Laboratory Control Sample (LCS - reported elsewhere) Conc. Spiked (mg/Kg)	LCS Conc. (mg/Kg)	LCS Percent Recovery	LCL (%)	UCL (%)	Flag
Phenol	0.33	mg/Kg								
n-Nitrosodi-n-Propylamine	0.33	mg/Kg								
1,2,4-Trichlorobenzene	0.33	mg/Kg								
2-Chlorophenol	0.33	mg/Kg								
4-Chloro-3-Methylphenol	0.33	mg/Kg								
Acenaphthene	0.33	mg/Kg								
4-Nitrophenol	1.32	mg/Kg								
2,4-Dinitrotoluene	0.33	mg/Kg								
Pentachlorophenol	1.32	mg/Kg								
Pyrene	0.33	mg/Kg								
2-Fluorophenol (S)	0.33	mg/Kg								
Phenol D-6 (S)	0.33	mg/Kg								
Nitrobenzene D-5 (S)	0.33	mg/Kg								
2-Fluorobiphenyl (S)	0.33	mg/Kg								
2,4,6-Tribromophenol (S)	0.33	mg/Kg								
4-Terphenyl D-14 (S)	0.33	mg/Kg								

MATRIX SPIKE / MATRIX SPIKE DUPLICATE (MS / MSD) Laboratory Sample ID	Sample Conc.W (mg/Kg)	Conc.W Spiked (mg/Kg)	MS Conc.W (mg/Kg)	MSD Conc.W (mg/Kg)	MS Percent Recovery	MSD Percent Recovery	LCL (%)	UCL (%)	Flag	RPD MS/MSD (%)	UCL (%)	Flag
45027-011	U	2.66	1.85	1.76	70	66	30	122		5.0	30	
45027-011	U	2.66	2.16	2.08	81	78	28	135		4.1	30	
45027-011	U	2.66	2.14	2.07	80	78	29	124		3.5	30	
45027-011	U	2.66	2.12	2.00	80	75	31	123		5.5	30	
45027-011	U	2.66	2.51	2.45	94	92	27	136		2.3	30	
45027-011	U	2.66	2.36	2.28	89	86	44	132		3.4	30	
45027-011	U	2.66	2.22	2.05	83	77	21	131		7.8	30	
45027-011	U	2.66	2.58	2.44	97	92	30	144		5.5	30	
45027-011	U	2.66	2.84	2.74	107	103	13	138		3.5	30	
45027-011	U	2.66	2.34	2.35	88	88	47	143		0.4	30	
45027-011	4.3	5.33	4.36	4.14	82	78	37	113		5.1	30	
45027-011	4.0	5.33	4.17	3.96	78	74	44	116		5.3	30	
45027-011	2.2	2.67	2.29	2.17	86	81	28	126		5.2	30	
45027-011	2.3	2.67	2.41	2.33	90	87	28	123		3.4	30	
45027-011	6.0	5.33	6.50	6.14	122	115	38	122		5.7	30	
45027-011	2.5	2.67	2.48	2.45	93	92	41	148		1.1	30	

Codes,Flags :

- U — The analyte was not detected at or above the quantitation limit.
- E — The analyte was detected at a concentration greater than the calibration range; therefore the result is estimated.
- * — The value is outside quality control limits
- W — Result is always reported as "wet weight".
- J — The analyte was detected at a conc. below the quant. limit but above the method detection limit.
- B — The analyte was detected in the associated method blank.
- X — Matrix interference has resulted in an elevated reporting limit or distorted QC result.
- A — Spike recovery or precision unusable due to dilution.

Comments :

Chemist/Date 6/27/11

Quality Assurance Officer/Date ZM 6/27/11

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Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Semivolatile Organics by GC/MS
Soil/Solid

Batch ID: PS11F21B
Page: 1 of 2
Date: 06/22/11

Preparation Batch: PS11F21B **Preparation Date: 06/21/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Acenaphthene	U	33.3		2380	2670	89	44 - 132						MB-1	LCS-1	
2. Acenaphthylene	U	33.3		2370	2670	89	45 - 132						MB-1	LCS-1	
3. Aniline	U	33.3		1380	2670	52	21 - 84						MB-1	LCS-1	
4. Anthracene	U	33.3		2460	2670	92	46 - 131						MB-1	LCS-1	
5. Azobenzene	U	33.3		2320	2670	87	31 - 135						MB-1	LCS-1	
6. Benzo(a)anthracene	U	33.3		2440	2670	92	48 - 134						MB-1	LCS-1	
7. Benzo(a)pyrene	U	33.3		2390	2670	90	44 - 142						MB-1	LCS-1	
8. Benzo(b)fluoranthene	U	33.3		2450	2670	92	45 - 142						MB-1	LCS-1	
9. Benzo(ghi)perylene	U	33.3		2720	2670	102	36 - 149						MB-1	LCS-1	
10. Benzo(k)fluoranthene	U	33.3		2400	2670	90	43 - 143						MB-1	LCS-1	
11. Benzyl Alcohol	U	33.3		2200	2670	83	30 - 123						MB-1	LCS-1	
12. Bis(2-chloroethoxy)methane	U	33.3		2000	2670	75	26 - 127						MB-1	LCS-1	
13. Bis(2-chloroethyl)ether	U	33.3		1950	2670	73	29 - 120						MB-1	LCS-1	
14. Bis(2-chloroisopropyl) Ether	U	33.3		1580	2670	59	12 - 125						MB-1	LCS-1	
15. Bis(2-ethylhexyl)phthalate	U	66.7		2740	2670	103	28 - 154						MB-1	LCS-1	
16. 4-Bromophenyl Phenylether	U	33.3		2560	2670	96	40 - 151						MB-1	LCS-1	
17. Butyl Benzyl Phthalate	U	167		2620	2670	98	30 - 144						MB-1	LCS-1	
18. Carbazole	U	33.3		2930	2670	110	37 - 152						MB-1	LCS-1	
19. 4-Chloroaniline	U	33.3		1920	2670	72	25 - 101						MB-1	LCS-1	
20. 4-Chloro-3-methylphenol	U	33.3		2490	2670	93	27 - 136						MB-1	LCS-1	
21. 2-Chloronaphthalene	U	33.3		2330	2670	87	31 - 131						MB-1	LCS-1	
22. 2-Chlorophenol	U	33.3		2130	2670	80	31 - 123						MB-1	LCS-1	
23. 4-Chlorophenyl Phenylether	U	33.3		2270	2670	85	35 - 145						MB-1	LCS-1	
24. Chrysene	U	33.3		2380	2670	89	39 - 132						MB-1	LCS-1	
25. Dibenzo(a,h)anthracene	U	33.3		2680	2670	100	41 - 142						MB-1	LCS-1	
26. Dibenzofuran	U	33.3		2360	2670	88	29 - 126						MB-1	LCS-1	
27. 1,2-Dichlorobenzene	U	33.3		2150	2670	80	30 - 115						MB-1	LCS-1	
28. 1,3-Dichlorobenzene	U	33.3		2100	2670	79	29 - 112						MB-1	LCS-1	
29. 1,4-Dichlorobenzene	U	33.3		2110	2670	79	29 - 113						MB-1	LCS-1	
30. 2,4-Dichlorophenol	U	33.3		2340	2670	88	28 - 129						MB-1	LCS-1	
31. 2,6-Dichlorophenol	U	33.3		2600	2670	97	30 - 130						MB-1	LCS-1	
32. Diethyl Phthalate	U	33.3		2660	2670	100	30 - 142						MB-1	LCS-1	
33. Dimethyl Phthalate	U	33.3		2490	2670	93	31 - 136						MB-1	LCS-1	
34. 2,4-Dimethylphenol	U	33.3		2110	2670	79	30 - 136						MB-1	LCS-1	
35. Di-n-butyl Phthalate	U	33.3		2840	2670	106	28 - 144						MB-1	LCS-1	
36. 2,4-Dinitrophenol	U	667		745	2670	28	10 - 95						MB-1	LCS-1	
37. 2,4-Dinitrotoluene	U	167		2640	2670	99	30 - 144						MB-1	LCS-1	
38. 2,6-Dinitrotoluene	U	66.7		2410	2670	90	31 - 132						MB-1	LCS-1	
39. Di-n-octyl Phthalate	U	167		2690	2670	101	27 - 152						MB-1	LCS-1	
40. Fluoranthene	U	33.3		2680	2670	100	48 - 143						MB-1	LCS-1	
41. Fluorene	U	33.3		2520	2670	94	46 - 133						MB-1	LCS-1	
42. Hexachlorobenzene	U	33.3		2370	2670	89	24 - 139						MB-1	LCS-1	
43. Hexachlorobutadiene	U	33.3		2500	2670	94	28 - 145						MB-1	LCS-1	
44. Hexachlorocyclopentadiene	U	167		2500	2670	94	10 - 130						MB-1	LCS-1	
45. Hexachloroethane	U	33.3		2260	2670	85	30 - 119						MB-1	LCS-1	
46. Indeno(1,2,3-cd)pyrene	U	66.7		2780	2670	104	40 - 147						MB-1	LCS-1	
47. Isophorone	U	33.3		2230	2670	83	26 - 137						MB-1	LCS-1	
48. 2-Methyl-4,6-dinitrophenol	U	333		1760	2670	66	15 - 130						MB-1	LCS-1	
49. 2-Methylnaphthalene	U	33.3		2260	2670	85	27 - 120						MB-1	LCS-1	
50. 2-Methylphenol	U	33.3		2100	2670	79	29 - 119						MB-1	LCS-1	
51. 3&4-Methylphenol	U	33.3		2100	2670	79	31 - 139						MB-1	LCS-1	
52. Naphthalene	U	33.3		2300	2670	86	37 - 125						MB-1	LCS-1	

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Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Semivolatile Organics by GC/MS
Soil/Solid

Batch ID: PS11F21B
Page: 2 of 2
Date: 06/22/11

Preparation Batch: PS11F21B **Preparation Date: 06/21/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
53. 2-Nitroaniline	U	167		1990	2670	74	33 - 149						MB-1	LCS-1	
54. 3-Nitroaniline	U	66.7		2420	2670	91	32 - 117						MB-1	LCS-1	
55. 4-Nitroaniline	U	66.7		3140	2670	118	35 - 131						MB-1	LCS-1	
56. Nitrobenzene	U	33.3		2170	2670	81	30 - 131						MB-1	LCS-1	
57. 2-Nitrophenol	U	167		2350	2670	88	28 - 129						MB-1	LCS-1	
58. 4-Nitrophenol	U	667		2200	2670	82	21 - 131						MB-1	LCS-1	
59. N-Nitrosodimethylamine	U	167		1840	2670	69	27 - 122						MB-1	LCS-1	
60. N-Nitrosodi-n-propylamine	U	33.3		2130	2670	80	28 - 135						MB-1	LCS-1	
61. N-Nitrosodiphenylamine	U	33.3		2750	2670	103	32 - 145						MB-1	LCS-1	
62. Pentachlorophenol	U	667		2260	2670	85	13 - 138						MB-1	LCS-1	
63. Phenanthrene	U	33.3		2470	2670	93	46 - 136						MB-1	LCS-1	
64. Phenol	U	33.3		1860	2670	70	30 - 122						MB-1	LCS-1	
65. Pyrene	U	33.3		2400	2670	90	47 - 143						MB-1	LCS-1	
66. Pyridine	U	167		1230	2670	46	10 - 76						MB-1	LCS-1	
67. 1,2,4-Trichlorobenzene	U	33.3		2200	2670	82	29 - 124						MB-1	LCS-1	
68. 2,4,5-Trichlorophenol	U	167		2320	2670	87	29 - 129						MB-1	LCS-1	
69. 2,4,6-Trichlorophenol	U	66.7		2400	2670	90	31 - 138						MB-1	LCS-1	

System Monitoring Compounds (Surrogates):	Method Blank (MB) Result µg/kg	Spike µg/kg	Rec. %	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. 2-Fluorobiphenyl(S)	2510	2670	94		2410	2670	90	28 - 123						MB-1	LCS-1	
2. 2-Fluorophenol(S)	4500	5330	84		4290	5330	80	37 - 113						MB-1	LCS-1	
3. Nitrobenzene-d5(S)	2320	2670	87		2260	2670	85	28 - 126						MB-1	LCS-1	
4. Phenol-d6(S)	4290	5330	80		4080	5330	76	44 - 116						MB-1	LCS-1	
5. 4-Terphenyl-d14(S)	2610	2670	98		2480	2670	93	41 - 148						MB-1	LCS-1	
6. 2,4,6-Tribromophenol(S)	5380	5330	101		6330	5330	119	38 - 122						MB-1	LCS-1	

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	S711F21A	06/21/11 14:41
LCS-1	S711F21A	06/21/11 15:31

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Heather L. Smith

Heather Smith
Chemist, Semivolatile Organics
Wednesday, June 22, 2011
9:41:08 AM

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Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Trace Elements by ICP/MS
Soil/Solid

Batch ID: PT11F21E
Page: 1 of 1
Date: 06/27/11

Preparation Batch: PT11F21E **Preparation Date: 06/21/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Aluminum	32100	1000	*	46400	50000	93	85 - 115						MB-2	LCS-2	
2. Antimony	U	20.0		9770	10000	98	85 - 115						MB-2	LCS-2	
3. Arsenic	U	20.0		10200	10000	102	85 - 115						MB-2	LCS-2	
4. Barium	U	1000		49700	50000	99	85 - 115						MB-2	LCS-2	
5. Beryllium	U	43.5		16000	10000	160	85 - 115	*					MB-2	LCS-2	
6. Boron	U	1000		14400	10000	144	85 - 115	*					MB-2	LCS-2	
7. Cadmium	U	20.0		10000	10000	100	85 - 115						MB-2	LCS-2	
8. Chromium	U	54.7		21300	20000	106	85 - 115						MB-2	LCS-2	
9. Cobalt	24.8	20.0	*	10200	10000	102	85 - 115						MB-2	LCS-2	
10. Copper	92.2	40.0	*	20300	20000	102	85 - 115						MB-2	LCS-2	
11. Lead	350	40.0	*	21100	20000	105	85 - 115						MB-2	LCS-2	
12. Lithium	U	200		15100	10000	151	85 - 115	*					MB-2	LCS-2	
13. Manganese	U	1000		50900	50000	102	85 - 115						MB-2	LCS-2	
14. Molybdenum	U	40.0		20600	20000	103	85 - 115						MB-2	LCS-2	
15. Nickel	U	400		20200	20000	101	85 - 115						MB-2	LCS-2	
16. Selenium	U	200		9510	10000	95	85 - 115						MB-2	LCS-2	
17. Silver	U	20.0		10100	10000	101	85 - 115						MB-2	LCS-2	
18. Strontium	82.4	34.1	*	9830	10000	98	85 - 115						MB-2	LCS-2	
19. Thallium	U	20.0		10300	10000	103	85 - 115						MB-2	LCS-2	
20. Thorium	37.0	20.0	*	10600	10000	106	85 - 115						MB-2	LCS-2	
21. Tin	U	23.4		10300	10000	103	85 - 115						MB-2	LCS-2	
22. Titanium	U	400		10100	10000	101	85 - 115						MB-2	LCS-2	
23. Uranium	U	20.0		11200	10000	112	85 - 115						MB-2	LCS-2	
24. Vanadium	U	400		10300	10000	103	85 - 115						MB-2	LCS-2	
25. Yttrium	36.4	20.0	*	9760	10000	98	-						MB-2	LCS-2	
26. Zinc	U	1000		49800	50000	100	85 - 115						MB-2	LCS-2	

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-2	T211F22A	06/22/11 10:45
LCS-2	T211F22A	06/22/11 10:47

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

J Haney

Jeri Haney
Group Leader, Trace Metals
Monday, June 27, 2011
2:32:50 PM

Fibertec Environmental Services

QUALITY ASSURANCE REPORT
for
LABORATORY BATCH NUMBER

ps11f21b

SEMI-VOLATILES

Sample Matrix :	SOIL/SOLID	Preparation Method :	SW-846 3550B	Analytical Method :	SW-846 8082A
Inclusive Projects :	VARIOUS	Preparation Date :	6/21/2011	Analysis Date :	6/21/2011
		Preparer(s) Initials:	DW	Analyst(s) Initials :	BDA

			Matrix Blank		Laboratory Control Sample (LCS)						MATRIX SPIKE / MATRIX SPIKE DUPLICATE (MS / MSD)													
Analyte	RL	Units	Conc. (ug/Kg) (%**)	Flag	Conc. Spiked (ug/Kg)	LCS Conc. (ug/Kg)	LCS Percent Recovery	LCL (%)	UCL (%)	Flag	Laboratory Sample ID	Sample Conc.W (ug/Kg)	Conc.W Spiked (ug/Kg)	MS Conc.W (ug/Kg)	MSD Conc.W (ug/Kg)	MS Percent Recovery	MSD Percent Recovery	LCL (%)	UCL (%)	Flag	RPD MS/MSD (%)	UCL (%)	Flag
TCMX (S)	33.0	µg/Kg	95		33.0	0.0	0	42	133	*	45027-011	33.0	33.0	0.0	0.0	0	0	42	133	*	#DIV/0!	30	####
Aroclor 1016	330	µg/Kg	U		660	685	104	60	122		45027-011	U	660	644	539	98	82	60	122		18	30	
Aroclor 1260	330	µg/Kg	U		660	583	88	70	131		45027-011	U	660	532	470	81	71	70	131		12	30	
DCB (S)	33.0	µg/Kg	106		33.0	29.7	90	40	143		45027-011	30.6	33.0	28.1	24.0	85	73	40	143		16	30	

Codes,Flags :

U	The analyte was not detected at or above the quantitation limit.	J	The analyte was detected at a conc. below the quant. limit but above the method detection limit.
E	The analyte was detected at a concentration greater than the calibration range; therefore the result is estimated.	B	The analyte was detected in the associated method blank.
*	The value is outside quality control limits	X	Matrix interference has resulted in an elevated reporting limit or distorted QC result.
W	Result is always reported as "wet weight".	A	Spike recovery or precision unusable due to dilution.

Comments :
**DCB (S) is added to all samples at 33.0 ug/Kg, and is therefore presented as a percent recovery in the reagent blank.
Calculation factor = #/1.5 TCMX and first Aroclor 1016 peak are interfered with on the LCS, MS, and MSD.

Bethany D. Dassett 6-27-11
Chemist/Date

ZM 6/27/11
Quality Assurance Officer/Date

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F20B
Page: 1 of 3
Date: 06/21/11

Preparation Batch: V911F20B **Preparation Date: 06/20/11**

arameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
Acetone	U	315		5730	5000	115	40 - 207		128	11	20		MB-1	LCS-1	LCD-1
Acrylonitrile	U	25.0		6270	5000	125	45 - 180		142	13	20		MB-1	LCS-1	LCD-1
. Allyl Chloride	U	10.0		5830	5000	117	70 - 130		98	17	20		MB-1	LCS-1	LCD-1
. Benzene	U	10.0		5670	5000	113	63 - 141		110	3	20		MB-1	LCS-1	LCD-1
5. Bromobenzene	16.0	10.0	*	4420	5000	88	70 - 144		86	2	20		MB-1	LCS-1	LCD-1
6. Bromochloromethane	U	10.0		5600	5000	112	42 - 161		106	6	20		MB-1	LCS-1	LCD-1
7. Bromodichloromethane	U	10.0		6270	5000	125	60 - 150		121	3	20		MB-1	LCS-1	LCD-1
8. Bromoform	U	25.0		5780	5000	116	50 - 117		121	4	20		MB-1	LCS-1	LCD-1
9. Bromomethane	59.8	25.0	*	6070	5000	121	58 - 217		113	7	20		MB-1	LCS-1	LCD-1
10. 2-Butanone	U	50.0		8170	5000	163	42 - 193		176	7	20		MB-1	LCS-1	LCD-1
11. tert-Butyl Alcohol	U	250		5650	5000	113	42 - 156		145	25	20	*	MB-1	LCS-1	LCD-1
12. n-Butylbenzene	13.2	10.0	*	4910	5000	98	65 - 151		95	3	20		MB-1	LCS-1	LCD-1
13. sec-Butylbenzene	U	10.0		4750	5000	95	68 - 147		93	2	20		MB-1	LCS-1	LCD-1
14. tert-Butylbenzene	U	10.0		5010	5000	100	68 - 140		98	3	20		MB-1	LCS-1	LCD-1
15. Carbon Disulfide	13.4	10.0	*	5570	5000	111	36 - 143		92	19	20		MB-1	LCS-1	LCD-1
16. Carbon Tetrachloride	16.3	10.0	*	6660	5000	133	50 - 159		129	3	20		MB-1	LCS-1	LCD-1
17. Chlorobenzene	U	10.0		4710	5000	94	72 - 135		93	2	20		MB-1	LCS-1	LCD-1
18. Chloroethane	U	25.0		5560	5000	111	16 - 207		104	7	20		MB-1	LCS-1	LCD-1
19. Chloroform	U	10.0		6070	5000	121	47 - 159		116	4	20		MB-1	LCS-1	LCD-1
20. Chloromethane	U	25.0		5420	5000	108	14 - 185		111	2	20		MB-1	LCS-1	LCD-1
21. 2-Chlorotoluene	U	10.0		4470	5000	89	73 - 141		87	2	20		MB-1	LCS-1	LCD-1
22. 4-Chlorotoluene	U	10.0		4600	5000	92	82 - 137		90	2	20		MB-1	LCS-1	LCD-1
23. Dibromochloromethane	U	25.0		5570	5000	111	59 - 130		112	1	20		MB-1	LCS-1	LCD-1
24. 1,2-Dibromo-3-chloropropane	12.0	5.00	*	5710	5000	114	34 - 164		118	4	20		MB-1	LCS-1	LCD-1
25. Dibromomethane	U	10.0		5810	5000	116	66 - 134		116	0	20		MB-1	LCS-1	LCD-1
26. 1,2-Dichlorobenzene	U	10.0		4610	5000	92	76 - 128		91	2	20		MB-1	LCS-1	LCD-1
27. 1,3-Dichlorobenzene	U	10.0		4430	5000	89	72 - 136		87	2	20		MB-1	LCS-1	LCD-1
28. 1,4-Dichlorobenzene	U	10.0		4220	5000	84	74 - 127		81	4	20		MB-1	LCS-1	LCD-1
29. trans-1,4-Dichloro-2-butene	U	50.0		4890	5000	98	56 - 153		106	8	20		MB-1	LCS-1	LCD-1
30. Dichlorodifluoromethane	U	10.0		5060	5000	101	10 - 207		99	2	20		MB-1	LCS-1	LCD-1
31. 1,1-Dichloroethane	U	10.0		5770	5000	115	42 - 157		112	3	20		MB-1	LCS-1	LCD-1
32. 1,2-Dichloroethane	U	20.0		11100	10000	111	56 - 146		111	1	20		MB-1	LCS-1	LCD-1
33. 1,1-Dichloroethene	U	10.0		6260	5000	125	34 - 165		110	13	20		MB-1	LCS-1	LCD-1
34. cis-1,2-Dichloroethene	U	10.0		7040	5000	141	43 - 170		136	4	20		MB-1	LCS-1	LCD-1
35. trans-1,2-Dichloroethene	U	10.0		4840	5000	97	49 - 162		93	4	20		MB-1	LCS-1	LCD-1
36. 1,2-Dichloropropane	U	10.0		5900	5000	118	62 - 151		116	2	20		MB-1	LCS-1	LCD-1
37. 1,3-Dichloropropane	U	10.0		5020	5000	100	77 - 132		102	2	20		MB-1	LCS-1	LCD-1
38. 2,2-Dichloropropane	U	25.0		6550	5000	131	52 - 169		129	2	20		MB-1	LCS-1	LCD-1
39. 1,1-Dichloropropene	U	10.0		6040	5000	121	52 - 153		118	2	20		MB-1	LCS-1	LCD-1
40. cis-1,3-Dichloropropene	U	10.0		6240	5000	125	45 - 156		123	2	20		MB-1	LCS-1	LCD-1
41. trans-1,3-Dichloropropene	U	10.0		6240	5000	125	40 - 157		123	2	20		MB-1	LCS-1	LCD-1
42. Diethyl Ether	U	25.0		6940	5000	139	30 - 167		129	7	20		MB-1	LCS-1	LCD-1
43. Ethyl Methacrylate	U	250		5630	5000	113	80 - 132		118	5	20		MB-1	LCS-1	LCD-1
44. Ethylbenzene	U	10.0		4890	5000	98	76 - 137		96	2	20		MB-1	LCS-1	LCD-1
45. Ethylene Dibromide	U	10.0		10300	10000	103	71 - 133		106	3	20		MB-1	LCS-1	LCD-1
46. Hexachlorobutadiene	73.0	29.5	*	4790	5000	96	79 - 142		96	0	20		MB-1	LCS-1	LCD-1
47. Hexachloroethane	U	50.0		6130	5000	123	42 - 151		123	0	20		MB-1	LCS-1	LCD-1
48. 2-Hexanone	U	50.0		5640	5000	113	29 - 211		130	14	20		MB-1	LCS-1	LCD-1
49. Isopropylbenzene	U	10.0		5210	5000	104	68 - 153		102	2	20		MB-1	LCS-1	LCD-1
50. p-Isopropyltoluene	U	10.0		5020	5000	100	75 - 139		98	3	20		MB-1	LCS-1	LCD-1
51. Methacrylonitrile	U	25.0		5750	5000	115	70 - 130		125	9	20		MB-1	LCS-1	LCD-1
52. Methyl Iodide	48.2	25.0	*	7270	5000	145	17 - 150		123	16	20		MB-1	LCS-1	LCD-1

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F20B
Page: 2 of 3
Date: 06/21/11

Preparation Batch: V911F20B **Preparation Date: 06/20/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
53. Methyl Methacrylate	U	25.0		5550	5000	111	70 - 130		125	12	20		MB-1	LCS-1	LCD-1
54. Methylene Chloride	U	100		5340	5000	107	38 - 180		104	3	20		MB-1	LCS-1	LCD-1
55. 2-Methylnaphthalene	U	100		3810	5000	76	42 - 202		105	32	20	*	MB-1	LCS-1	LCD-1
56. 4-Methyl-2-pentanone	U	100		6180	5000	124	55 - 161		137	10	20		MB-1	LCS-1	LCD-1
57. MTBE	U	20.0		12900	10000	129	58 - 147		133	3	20		MB-1	LCS-1	LCD-1
58. Naphthalene	17.9	10.0	*	4220	5000	84	45 - 180		96	12	20		MB-1	LCS-1	LCD-1
59. 2-Nitropropane	U	50.0		7420	5000	148	80 - 132	*	166	11	20		MB-1	LCS-1	LCD-1
60. Propionitrile	U	250		5230	5000	105	70 - 130		138	28	20	*	MB-1	LCS-1	LCD-1
61. n-Propylbenzene	U	10.0		4580	5000	92	71 - 146		90	2	20		MB-1	LCS-1	LCD-1
62. Styrene	U	10.0		5220	5000	104	72 - 138		102	3	20		MB-1	LCS-1	LCD-1
63. 1,1,1,2-Tetrachloroethane	U	10.0		5690	5000	114	61 - 131		111	2	20		MB-1	LCS-1	LCD-1
64. 1,1,2,2-Tetrachloroethane	U	10.0		4550	5000	91	72 - 145		97	6	20		MB-1	LCS-1	LCD-1
65. Tetrachloroethene	U	10.0		4810	5000	96	50 - 151		94	2	20		MB-1	LCS-1	LCD-1
66. Tetrahydrofuran	U	250		5450	5000	109	28 - 169		121	11	20		MB-1	LCS-1	LCD-1
67. Toluene	U	10.0		5730	5000	115	65 - 144		111	3	20		MB-1	LCS-1	LCD-1
68. 1,2,3-Trichlorobenzene	16.9	10.0	*	3890	5000	78	50 - 161		87	11	20		MB-1	LCS-1	LCD-1
69. 1,2,4-Trichlorobenzene	14.0	10.0	*	4310	5000	86	54 - 152		91	5	20		MB-1	LCS-1	LCD-1
70. 1,1,1-Trichloroethane	U	10.0		6390	5000	128	46 - 156		122	5	20		MB-1	LCS-1	LCD-1
71. 1,1,2-Trichloroethane	U	10.0		4990	5000	100	80 - 129		101	2	20		MB-1	LCS-1	LCD-1
72. Trichloroethene	U	10.0		6070	5000	121	65 - 144		118	3	20		MB-1	LCS-1	LCD-1
73. Trichlorofluoromethane	U	16.6		5990	5000	120	31 - 226		115	4	20		MB-1	LCS-1	LCD-1
74. 1,2,3-Trichloropropane	U	25.0		4560	5000	91	74 - 139		99	8	20		MB-1	LCS-1	LCD-1
75. 1,1,2-Trichloro-1,2,2-trifluoroethane	U	25.0		8220	5000	164	52 - 156	*	120	31	20	*	MB-1	LCS-1	LCD-1
76. 1,2,3-Trimethylbenzene	U	10.0		4620	5000	92	77 - 133		91	1	20		MB-1	LCS-1	LCD-1
77. 1,2,4-Trimethylbenzene	U	10.0		4770	5000	95	71 - 139		93	3	20		MB-1	LCS-1	LCD-1
78. 1,3,5-Trimethylbenzene	U	10.0		4790	5000	96	71 - 138		94	2	20		MB-1	LCS-1	LCD-1
79. Vinyl Chloride	U	10.0		5670	5000	113	25 - 189		107	6	20		MB-1	LCS-1	LCD-1
80. m&p-Xylene	U	20.0		9630	10000	96	69 - 134		94	3	20		MB-1	LCS-1	LCD-1
81. o-Xylene	U	10.0		5160	5000	103	69 - 134		101	3	20		MB-1	LCS-1	LCD-1

System Monitoring Compounds (Surrogates):	Method Blank (MB) Result µg/kg	Spike µg/kg	Rec. %	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Dibromofluoromethane(S)	3770	3750	101		3820	3750	102	53 - 139		99	2	20		MB-1	LCS-1	LCD-1
2. 1,2-Dichloroethane-d4(S)	3420	3750	91		3460	3750	92	64 - 135		92	0	20		MB-1	LCS-1	LCD-1
3. Toluene-d8(S)	3690	3750	98		3700	3750	99	70 - 130		97	1	20		MB-1	LCS-1	LCD-1
4. 4-Bromofluorobenzene(S)	3600	3750	96		3730	3750	99	71 - 129		98	1	20		MB-1	LCS-1	LCD-1

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	V911F20B	06/20/11 23:44
LCS-1	V911F20B	06/20/11 22:21
LCD-1	V911F20B	06/20/11 22:49

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F20B
Page: 3 of 3
Date: 06/21/11

Preparation Batch: V911F20B **Preparation Date: 06/20/11**

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Jennifer Smith
Group Leader, Volatile Organics
Tuesday, June 21, 2011
11:31:09 AM

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18C
Page: 1 of 3
Date: 06/20/11

Preparation Batch: V911F18C **Preparation Date: 06/18/11**

	Method Blank (MB)			Laboratory Control Sample (LCS)					LCS Duplicate (LCD)				Run Code		
Parameter	Result µg/kg	PQL µg/kg	Q	Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	Rec. %	RPD %	UCL %	Q	MB	LCS	LCD
1. Acetone	U	315		6320	5000	126	40 - 207		119	6	20		MB-1	LCS-1	LCD-1
2. Acrylonitrile	U	25.0		6330	5000	127	45 - 180		118	7	20		MB-1	LCS-1	LCD-1
3. Allyl Chloride	U	10.0		5280	5000	106	70 - 130		108	3	20		MB-1	LCS-1	LCD-1
4. Benzene	U	10.0		5630	5000	113	63 - 141		112	1	20		MB-1	LCS-1	LCD-1
5. Bromobenzene	14.6	10.0	*	4510	5000	90	70 - 144		90	1	20		MB-1	LCS-1	LCD-1
6. Bromochloromethane	U	10.0		5420	5000	108	42 - 161		106	3	20		MB-1	LCS-1	LCD-1
7. Bromodichloromethane	U	10.0		6130	5000	123	60 - 150		121	2	20		MB-1	LCS-1	LCD-1
8. Bromoform	U	25.0		5910	5000	118	50 - 117	*	114	4	20		MB-1	LCS-1	LCD-1
9. Bromomethane	62.1	25.0	*	5830	5000	117	58 - 217		115	1	20		MB-1	LCS-1	LCD-1
10. 2-Butanone	U	50.0		6770	5000	135	42 - 193		116	15	20		MB-1	LCS-1	LCD-1
11. tert-Butyl Alcohol	U	250		5610	5000	112	42 - 156		106	6	20		MB-1	LCS-1	LCD-1
12. n-Butylbenzene	U	10.0		4820	5000	96	65 - 151		94	2	20		MB-1	LCS-1	LCD-1
13. sec-Butylbenzene	U	10.0		4840	5000	97	68 - 147		96	1	20		MB-1	LCS-1	LCD-1
14. tert-Butylbenzene	U	10.0		5140	5000	103	68 - 140		101	2	20		MB-1	LCS-1	LCD-1
15. Carbon Disulfide	11.6	10.0	*	5340	5000	107	36 - 143		97	10	20		MB-1	LCS-1	LCD-1
16. Carbon Tetrachloride	18.1	10.0	*	6570	5000	131	50 - 159		129	2	20		MB-1	LCS-1	LCD-1
17. Chlorobenzene	U	10.0		4810	5000	96	72 - 135		95	1	20		MB-1	LCS-1	LCD-1
18. Chloroethane	U	25.0		5450	5000	109	16 - 207		107	2	20		MB-1	LCS-1	LCD-1
19. Chloroform	U	10.0		5790	5000	116	47 - 159		114	2	20		MB-1	LCS-1	LCD-1
20. Chloromethane	U	25.0		5420	5000	108	14 - 185		107	1	20		MB-1	LCS-1	LCD-1
21. 2-Chlorotoluene	U	10.0		4560	5000	91	73 - 141		90	2	20		MB-1	LCS-1	LCD-1
22. 4-Chlorotoluene	U	10.0		4670	5000	93	82 - 137		92	1	20		MB-1	LCS-1	LCD-1
23. Dibromochloromethane	U	25.0		5640	5000	113	59 - 130		110	2	20		MB-1	LCS-1	LCD-1
24. 1,2-Dibromo-3-chloropropane	13.5	5.00	*	6110	5000	122	34 - 164		104	16	20		MB-1	LCS-1	LCD-1
25. Dibromomethane	U	10.0		5810	5000	116	66 - 134		113	2	20		MB-1	LCS-1	LCD-1
26. 1,2-Dichlorobenzene	U	10.0		4660	5000	93	76 - 128		90	3	20		MB-1	LCS-1	LCD-1
27. 1,3-Dichlorobenzene	U	10.0		4540	5000	91	72 - 136		89	2	20		MB-1	LCS-1	LCD-1
28. 1,4-Dichlorobenzene	U	10.0		4210	5000	84	74 - 127		83	2	20		MB-1	LCS-1	LCD-1
29. trans-1,4-Dichloro-2-butene	U	50.0		4310	5000	86	56 - 153		82	5	20		MB-1	LCS-1	LCD-1
30. Dichlorodifluoromethane	U	10.0		5080	5000	102	10 - 207		100	1	20		MB-1	LCS-1	LCD-1
31. 1,1-Dichloroethane	U	10.0		5560	5000	111	42 - 157		110	1	20		MB-1	LCS-1	LCD-1
32. 1,2-Dichloroethane	U	20.0		11200	10000	112	56 - 146		109	3	20		MB-1	LCS-1	LCD-1
33. 1,1-Dichloroethene	U	10.0		6040	5000	121	34 - 165		108	11	20		MB-1	LCS-1	LCD-1
34. cis-1,2-Dichloroethene	U	10.0		6740	5000	135	43 - 170		133	1	20		MB-1	LCS-1	LCD-1
35. trans-1,2-Dichloroethene	U	10.0		4650	5000	93	49 - 162		93	0	20		MB-1	LCS-1	LCD-1
36. 1,2-Dichloropropane	U	10.0		5870	5000	117	62 - 151		114	3	20		MB-1	LCS-1	LCD-1
37. 1,3-Dichloropropane	U	10.0		5170	5000	103	77 - 132		100	3	20		MB-1	LCS-1	LCD-1
38. 2,2-Dichloropropane	U	25.0		4430	5000	89	52 - 169		84	5	20		MB-1	LCS-1	LCD-1
39. 1,1-Dichloropropene	U	10.0		5870	5000	117	52 - 153		116	1	20		MB-1	LCS-1	LCD-1
40. cis-1,3-Dichloropropene	U	10.0		5780	5000	116	45 - 156		114	1	20		MB-1	LCS-1	LCD-1
41. trans-1,3-Dichloropropene	U	10.0		5780	5000	116	40 - 157		114	1	20		MB-1	LCS-1	LCD-1
42. Diethyl Ether	U	25.0		6420	5000	128	30 - 167		117	9	20		MB-1	LCS-1	LCD-1
43. Ethyl Methacrylate	U	250		5610	5000	112	80 - 132		110	2	20		MB-1	LCS-1	LCD-1
44. Ethylbenzene	U	10.0		4960	5000	99	76 - 137		98	1	20		MB-1	LCS-1	LCD-1
45. Ethylene Dibromide	U	10.0		10700	10000	107	71 - 133		104	3	20		MB-1	LCS-1	LCD-1
46. Hexachlorobutadiene	69.4	29.5	*	4680	5000	94	79 - 142		90	4	20		MB-1	LCS-1	LCD-1
47. Hexachloroethane	U	50.0		6250	5000	125	42 - 151		122	2	20		MB-1	LCS-1	LCD-1
48. 2-Hexanone	U	50.0		5530	5000	111	29 - 211		107	3	20		MB-1	LCS-1	LCD-1
49. Isopropylbenzene	U	10.0		5240	5000	105	68 - 153		103	2	20		MB-1	LCS-1	LCD-1
50. p-Isopropyltoluene	U	10.0		5040	5000	101	75 - 139		99	1	20		MB-1	LCS-1	LCD-1
51. Methacrylonitrile	U	25.0		5640	5000	113	70 - 130		108	4	20		MB-1	LCS-1	LCD-1
52. Methyl Iodide	46.6	25.0	*	5780	5000	116	17 - 150		104	11	20		MB-1	LCS-1	LCD-1

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18C
Page: 2 of 3
Date: 06/20/11

Preparation Batch: V911F18C **Preparation Date: 06/18/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
53. Methyl Methacrylate	U	25.0		5560	5000	111	70 - 130		107	4	20		MB-1	LCS-1	LCD-1
54. Methylene Chloride	U	100		5140	5000	103	38 - 180		102	1	20		MB-1	LCS-1	LCD-1
55. 2-Methylnaphthalene	U	100		4020	5000	80	42 - 202		75	6	20		MB-1	LCS-1	LCD-1
56. 4-Methyl-2-pentanone	U	100		6050	5000	121	55 - 161		115	5	20		MB-1	LCS-1	LCD-1
57. MTBE	U	20.0		12400	10000	124	58 - 147		120	4	20		MB-1	LCS-1	LCD-1
58. Naphthalene	16.7	10.0	*	4450	5000	89	45 - 180		85	5	20		MB-1	LCS-1	LCD-1
59. 2-Nitropropane	U	50.0		6810	5000	136	80 - 132	*	129	5	20		MB-1	LCS-1	LCD-1
60. Propionitrile	U	250		6080	5000	122	70 - 130		109	10	20		MB-1	LCS-1	LCD-1
61. n-Propylbenzene	U	10.0		4680	5000	94	71 - 146		93	0	20		MB-1	LCS-1	LCD-1
62. Styrene	U	10.0		5260	5000	105	72 - 138		103	2	20		MB-1	LCS-1	LCD-1
63. 1,1,1,2-Tetrachloroethane	U	10.0		5730	5000	115	61 - 131		113	1	20		MB-1	LCS-1	LCD-1
64. 1,1,2,2-Tetrachloroethane	U	10.0		4730	5000	95	72 - 145		90	5	20		MB-1	LCS-1	LCD-1
65. Tetrachloroethene	U	10.0		4890	5000	98	50 - 151		96	1	20		MB-1	LCS-1	LCD-1
66. Tetrahydrofuran	U	250		5320	5000	106	28 - 169		104	3	20		MB-1	LCS-1	LCD-1
67. Toluene	U	10.0		5690	5000	114	65 - 144		112	2	20		MB-1	LCS-1	LCD-1
68. 1,2,3-Trichlorobenzene	18.6	10.0	*	4080	5000	82	50 - 161		79	3	20		MB-1	LCS-1	LCD-1
69. 1,2,4-Trichlorobenzene	17.3	10.0	*	4430	5000	89	54 - 152		86	3	20		MB-1	LCS-1	LCD-1
70. 1,1,1-Trichloroethane	U	10.0		6080	5000	122	46 - 156		120	1	20		MB-1	LCS-1	LCD-1
71. 1,1,2-Trichloroethane	U	10.0		5110	5000	102	80 - 129		99	3	20		MB-1	LCS-1	LCD-1
72. Trichloroethene	U	10.0		5970	5000	119	65 - 144		119	1	20		MB-1	LCS-1	LCD-1
73. Trichlorofluoromethane	U	16.6		5900	5000	118	31 - 226		117	1	20		MB-1	LCS-1	LCD-1
74. 1,2,3-Trichloropropane	U	25.0		4760	5000	95	74 - 139		92	3	20		MB-1	LCS-1	LCD-1
75. 1,1,2-Trichloro-1,2,2-trifluoroethane	U	25.0		6440	5000	129	52 - 156		113	13	20		MB-1	LCS-1	LCD-1
76. 1,2,3-Trimethylbenzene	U	10.0		4750	5000	95	77 - 133		93	3	20		MB-1	LCS-1	LCD-1
77. 1,2,4-Trimethylbenzene	U	10.0		4820	5000	96	71 - 139		94	2	20		MB-1	LCS-1	LCD-1
78. 1,3,5-Trimethylbenzene	U	10.0		4910	5000	98	71 - 138		96	2	20		MB-1	LCS-1	LCD-1
79. Vinyl Chloride	U	10.0		5590	5000	112	25 - 189		111	0	20		MB-1	LCS-1	LCD-1
80. m&p-Xylene	U	20.0		9750	10000	97	69 - 134		96	2	20		MB-1	LCS-1	LCD-1
81. o-Xylene	U	10.0		5210	5000	104	69 - 134		102	2	20		MB-1	LCS-1	LCD-1

System Monitoring Compounds (Surrogates):	Method Blank (MB) Result µg/kg	Spike µg/kg	Rec. %	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Dibromofluoromethane(S)	3890	3750	104		3780	3750	101	53 - 139		99	2	20		MB-1	LCS-1	LCD-1
2. 1,2-Dichloroethane-d4(S)	3570	3750	95		3610	3750	96	64 - 135		94	2	20		MB-1	LCS-1	LCD-1
3. Toluene-d8(S)	3730	3750	100		3780	3750	101	70 - 130		101	0	20		MB-1	LCS-1	LCD-1
4. 4-Bromofluorobenzene(S)	3550	3750	95		3770	3750	101	71 - 129		99	2	20		MB-1	LCS-1	LCD-1

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	V911F18C	06/19/11 14:52
LCS-1	V911F18C	06/19/11 13:30
LCD-1	V911F18C	06/19/11 13:57

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Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18C
Page: 3 of 3
Date: 06/20/11

Preparation Batch: V911F18C **Preparation Date: 06/18/11**

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Jennifer Smith
Group Leader, Volatile Organics
Monday, June 20, 2011
12:01:41 PM

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Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18B
Page: 1 of 3
Date: 06/20/11

Preparation Batch: V911F18B **Preparation Date: 06/18/11**

	Method Blank (MB)			Laboratory Control Sample (LCS)					LCS Duplicate (LCD)				Run Code		
Parameter	Result µg/kg	PQL µg/kg	Q	Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	Rec. %	RPD %	UCL %	Q	MB	LCS	LCD
1. Acetone	U	315		6160	5000	123	40 - 207		115	7	20		MB-1	LCS-1	LCD-1
2. Acrylonitrile	U	25.0		6230	5000	125	45 - 180		123	2	20		MB-1	LCS-1	LCD-1
3. Allyl Chloride	U	10.0		4970	5000	99	70 - 130		107	7	20		MB-1	LCS-1	LCD-1
4. Benzene	U	10.0		5380	5000	108	63 - 141		110	3	20		MB-1	LCS-1	LCD-1
5. Bromobenzene	11.7	10.0	*	4480	5000	90	70 - 144		90	0	20		MB-1	LCS-1	LCD-1
6. Bromochloromethane	U	10.0		5240	5000	105	42 - 161		106	1	20		MB-1	LCS-1	LCD-1
7. Bromodichloromethane	U	10.0		5850	5000	117	60 - 150		120	3	20		MB-1	LCS-1	LCD-1
8. Bromoform	U	25.0		5910	5000	118	50 - 117	*	119	1	20		MB-1	LCS-1	LCD-1
9. Bromomethane	83.2	25.0	*	5600	5000	112	58 - 217		119	6	20		MB-1	LCS-1	LCD-1
10. 2-Butanone	U	50.0		7380	5000	148	42 - 193		131	12	20		MB-1	LCS-1	LCD-1
11. tert-Butyl Alcohol	U	250		6160	5000	123	42 - 156		122	1	20		MB-1	LCS-1	LCD-1
12. n-Butylbenzene	10.2	10.0	*	4850	5000	97	65 - 151		100	4	20		MB-1	LCS-1	LCD-1
13. sec-Butylbenzene	U	10.0		4830	5000	97	68 - 147		98	1	20		MB-1	LCS-1	LCD-1
14. tert-Butylbenzene	U	10.0		5070	5000	101	68 - 140		101	0	20		MB-1	LCS-1	LCD-1
15. Carbon Disulfide	12.0	10.0	*	4650	5000	93	36 - 143		109	16	20		MB-1	LCS-1	LCD-1
16. Carbon Tetrachloride	13.9	10.0	*	6250	5000	125	50 - 159		129	3	20		MB-1	LCS-1	LCD-1
17. Chlorobenzene	U	10.0		4660	5000	93	72 - 135		95	2	20		MB-1	LCS-1	LCD-1
18. Chloroethane	U	25.0		5310	5000	106	16 - 207		105	1	20		MB-1	LCS-1	LCD-1
19. Chloroform	U	10.0		5620	5000	112	47 - 159		113	1	20		MB-1	LCS-1	LCD-1
20. Chloromethane	U	25.0		5400	5000	108	14 - 185		107	1	20		MB-1	LCS-1	LCD-1
21. 2-Chlorotoluene	U	10.0		4540	5000	91	73 - 141		91	0	20		MB-1	LCS-1	LCD-1
22. 4-Chlorotoluene	U	10.0		4680	5000	94	82 - 137		94	0	20		MB-1	LCS-1	LCD-1
23. Dibromochloromethane	U	25.0		5550	5000	111	59 - 130		114	2	20		MB-1	LCS-1	LCD-1
24. 1,2-Dibromo-3-chloropropane	15.5	5.00	*	6360	5000	127	34 - 164		118	7	20		MB-1	LCS-1	LCD-1
25. Dibromomethane	U	10.0		5650	5000	113	66 - 134		113	0	20		MB-1	LCS-1	LCD-1
26. 1,2-Dichlorobenzene	U	10.0		4670	5000	93	76 - 128		94	1	20		MB-1	LCS-1	LCD-1
27. 1,3-Dichlorobenzene	U	10.0		4530	5000	91	72 - 136		92	1	20		MB-1	LCS-1	LCD-1
28. 1,4-Dichlorobenzene	U	10.0		4250	5000	85	74 - 127		86	1	20		MB-1	LCS-1	LCD-1
29. trans-1,4-Dichloro-2-butene	U	50.0		5020	5000	100	56 - 153		99	1	20		MB-1	LCS-1	LCD-1
30. Dichlorodifluoromethane	U	10.0		5070	5000	101	10 - 207		102	1	20		MB-1	LCS-1	LCD-1
31. 1,1-Dichloroethane	U	10.0		5420	5000	108	42 - 157		109	1	20		MB-1	LCS-1	LCD-1
32. 1,2-Dichloroethane	20.2	20.0	*	10800	10000	108	56 - 146		109	1	20		MB-1	LCS-1	LCD-1
33. 1,1-Dichloroethene	U	10.0		5200	5000	104	34 - 165		123	17	20		MB-1	LCS-1	LCD-1
34. cis-1,2-Dichloroethene	U	10.0		6520	5000	130	43 - 170		132	1	20		MB-1	LCS-1	LCD-1
35. trans-1,2-Dichloroethene	U	10.0		4520	5000	90	49 - 162		92	2	20		MB-1	LCS-1	LCD-1
36. 1,2-Dichloropropane	U	10.0		5510	5000	110	62 - 151		112	2	20		MB-1	LCS-1	LCD-1
37. 1,3-Dichloropropane	U	10.0		5050	5000	101	77 - 132		102	1	20		MB-1	LCS-1	LCD-1
38. 2,2-Dichloropropane	U	25.0		6150	5000	123	52 - 169		121	1	20		MB-1	LCS-1	LCD-1
39. 1,1-Dichloropropene	U	10.0		5740	5000	115	52 - 153		116	1	20		MB-1	LCS-1	LCD-1
40. cis-1,3-Dichloropropene	U	10.0		5890	5000	118	45 - 156		121	3	20		MB-1	LCS-1	LCD-1
41. trans-1,3-Dichloropropene	U	10.0		5890	5000	118	40 - 157		121	3	20		MB-1	LCS-1	LCD-1
42. Diethyl Ether	U	25.0		6040	5000	121	30 - 167		129	7	20		MB-1	LCS-1	LCD-1
43. Ethyl Methacrylate	U	250		5660	5000	113	80 - 132		114	1	20		MB-1	LCS-1	LCD-1
44. Ethylbenzene	U	10.0		4830	5000	97	76 - 137		99	3	20		MB-1	LCS-1	LCD-1
45. Ethylene Dibromide	U	10.0		10500	10000	105	71 - 133		107	1	20		MB-1	LCS-1	LCD-1
46. Hexachlorobutadiene	84.5	29.5	*	4760	5000	95	79 - 142		103	8	20		MB-1	LCS-1	LCD-1
47. Hexachloroethane	U	50.0		6140	5000	123	42 - 151		126	2	20		MB-1	LCS-1	LCD-1
48. 2-Hexanone	U	50.0		5850	5000	117	29 - 211		117	0	20		MB-1	LCS-1	LCD-1
49. Isopropylbenzene	U	10.0		5100	5000	102	68 - 153		105	3	20		MB-1	LCS-1	LCD-1
50. p-Isopropyltoluene	U	10.0		5030	5000	101	75 - 139		102	2	20		MB-1	LCS-1	LCD-1
51. Methacrylonitrile	U	25.0		5760	5000	115	70 - 130		111	4	20		MB-1	LCS-1	LCD-1
52. Methyl Iodide	38.7	25.0	*	4390	5000	88	17 - 150		96	9	20		MB-1	LCS-1	LCD-1

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18B
Page: 2 of 3
Date: 06/20/11

Preparation Batch: V911F18B **Preparation Date: 06/18/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
53. Methyl Methacrylate	U	25.0		5610	5000	112	70 - 130		111	1	20		MB-1	LCS-1	LCD-1
54. Methylene Chloride	U	100		5070	5000	101	38 - 180		99	2	20		MB-1	LCS-1	LCD-1
55. 2-Methylnaphthalene	U	100		4880	5000	98	42 - 202		85	13	20		MB-1	LCS-1	LCD-1
56. 4-Methyl-2-pentanone	U	100		6190	5000	124	55 - 161		122	2	20		MB-1	LCS-1	LCD-1
57. MTBE	U	20.0		12500	10000	125	58 - 147		124	1	20		MB-1	LCS-1	LCD-1
58. Naphthalene	20.3	10.0	*	4740	5000	95	45 - 180		93	2	20		MB-1	LCS-1	LCD-1
59. 2-Nitropropane	U	50.0		7090	5000	142	80 - 132	*	141	1	20		MB-1	LCS-1	LCD-1
60. Propionitrile	U	250		6370	5000	127	70 - 130		119	7	20		MB-1	LCS-1	LCD-1
61. n-Propylbenzene	U	10.0		4660	5000	93	71 - 146		95	2	20		MB-1	LCS-1	LCD-1
62. Styrene	U	10.0		5170	5000	103	72 - 138		105	1	20		MB-1	LCS-1	LCD-1
63. 1,1,1,2-Tetrachloroethane	U	10.0		5580	5000	112	61 - 131		115	3	20		MB-1	LCS-1	LCD-1
64. 1,1,2,2-Tetrachloroethane	U	10.0		4790	5000	96	72 - 145		96	0	20		MB-1	LCS-1	LCD-1
65. Tetrachloroethene	U	10.0		4780	5000	96	50 - 151		99	4	20		MB-1	LCS-1	LCD-1
66. Tetrahydrofuran	U	250		5540	5000	111	28 - 169		108	3	20		MB-1	LCS-1	LCD-1
67. Toluene	U	10.0		5420	5000	108	65 - 144		112	3	20		MB-1	LCS-1	LCD-1
68. 1,2,3-Trichlorobenzene	21.2	10.0	*	4300	5000	86	50 - 161		84	2	20		MB-1	LCS-1	LCD-1
69. 1,2,4-Trichlorobenzene	14.7	10.0	*	4490	5000	90	54 - 152		93	3	20		MB-1	LCS-1	LCD-1
70. 1,1,1-Trichloroethane	U	10.0		5940	5000	119	46 - 156		120	1	20		MB-1	LCS-1	LCD-1
71. 1,1,2-Trichloroethane	U	10.0		5030	5000	101	80 - 129		101	0	20		MB-1	LCS-1	LCD-1
72. Trichloroethene	U	10.0		5760	5000	115	65 - 144		118	2	20		MB-1	LCS-1	LCD-1
73. Trichlorofluoromethane	U	16.6		5870	5000	117	31 - 226		115	2	20		MB-1	LCS-1	LCD-1
74. 1,2,3-Trichloropropane	U	25.0		4910	5000	98	74 - 139		97	1	20		MB-1	LCS-1	LCD-1
75. 1,1,2-Trichloro-1,2,2-trifluoroethane	U	25.0		5700	5000	114	52 - 156		135	17	20		MB-1	LCS-1	LCD-1
76. 1,2,3-Trimethylbenzene	U	10.0		4700	5000	94	77 - 133		95	1	20		MB-1	LCS-1	LCD-1
77. 1,2,4-Trimethylbenzene	U	10.0		4810	5000	96	71 - 139		97	1	20		MB-1	LCS-1	LCD-1
78. 1,3,5-Trimethylbenzene	U	10.0		4850	5000	97	71 - 138		98	1	20		MB-1	LCS-1	LCD-1
79. Vinyl Chloride	U	10.0		5360	5000	107	25 - 189		111	4	20		MB-1	LCS-1	LCD-1
80. m&p-Xylene	U	20.0		9530	10000	95	69 - 134		98	3	20		MB-1	LCS-1	LCD-1
81. o-Xylene	U	10.0		5080	5000	102	69 - 134		104	2	20		MB-1	LCS-1	LCD-1

System Monitoring Compounds (Surrogates):	Method Blank (MB) Result µg/kg	Spike µg/kg	Rec. %	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Dibromofluoromethane(S)	3620	3750	97		3770	3750	100	53 - 139		99	1	20		MB-1	LCS-1	LCD-1
2. 1,2-Dichloroethane-d4(S)	3350	3750	89		3510	3750	94	64 - 135		92	2	20		MB-1	LCS-1	LCD-1
3. Toluene-d8(S)	3570	3750	95		3660	3750	98	70 - 130		97	0	20		MB-1	LCS-1	LCD-1
4. 4-Bromofluorobenzene(S)	3510	3750	94		3710	3750	99	71 - 129		98	1	20		MB-1	LCS-1	LCD-1

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	V911F18B	06/19/11 02:01
LCS-1	V911F18B	06/19/11 00:38
LCD-1	V911F18B	06/19/11 01:06

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Quality Control Report
Preparation Batch QC Summary
Volatile Organics by GC/MS
Soil/Solid

Batch ID: V911F18B
Page: 3 of 3
Date: 06/20/11

Preparation Batch: V911F18B **Preparation Date: 06/18/11**

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Jennifer Smith
Group Leader, Volatile Organics
Monday, June 20, 2011
1:28:03 PM

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Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Mercury by CVAAS
Soil/Solid

Batch ID: PM11F21
Page: 1 of 1
Date: 06/22/11

Preparation Batch: PM11F21A **Preparation Date: 06/21/11**

	Method Blank (MB)			Laboratory Control Sample (LCS)					LCS Duplicate (LCD)				Run Code		
Parameter	Result µg/kg	PQL µg/kg	Q	Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	Rec. %	RPD %	UCL %	Q	MB	LCS	LCD
1. Mercury	U	20.0		199	143	139	85 - 115	*					MB-1	LCS-1	

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	M411F22A	06/22/11 10:54
LCS-1	M411F22A	06/22/11 10:56

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Michaelia Papranec

Michaelia Papranec
Chemist, Trace Metals
Wednesday, June 22, 2011
1:57:38 PM

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Fibertec Environmental Services

QUALITY ASSURANCE REPORT
for
LABORATORY BATCH NUMBER

PS11F20B

SEMI-VOLATILES

Sample Matrix :	SOIL/SOLID	Preparation Method :	SW-846 3550B	Analytical Method :	SW-846 8270D - BNA
Inclusive Projects :	VARIOUS	Preparation Date :	6/20/2011	Analysis Date :	6/20/2011
		Preparer(s) Initials:	DW	Analyst(s) Initials :	TC

Analyte	RL	Units	Matrix Blank Conc. (mg/Kg)	Matrix Blank Flag	Laboratory Control Sample (LCS - reported elsewhere) Conc. Spiked (mg/Kg)	LCS Conc. (mg/Kg)	LCS Percent Recovery	LCL (%)	UCL (%)	Flag
Phenol	0.33	mg/Kg								
n-Nitrosodi-n-Propylamine	0.33	mg/Kg								
1,2,4-Trichlorobenzene	0.33	mg/Kg								
2-Chlorophenol	0.33	mg/Kg								
4-Chloro-3-Methylphenol	0.33	mg/Kg								
Acenaphthene	0.33	mg/Kg								
4-Nitrophenol	1.32	mg/Kg								
2,4-Dinitrotoluene	0.33	mg/Kg								
Pentachlorophenol	1.32	mg/Kg								
Pyrene	0.33	mg/Kg								
2-Fluorophenol (S)	0.33	mg/Kg								
Phenol D-6 (S)	0.33	mg/Kg								
Nitrobenzene D-5 (S)	0.33	mg/Kg								
2-Fluorobiphenyl (S)	0.33	mg/Kg								
2,4,6-Tribromophenol (S)	0.33	mg/Kg								
4-Terphenyl D-14 (S)	0.33	mg/Kg								

MATRIX SPIKE / MATRIX SPIKE DUPLICATE (MS / MSD) Laboratory Sample ID	Sample Conc.W (mg/Kg)	Conc.W Spiked (mg/Kg)	MS Conc.W (mg/Kg)	MSD Conc.W (mg/Kg)	MS Percent Recovery	MSD Percent Recovery	LCL (%)	UCL (%)	Flag	RPD MS/MSD (%)	UCL (%)	Flag
45031-001	U	2.66	2.23	1.99	84	75	30	122		11.5	30	
45031-001	U	2.66	2.31	2.05	87	77	28	135		11.6	30	
45031-001	U	2.66	2.22	2.10	83	79	29	124		5.7	30	
45031-001	U	2.66	2.30	2.16	87	81	31	123		6.6	30	
45031-001	U	2.66	2.26	2.03	85	76	27	136		10.7	30	
45031-001	U	2.66	2.32	2.12	87	80	44	132		8.7	30	
45031-001	U	2.66	2.29	1.91	86	72	21	131		18.1	30	
45031-001	U	2.66	2.16	1.99	81	75	30	144		8.2	30	
45031-001	U	2.66	1.68	1.54	63	58	13	138		9.1	30	
45031-001	U	2.66	2.56	2.39	96	90	47	143		6.7	30	
45031-001	4.2	5.33	3.84	3.52	72	66	37	113		8.7	30	
45031-001	4.0	5.33	4.51	4.04	85	76	44	116		11.0	30	
45031-001	2.1	2.67	2.04	1.90	76	71	28	126		6.8	30	
45031-001	2.2	2.67	2.04	1.93	76	72	28	123		5.7	30	
45031-001	0.0	5.33	4.14	3.94	78	74	38	122		4.8	30	
45031-001	2.3	2.67	2.14	1.99	80	75	41	148		7.1	30	

Codes/Flags :

- U — The analyte was not detected at or above the quantitation limit.
- E — The analyte was detected at a concentration greater than the calibration range; therefore the result is estimated.
- * — The value is outside quality control limits
- W — Result is always reported as "wet weight".
- J — The analyte was detected at a conc. below the quant. limit but above the method detection limit.
- B — The analyte was detected in the associated method blank.
- X — Matrix interference has resulted in an elevated reporting limit or distorted QC result.
- A — Spike recovery or precision unusable due to dilution.

Comments :

Chemist/Date 6/27/11

Quality Assurance Officer/Date 6/27/11

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Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Semivolatile Organics by GC/MS
Soil/Solid

Batch ID: ps11f20b
Page: 1 of 2
Date: 06/21/11

Preparation Batch: ps11f20b **Preparation Date: 06/20/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. Acenaphthene	U	33.3		1990	2670	75	44 - 132						MB-1	LCS-1	
2. Acenaphthylene	U	33.3		2080	2670	78	45 - 132						MB-1	LCS-1	
3. Aniline	U	33.3		1730	2670	65	21 - 84						MB-1	LCS-1	
4. Anthracene	U	33.3		2050	2670	77	46 - 131						MB-1	LCS-1	
5. Azobenzene	U	34.8		2010	2670	75	31 - 135						MB-1	LCS-1	
6. Benzo(a)anthracene	U	33.3		2390	2670	89	48 - 134						MB-1	LCS-1	
7. Benzo(a)pyrene	U	33.3		2300	2670	86	44 - 142						MB-1	LCS-1	
8. Benzo(b)fluoranthene	U	33.3		2290	2670	86	45 - 142						MB-1	LCS-1	
9. Benzo(ghi)perylene	U	33.3		2030	2670	76	36 - 149						MB-1	LCS-1	
10. Benzo(k)fluoranthene	U	33.4		2150	2670	80	43 - 143						MB-1	LCS-1	
11. Benzyl Alcohol	U	33.3		1910	2670	71	30 - 123						MB-1	LCS-1	
12. Bis(2-chloroethoxy)methane	U	33.3		1960	2670	73	26 - 127						MB-1	LCS-1	
13. Bis(2-chloroethyl)ether	U	33.3		2040	2670	77	29 - 120						MB-1	LCS-1	
14. Bis(2-chloroisopropyl) Ether	U	33.4		2150	2670	81	12 - 125						MB-1	LCS-1	
15. Bis(2-ethylhexyl)phthalate	U	33.3		2420	2670	91	28 - 154						MB-1	LCS-1	
16. 4-Bromophenyl Phenylether	U	33.3		2060	2670	77	40 - 151						MB-1	LCS-1	
17. Butyl Benzyl Phthalate	U	33.3		2340	2670	87	30 - 144						MB-1	LCS-1	
18. Carbazole	U	33.3		2240	2670	84	37 - 152						MB-1	LCS-1	
19. 4-Chloroaniline	U	34.0		1640	2670	61	25 - 101						MB-1	LCS-1	
20. 4-Chloro-3-methylphenol	U	33.3		2160	2670	81	27 - 136						MB-1	LCS-1	
21. 2-Chloronaphthalene	U	33.3		1900	2670	71	31 - 131						MB-1	LCS-1	
22. 2-Chlorophenol	U	33.3		1880	2670	70	31 - 123						MB-1	LCS-1	
23. 4-Chlorophenyl Phenylether	U	33.3		2090	2670	78	35 - 145						MB-1	LCS-1	
24. Chrysene	U	33.4		2420	2670	91	39 - 132						MB-1	LCS-1	
25. Dibenzo(a,h)anthracene	U	33.3		2200	2670	82	41 - 142						MB-1	LCS-1	
26. Dibenzofuran	U	33.3		1990	2670	74	29 - 126						MB-1	LCS-1	
27. 1,2-Dichlorobenzene	U	33.3		1820	2670	68	30 - 115						MB-1	LCS-1	
28. 1,3-Dichlorobenzene	U	33.3		1810	2670	68	29 - 112						MB-1	LCS-1	
29. 1,4-Dichlorobenzene	U	33.3		1790	2670	67	29 - 113						MB-1	LCS-1	
30. 2,4-Dichlorophenol	U	33.3		1920	2670	72	28 - 129						MB-1	LCS-1	
31. 2,6-Dichlorophenol	U	33.3		2130	2670	80	30 - 130						MB-1	LCS-1	
32. Diethyl Phthalate	U	33.3		2180	2670	82	30 - 142						MB-1	LCS-1	
33. Dimethyl Phthalate	U	33.3		2150	2670	80	31 - 136						MB-1	LCS-1	
34. 2,4-Dimethylphenol	U	33.3		2110	2670	79	30 - 136						MB-1	LCS-1	
35. Di-n-butyl Phthalate	U	33.3		2150	2670	81	28 - 144						MB-1	LCS-1	
36. 2,4-Dinitrophenol	U	333		1280	2670	48	10 - 95						MB-1	LCS-1	
37. 2,4-Dinitrotoluene	U	33.3		2290	2670	86	30 - 144						MB-1	LCS-1	
38. 2,6-Dinitrotoluene	U	33.3		2020	2670	75	31 - 132						MB-1	LCS-1	
39. Di-n-octyl Phthalate	U	33.3		2150	2670	81	27 - 152						MB-1	LCS-1	
40. Fluoranthene	U	33.3		2230	2670	84	48 - 143						MB-1	LCS-1	
41. Fluorene	U	33.3		2050	2670	77	46 - 133						MB-1	LCS-1	
42. Hexachlorobenzene	U	33.3		2230	2670	83	24 - 139						MB-1	LCS-1	
43. Hexachlorobutadiene	U	35.6		2110	2670	79	28 - 145						MB-1	LCS-1	
44. Hexachlorocyclopentadiene	U	33.3		2070	2670	78	10 - 130						MB-1	LCS-1	
45. Hexachloroethane	U	33.3		2000	2670	75	30 - 119						MB-1	LCS-1	
46. Indeno(1,2,3-cd)pyrene	U	33.3		2210	2670	83	40 - 147						MB-1	LCS-1	
47. Isophorone	U	33.3		2140	2670	80	26 - 137						MB-1	LCS-1	
48. 2-Methyl-4,6-dinitrophenol	U	333		1870	2670	70	15 - 130						MB-1	LCS-1	
49. 2-Methylnaphthalene	U	33.3		1840	2670	69	27 - 120						MB-1	LCS-1	
50. 2-Methylphenol	U	33.3		2020	2670	76	29 - 119						MB-1	LCS-1	
51. 3&4-Methylphenol	U	33.3		1920	2670	72	31 - 139						MB-1	LCS-1	
52. Naphthalene	U	33.3		1970	2670	74	37 - 125						MB-1	LCS-1	

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Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Semivolatile Organics by GC/MS
Soil/Solid

Batch ID: ps11f20b
Page: 2 of 2
Date: 06/21/11

Preparation Batch: ps11f20b **Preparation Date: 06/20/11**

Parameter	Method Blank (MB) Result µg/kg	PQL µg/kg	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
53. 2-Nitroaniline	U	33.3		2350	2670	88	33 - 149						MB-1	LCS-1	
54. 3-Nitroaniline	U	33.3		1890	2670	71	32 - 117						MB-1	LCS-1	
55. 4-Nitroaniline	U	66.7		2220	2670	83	35 - 131						MB-1	LCS-1	
56. Nitrobenzene	U	33.3		2050	2670	77	30 - 131						MB-1	LCS-1	
57. 2-Nitrophenol	U	33.3		1900	2670	71	28 - 129						MB-1	LCS-1	
58. 4-Nitrophenol	U	333		2090	2670	78	21 - 131						MB-1	LCS-1	
59. N-Nitrosodimethylamine	U	48.0		2140	2670	80	27 - 122						MB-1	LCS-1	
60. N-Nitrosodi-n-propylamine	U	33.3		2240	2670	84	28 - 135						MB-1	LCS-1	
61. N-Nitrosodiphenylamine	U	33.3		2150	2670	81	32 - 145						MB-1	LCS-1	
62. Pentachlorophenol	U	167		2340	2670	88	13 - 138						MB-1	LCS-1	
63. Phenanthrene	U	33.3		2070	2670	77	46 - 136						MB-1	LCS-1	
64. Phenol	U	33.3		1840	2670	69	30 - 122						MB-1	LCS-1	
65. Pyrene	U	33.3		2220	2670	83	47 - 143						MB-1	LCS-1	
66. Pyridine	U	33.3		1390	2670	52	10 - 76						MB-1	LCS-1	
67. 1,2,4-Trichlorobenzene	U	33.3		1910	2670	71	29 - 124						MB-1	LCS-1	
68. 2,4,5-Trichlorophenol	U	33.3		2140	2670	80	29 - 129						MB-1	LCS-1	
69. 2,4,6-Trichlorophenol	U	33.3		2020	2670	76	31 - 138						MB-1	LCS-1	

System Monitoring Compounds (Surrogates):	Method Blank (MB) Result µg/kg	Spike µg/kg	Rec. %	Q	Laboratory Control Sample (LCS) Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	LCS Duplicate (LCD) Rec. %	RPD %	UCL %	Q	Run Code MB	LCS	LCD
1. 2-Fluorobiphenyl(S)	2070	2670	78		2070	2670	78	28 - 123						MB-1	LCS-1	
2. 2-Fluorophenol(S)	3920	5330	74		4030	5330	76	37 - 113						MB-1	LCS-1	
3. Nitrobenzene-d5(S)	2140	2670	80		2240	2670	84	28 - 126						MB-1	LCS-1	
4. Phenol-d6(S)	4000	5330	75		3960	5330	74	44 - 116						MB-1	LCS-1	
5. 4-Terphenyl-d14(S)	2450	2670	92		2530	2670	95	41 - 148						MB-1	LCS-1	
6. 2,4,6-Tribromophenol(S)	1.66	5330	0	*	3290	5330	62	38 - 122						MB-1	LCS-1	

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	S111F20B	06/20/11 15:02
LCS-1	S111F20B	06/20/11 15:47

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

Tammy M. Coffman

Tammy Coffman
Chemist, Semivolatile Organics
Tuesday, June 21, 2011
1:47:05 PM

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Fibertec environmental services

Quality Control Report
Preparation Batch QC Summary
Trace Elements by ICP/MS
Soil/Solid

Batch ID: PT11F21F
Page: 1 of 1
Date: 06/27/11

Preparation Batch: PT11F21F **Preparation Date: 06/21/11**

	Method Blank (MB)			Laboratory Control Sample (LCS)					LCS Duplicate (LCD)				Run Code		
Parameter	Result µg/kg	PQL µg/kg	Q	Result µg/kg	Spike µg/kg	Rec. %	LCL - UCL %	Q	Rec. %	RPD %	UCL %	Q	MB	LCS	LCD
1. Aluminum	U	1000		45700	50000	91	85 - 115						MB-1	LCS-1	
2. Antimony	310	20.0	*	9820	10000	98	85 - 115						MB-1	LCS-1	
3. Arsenic	U	20.0		10200	10000	102	85 - 115						MB-1	LCS-1	
4. Barium	U	1000		49000	50000	98	85 - 115						MB-1	LCS-1	
5. Beryllium	U	43.5		15700	10000	157	85 - 115	*					MB-1	LCS-1	
6. Boron	U	1000		14400	10000	144	85 - 115	*					MB-1	LCS-1	
7. Cadmium	37.5	20.0	*	10100	10000	101	85 - 115						MB-1	LCS-1	
8. Chromium	U	54.7		21200	20000	106	85 - 115						MB-1	LCS-1	
9. Cobalt	U	20.0		10100	10000	101	85 - 115						MB-1	LCS-1	
10. Copper	U	40.0		20500	20000	103	85 - 115						MB-1	LCS-1	
11. Lead	660	40.0	*	22500	20000	113	85 - 115						MB-1	LCS-1	
12. Lithium	U	200		15400	10000	154	85 - 115	*					MB-1	LCS-1	
13. Manganese	U	1000		50900	50000	102	85 - 115						MB-1	LCS-1	
14. Molybdenum	69.0	40.0	*	21000	20000	105	85 - 115						MB-1	LCS-1	
15. Nickel	U	400		20900	20000	105	85 - 115						MB-1	LCS-1	
16. Selenium	U	200		9800	10000	98	85 - 115						MB-1	LCS-1	
17. Silver	U	20.0		10100	10000	101	85 - 115						MB-1	LCS-1	
18. Strontium	U	34.1		9660	10000	97	85 - 115						MB-1	LCS-1	
19. Thallium	U	20.0		10200	10000	102	85 - 115						MB-1	LCS-1	
20. Thorium	134	20.0	*	10700	10000	107	85 - 115						MB-1	LCS-1	
21. Tin	U	23.4		10100	10000	101	85 - 115						MB-1	LCS-1	
22. Titanium	U	400		10300	10000	103	85 - 115						MB-1	LCS-1	
23. Uranium	U	20.0		10900	10000	109	85 - 115						MB-1	LCS-1	
24. Vanadium	U	400		10200	10000	102	85 - 115						MB-1	LCS-1	
25. Yttrium	U	20.0		10000	10000	100	-						MB-1	LCS-1	
26. Zinc	U	1000		50300	50000	101	85 - 115						MB-1	LCS-1	

Definitions/ Qualifiers:

U: The analyte was not detected at or above the PQL.
*: Value reported is outside QC limits

Run Code (Analysis Sequence/Run Time):

MB-1	T211F22A	06/22/11 10:35
LCS-1	T211F22A	06/22/11 09:46

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

J Haney

Jeri Haney
Group Leader, Trace Metals
Monday, June 27, 2011
2:32:51 PM

Fibertec Environmental Services

QUALITY ASSURANCE REPORT
for
LABORATORY BATCH NUMBER

ps11f20b

SEMI-VOLATILES

Sample Matrix :	SOIL/SOLID	Preparation Method :	SW-846 3550B	Analytical Method :	SW-846 8082A
Inclusive Projects :	VARIOUS	Preparation Date :	6/20/2011	Analysis Date :	6/21/2011
		Preparer(s) Initials:	DW	Analyst(s) Initials :	BDA

			Matrix Blank		Laboratory Control Sample (LCS)						MATRIX SPIKE / MATRIX SPIKE DUPLICATE (MS / MSD)													
Analyte	RL	Units	Conc. (ug/Kg) (%**)	Flag	Conc. Spiked (ug/Kg)	LCS Conc. (ug/Kg)	LCS Percent Recovery	LCL (%)	UCL (%)	Flag	Laboratory Sample ID	Sample Conc.W (ug/Kg)	Conc.W Spiked (ug/Kg)	MS Conc.W (ug/Kg)	MSD Conc.W (ug/Kg)	MS Percent Recovery	MSD Percent Recovery	LCL (%)	UCL (%)	Flag	RPD MS/MSD (%)	UCL (%)	Flag
TCMX (S)	33.0	µg/Kg	88		33.0	0.0	0	42	133	*	45031-001	31.7	33.0	0.0	0.0	0	0	42	133	*	#DIV/0!	30	####
Aroclor 1016	330	µg/Kg	U		660	716	109	60	122		45031-001	U	660	643	628	97	95	60	122		2	30	
Aroclor 1260	330	µg/Kg	U		660	610	92	70	131		45031-001	U	660	510	476	77	72	70	131		7	30	
DCB (S)	33.0	µg/Kg	108		33.0	29.7	90	40	143		45031-001	29.7	33.0	27.1	24.8	82	75	40	143		9	30	

Codes,Flags :

U	The analyte was not detected at or above the quantitation limit.	J	The analyte was detected at a conc. below the quant. limit but above the method detection limit.
E	The analyte was detected at a concentration greater than the calibration range; therefore the result is estimated.	B	The analyte was detected in the associated method blank.
*	The value is outside quality control limits	X	Matrix interference has resulted in an elevated reporting limit or distorted QC result.
W	Result is always reported as "wet weight".	A	Spike recovery or precision unusable due to dilution.

Comments :
**DCB (S) is added to all samples at 33.0 ug/Kg, and is therefore presented as a percent recovery in the reagent blank.
Calculation factor = #/1.5 TCMX and first Aroclor 1016 peak are interfered with on the LCS, MS, and MSD.

Bethany D. Annett 6·27·11
Chemist/Date

ZM 6/27/11
Quality Assurance Officer/Date

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APPENDIX I

RESUMES OF ENVIRONMENTAL PROFESSIONALS

A Full-Service Alliance

Prospect Engineering Alliance is a coalition of three award-winning engineering consulting firms dedicated to serving the needs of Federal agencies and offices.

- **NTH Consultants, Ltd.**
- **Tucker, Young, Jackson, Tull, Inc.**
- **VMX International, LLC.**

Our staff have worked together on projects for both the private and government sectors.

Together, our engineers and scientists can deliver services at every phase of your project, from the planning stages, through its final transformation, and every step in between.

Opportunities with Prospect Engineering Alliance

Prospect offers a wide range of infrastructure and environmental expertise and experience

Our experience on Federal projects includes providing services to the following Agencies:

- Architect of the Capital
- Department of Defense
- Department of the Air Force
- Department of the Army
- Department of the Navy
- Department of Transportation
- Department of Veteran Affairs
- Environmental Protection Agency
- General Services Administration
- US Army Corps of Engineers
- US Department of Agriculture
- US Postal Service

Energy / Water Management

- Energy Efficient Specifications and Design
- Renewable Energy Development
- Energy Conservation Analysis
- Power Market Knowledge and Experience
- Water System Operations, Design, Construction Assistance, Commissioning, and Maintenance
- Water Audits / Leak Detection
- Pump Optimization

Environmental Management

- Soil / Groundwater / Sediment Remediation
- Spill Prevention Control / Countermeasure Plans
- NPDES / SPDES / SWPPP Permits
- Compliance Auditing
- Risk Assessment / Toxicology
- UST Operator
- Health & Safety Compliance Training
- Air Quality Services
- ISO 14001 Training
- Asbestos Testing and Monitoring
- Lead Based Point Inspections and Testing

Waste Management/ Recycling

- Hazardous Waste Management
- Reycling Programs
- Waste Miminization
- On-Site Waste Specialist
- Agricultural Waste Planning and Design
- Landfill Monitoring Programs

Facilities Engineering

- Site Layout and Civil Engineering
- Stormwater Management and Design
- Erosion Control Plans
- Pavement Engineering and Design
- Structural Load Evaluations
- Property Condition Assessments
- Asset Management Programming
- Non-destructive Moisture Surveys
- Roof Assessment and Design
- Facility Decommissioning
- Forensic Investigations
- Complete Materials Testing and Analysis

Geotechnical / Underground

- Foundation Engineering
- Settlement Analysis
- Tunnel and Shaft Engineering
- Shoreline Protection
- Geosynthetics
- Soil Dynamics / Vibration Studies
- Slope / Excavation Stability Evaluations
- Excavation Support Systems
- Subsurface Utility Engineering
- Underground Utility Design
- Hydrogeologic Investigations
- Failure Analysis / Forensic Engineering

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NTH at a glance:

- **Incorporated: July 30, 1968**
- **State of Incorporation: MI**
- **Offices in Michigan, Ohio Pennsylvania, and Indiana**
- **Over 50 PEs, CPG, CPs**
- **Over 230 professionals**
- **Recipient of numerous excellence awards**
- **Serving public and private sector clients**
- **Specializing in infrastructure and environmental engineering services**

Firm History and Background

NTH Consultants, Ltd. (NTH) provides innovative solutions to a multitude of engineering challenges. As a full service infrastructure and environmental engineering firm, NTH has been providing professional consulting services to clients throughout the United States as a Michigan corporation since 1968.

NTH Philosophy

The NTH client philosophy encompasses three key principles:

Responsiveness – NTH has built a reputation on our ability to mobilize immediately. With offices located in Detroit, Northville, Lansing, and Grand Rapids, Michigan; as well as Exton and Lehigh Valley, Pennsylvania; Cleveland, Ohio; and Indianapolis, Indiana, NTH is able to respond to Midwest and Mid-Atlantic projects quickly – thus reducing project costs and adhering to project schedules.

Expertise – NTH staffs over 230 industry-leading engineers, hydrogeologists, geologists, environmental scientists and other professionals. The NTH team is comprised of over 50 Professional Engineers, holding registrations in 30 states, as well as Certified Professional Geologists and Certified UST Professionals.

Listening and Anticipating Needs – NTH is committed to understanding our clients' needs, and to completing projects as defined by the client. We actively query and listen to our clients to understand their needs and expectations, offer alternatives based upon our knowledge and experience, and provide to clients a quality, value added service in a timely manner.

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Cliff J. Andrews

Senior Project Professional

Expertise

Mr. Andrews has more than 26 years of experience in performing and managing soil investigations, remedial investigations, environmental due diligence assessments, demolition and construction oversight. His project work has included Phase I and II environmental site assessments, baseline environmental assessments and Compliance Analysis (Due Care) Plans, soil and groundwater contamination remedial studies, storm water illicit discharge studies, geotechnical investigations, building demolition, restoration of concrete structures, and construction monitoring.

Education

Associates Degree, Applied Science; Schoolcraft College (1993)

Experience

Environmental Investigations

Performed or managed over 3500 Phase I and Phase II Environmental Site Assessments for property transfers in Michigan and several other states. Additionally, served as a team member and field leader for Phase I and Phase II ESA's for the dual stadiums in Detroit, and the expansion of international terminal at Metro Airport.

Prepared Baseline Environmental Site Assessments and Compliance Analysis (Due Care) Plans for Brownfield sites.

Provided field monitoring, environmental consulting and project management for underground storage tank (UST) removal projects, including remedial investigation, and pilot studies for leaking UST's. Carried out geophysical surveys to identify buried UST's and drums on previously developed properties.

Presented field monitoring, environmental consulting and project management for petroleum hydrocarbon and chlorinated solvent soil and groundwater remediation projects, including remedial investigation, pilot studies, design, installation, and operation of air water separator and liquid phase carbon units, a soil vapor extraction and air sparge blowers.

Performed and managed storm water management for a local school district including illicit discharge investigations, preparation of storm water management plan and annual as management plans.

Demolition/Site Redevelopment Activities

Completed and managed demolition of commercial and educational structures including bid specification preparation, trade contractor procurement, and management for waste / debris removal, hazardous materials surveys and hazardous materials abatement, building demolition oversight, and site restoration.

Geotechnical Investigations

Performed more than 500 soil/geotechnical and hydrogeologic investigations, including the supervision of drilling operations, rock coring, monitoring well installation, and cross-hole, vane shear, and cone penetration testing. Performed Shelby and piston tube, soil/sediment and groundwater sampling.

Cliff J. Andrews

Geotechnical Investigations (cont'd)

Served as team leader for a combination geotechnical and concrete investigation for ten hydro-dams in northern Michigan. Collected vertical and horizontal concrete cores, and conducted a soil investigation, including soil borings and the installation of a piezometer along the concrete retaining walls and on sloped earthen embankments providing difficult access. Completed work under budget, ahead of schedule, and without interruption to the service provided by the dams.

Construction Restoration/Monitoring

Supervised investigations and restorations of parking structures and buildings. Investigated the structures to identify areas requiring repair by the contractor. Monitored the repairs, and assisted with contractor's invoicing.

Monitored more than 200 construction projects, including inspection of caissons, auger piles, grade beams, concrete placement, soil balancing and structural steel. Facilitated interaction between the general contractor and the various trades, including preparation of daily reports.

Certifications

State Michigan Certified Asbestos Inspector
40-Hour Hazardous Waste Activities Health and Safety Training per 29 CFR 1910.120, with yearly 8-hour refresher courses as required.

Philip J. Spalding, P.E.

Senior Vice President

Expertise

Mr. Spalding has more than 13 years of experience on a wide variety of environmental projects including investigations of soil, groundwater, and contaminated sediments; permitting, and environmental design for site redevelopment; inspection of underground and aboveground facilities; design, removal, and replacement of underground storage tanks; compliance audits and comprehensive environmental management, waste management, and emergency environmental response services.

Education

Master of Science, Civil Engineering; Wayne State University (1996)
Bachelor of Science, Civil Engineering; Northwestern University (1989)

Experience

Environmental Investigation/Remediation

Project Manager

Managed all phases of a comprehensive remediation of a former industrial site for reuse as an elementary school. Project involved removal of contaminated soils and underground storage tanks, extensive sampling of soil and soil gas, geophysical survey work, and design and installation of a protective direct contact barrier using a combination of structural components and earthen cap materials. Due to the sensitive nature of this project, NTH worked closely with the owner, the MDEQ, and other regulatory agencies confirming that the project met with all applicable regulations and provided a safe environment for the children. NTH also assisted with community outreach programs and attended several public meetings to answer technical questions regarding the project.

Project Engineer

Performed investigation and remediation of leaking underground storage tanks at more than 85 different sites owned by a large municipality. Identified releases from the USTs and defined the limits of contamination. Reported results to state and local officials. Prepared site specific bid documents and specifications to obtain the services of a contractor for the owner. Prepared feasibility studies and corrective action plans for site remediation, and submitted them to state officials. Monitored the contractor's site remediation cleanup activities for compliance with the specifications. Following the remediation, obtained soil samples, summarized results, and prepared report for state officials to obtain closure approval for the site. Reviewed contractor invoices for payment, and prepared claims on behalf of the owner for reimbursement of contractor and consultant invoices from available state funds.

Performed environmental evaluation of an illegal drum disposal site (EPA Superfund Site) with high concentrations of toxins, such as vinyl chloride. Conducted subsurface geophysical survey, including soil borings and monitoring well installations, to identify potential buried drums. Collected soil and groundwater samples for laboratory analysis. Performed computerized groundwater modeling, and conducted an engineering evaluation. Prepared a report summarizing the results. Retained an environmental contractor to containerize and dispose of hazardous waste drums.

Philip J. Spalding, P.E.

Environmental Investigation/Remediation

Project Manager

Coordinated an underwater environmental evaluation of a historic combined sewer overflow discharge creek. Performed a historical record review, conducted a hydrographic survey, performed computerized contour modeling, conducted sampling of sediments up to 14-feet thick for chemical analysis, evaluated data and prepared reports. Performed analysis of various dredging techniques and sediment dewatering methods, during later stages of the project. Worked with MDEQ and US Army Corps of Engineers to develop recommendations for disposal of sediments. Designed and conducted bench-scale and field-scale drying studies to evaluate various sediment handling and dewatering methods. Participated in public hearings and informational meetings on the project. Prepared engineering plans and specifications for the sediment dredging, drying, and disposal contract.

Assistant Project Engineer

Assisted with removal and closure of more than 90 underground storage tanks, including initial investigation, monitoring field activities, collection of soil and water samples, data evaluation, and preparation of required reports.

Senior Staff Engineer

Coordinated remediation of petroleum contaminated groundwater at a water treatment plant. Installed wells, monitored and sampled groundwater, evaluated hydrogeology of site, and implemented a systematic "pump and dispose" treatment system.

Assistant Project Engineer

Designed and implemented a combined groundwater treatment and free product recovery system at a leaking underground storage tank site. Performed groundwater evaluation, designed remedial system, and implemented and monitored remedial activities.

Environmental Compliance Audits/Management Programs

Project Manager

Performed an extensive environmental audit and management program for a large municipal operation at its maintenance facilities, plants, and remote stations. Coordinated multiple phases of the project, from initial site visits to preparation of detailed hazardous materials handling and storage procedures, spill prevention plans, design of waste storage warehouse facilities, preparation of Standard Operating Procedures, and researching waste minimization recommendations.

Project Engineer

Performed underground and above ground storage tank (UST/AST) compliance audits. Inspected each tank system through visual survey and records review. Performed various tests of tank systems to validate compliance with leak detection and corrosion protection requirements.

Philip J. Spalding, P.E.

Underground/Above Ground Storage Tank (UST/AST) Services

Project Manager

Coordinated all phases of two comprehensive design-build contracts, one for a private hospital corporation and one for a large municipality. Conducted audits of necessary changes; selected appropriate upgrades and/or tank replacements; designed and arranged for permitting of new systems; retained contractors to complete the work; monitored tank removals, remediation, and new system installation; and prepared closure reports. To date, these two contracts have involved 39 tanks at 20 sites, valued at more than $1 million.

Project Engineer

Designed fuel supply and waste storage ASTs and USTs for a large municipality. Performed contract administration, assisted in selecting contractors, managed contract, reviewed plans and operation manuals, and supervised installation of the storage tanks. To date, more than 30 UST and 20 AST systems have been designed and installed or are in the process of being installed.

Ongoing investigation and remediation of leaking underground storage tanks at more than 85 different sites owned by a large municipality. Services included investigations to determine existence of releases from the USTs and to define the limits of contamination, reporting of results to state and local officials, preparation of site specific bid documents and specifications to obtain the services of a contractor for the owner, preparation of Feasibility Studies and Corrective Action Plans for site remediation and submission of the FS and CAP to state officials. Services also included monitoring of the contractor's cleanup activities for remediation of the site in compliance with the specifications. Following the remediation, soil samples and other documentation of the cleanup were obtained and summarized in a report to state officials to obtain closure approval for the site. Assistance was also provided to the owner in reviewing contractor invoices for payment, and claims were prepared on behalf of the owner for reimbursement of contractor and consultant invoices from available state funds.

Dredging Projects

Project Manager

Coordinated an underwater environmental evaluation of a historic creek. Performed a historical record review, conducted a hydrographic survey, performed computerized contour modeling, conducted sampling of sediments up to 14-feet thick for chemical analysis, evaluated data and prepared reports. Performed analysis of various dredging techniques and sediment dewatering methods, during later stages of the project. Worked with MDEQ and US Army Corps of Engineers to develop recommendations for disposal of sediments. Designed and conducted bench-scale and field-scale drying studies to evaluate various sediment handling and dewatering methods. Participated in public hearings and informational meetings on the project. Prepared engineering plans and specifications for the sediment dredging, drying, and disposal contract.

Philip J. Spalding, P.E.

Dredging Projects (Continued)

Senior Staff Engineer

Performed geotechnical drilling and sampling of contaminated lake bottom sediments from a barge-mounted rig. Conducted condition surveys of outfalls and buildings that might be affected by the dewatering of the lake and sediment dredging operations. Conducted extensive bench-scale testing of the sediments to determine appropriate removal, drying, and disposal methods. Made recommendations for material handling and construction sequencing for the dredging project.

Collected and analyzed sediment samples from canals of a residential, riverside community. Evaluated the sediment characteristics with regards to proper handling and disposal requirements. Coordinated with the Michigan Department of Environmental Quality (MDEQ) and U.S. Army Corps of Engineers in evaluating land application of the sediments.

Professional Licenses and Certifications

Licensed Professional Engineer – State of Michigan
Certified Underground Storage Tank Professional – State of Michigan

Bhushan C. Modi

Vice President

Expertise

Mr. Modi has over 22 years of experience in performing and managing a wide variety of environmental, geotechnical and construction projects. He has extensive experience in soil investigations, remedial investigations, environmental due diligence assessments, hazardous materials inventory/demolition surveys, industrial hygiene studies and Brownfield projects. His project work has included site redevelopment, building demolition support, underground storage tanks, property transfers, and soil and groundwater remediation activities. He has successfully managed multi-disciplined teams addressing all phases of projects from coordinating and planning through construction and operation/implementation.

Education

Graduate Certificate, Environmental Auditing; Wayne State University
Master of Science, Civil Engineering; University of Detroit
Bachelor of Science, Civil Engineering; University of Bombay

Experience

Environmental Due Diligence Assessments

Performed and managed over 5,000 Phase I and Phase II environmental site assessments for private and public sector clients in US, Canada and Mexico.

Prepared and reviewed over 150 Baseline Environmental Assessments and Compliance Analysis or Due Care Plans for Brownfield redevelopment projects.

Provided management and engineering services for waste removal and industrial hygiene projects. Project tasks have included coordinating and managing asbestos and lead-based paint surveys, mold investigations and indoor air quality studies.

Geotechnical/Hydrogeological Investigations

Performed and managed over 500 soil/geotechnical investigations and construction monitoring projects for residential, recreational, commercial and industrial developments.

Implemented various phases of geotechnical and hydrogeologic investigations, including supervising drilling operations, monitoring well installations, performing soil/sediment and groundwater sampling, as well as conducting aquifer testing and geophysical surveys.

Underground Storage Tank (UST) Removal/Closure Services

Provided field monitoring and environmental consulting services for underground storage tank (UST) removal projects. Prepared UST removal specifications and bid packages, participated in selecting subcontractors on client's behalf, and communicated with appropriate regulatory agencies to achieve site closures and no further action letters.

Oversaw investigation and remediation of leaking USTs at several various educational facilities in Michigan. Performed contract review, processed contractor invoices/change orders and engineering oversight.

Bhushan C. Modi

Remediation Projects

Provided engineering services in a project involving remediation of soil and groundwater impacted with petroleum hydrocarbons, at a former gasoline service station site. Assisted in developing a work plan for performing pilot studies and a feasibility analysis to evaluate several corrective action alternatives.

Managed a large remediation project at a dry cleaning facility with tetrachloroethene (PCE) or "Perc" contamination. Responsibilities included development of subsurface environmental investigation work plan to determine the severity and extent of PCE contamination in soil and groundwater, provide remedial alternatives, design air sparge (AS) and soil vapor extraction (SVE) system, based on design parameters and cleanup objectives designed a pilot system, and developed bid package for the construction of a remediation system.

Demolition/Site Redevelopment Activities

Performed project management and demolition oversight for various Brownfield Redevelopment Projects entailing asbestos abatement, lead-based paint evaluation, and removal and disposal of PCB/Mercury-containing equipment and other hazardous materials prior to building demolition or rehabilitation activities. Prepared and reviewed Technical Specifications and Bidding Documents for abatement/removal of hazardous materials and demolition of commercial and educational structures.

Certifications

24-hour Asbestos Inspectors Program
Radon Diagnostician Certification Course
40-hour OSHA HAZWOP Program

Eric Schupp

Senior Staff Professional

Expertise

Mr. Schupp has more than 8 years of experience in environmental services, including asbestos abatement, oversight, and management. For the past 5 years he has been involved with a variety of site work, including oversight of UST removals, monitoring building demolitions, conducting risk management plan audits for liquid chlorine processes, and compliance with water treatment effluent discharge limitations.

Education

Bachelor of Science, Environmental Science; Central Michigan University (2000)

Experience

Environmental Services
Staff Engineer

- Driller, including split spoon soil sampling used for site evaluation and risk management
- Oversight of drilling/soil sampling, including split spoon, geoprobing, rock coring, at several southern Michigan locations
- Development of well installations and groundwater sampling, including retrieving water elevations used to assist in groundwater flow modeling and potential plume identification
- Experienced with field screening devices, including photoionization and fire ionization detectors, tri-gas and dissolved oxygen meters
- Asbestos abatement contractor supervisor, utilizing air monitoring equipment, including high and low volume air pumps
- Conduct Risk Management Plan Audits for operations using liquid chlorine.

Certificates

40-Hour Hazwoper – 2000
Asbestos Contractor Supervisor – 2004

Registrations

Environmental Scientist – 2003

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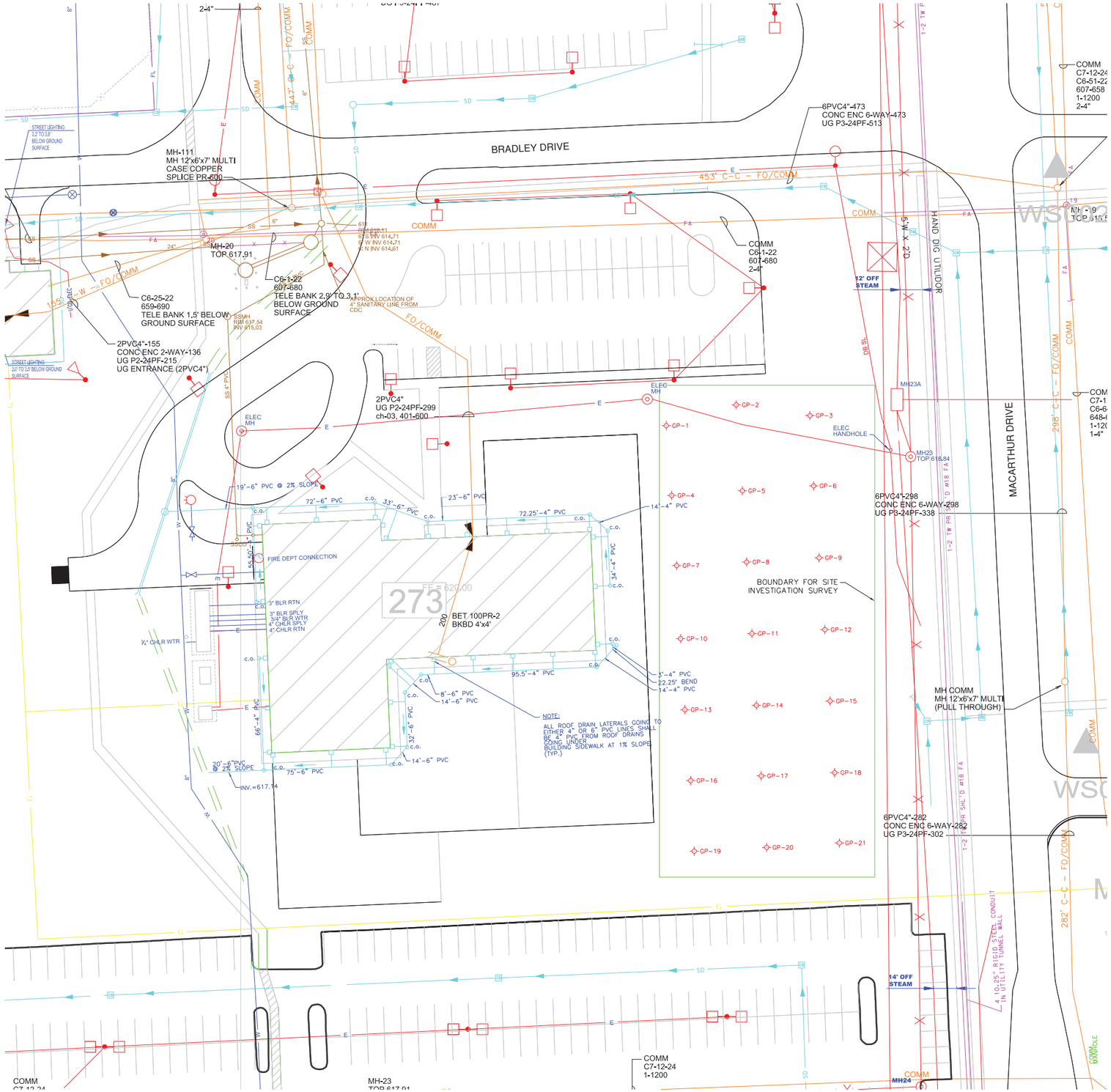


N

0 15' 30' 60'
SCALE

UTILITY LEGEND

WATER SYSTEM
- 8" CI W — WATER MAIN
- VALVE
- SCV — SECTIONAL CONTROL VALVE
- PIV — POST INDICATOR VALVE
- YARD HYDRANT
- METER PIT

FIRE LINE SYSTEM
- 8" CI FL — FIRE MAIN
- VALVE
- SCV — SECTIONAL CONTROL VALVE
- PIV — POST INDICATOR VALVE
- FIRE HYDRANT
- METER PIT

IRRIGATION SPRINKLER SYSTEM
- 1" PE IR — SPRINKLER PIPE
- SPRINKLER HEAD
- VALVE
- SOLENOID

SANITARY SEWER SYSTEM
- 8" VC SS — SANITARY SEWER MAIN
- MANHOLE
- CLEANOUT

STORM DRAINAGE SYSTEM
- 30" C SD — STORM DRAINAGE MAIN
- 15" CM SD — STORM DRAINAGE CULVERT
- MANHOLE
- CATCH BASIN
- CLEANOUT

ELECTRICAL DISTRIBUTION SYSTEM
- 2 - 3 500MCM E — UNDERGROUND CABLE
- 1 - 3 #1/0 DB E — DIRECT BURIED CABLE
- OVERHEAD CABLE
- MANHOLE
- POWER POLE
- TRANSFORMER

EXTERIOR LIGHTING SYSTEM
- 1 - 2 #6 SL — UNDERGROUND CABLE
- 1 - 2 #6 DB SL — DIRECT BURIED CABLE
- STREET LIGHT

GAS, OIL AND PETROLEUM SYSTEM
- 1" FB GL — GASOLINE LINE
- 2" G — GAS MAIN

TELEPHONE SYSTEM
- C6-6-22 304-3092-4" T — UNDERGROUND TELEPHONE CABLE
- DB T — DIRECT BURIED TELEPHONE CABLE
- MANHOLE AND HANDHOLE
- 6 309-312-716 — TERMINAL
- EMER. WARNING SYSTEM CONTROL

LAN SYSTEM
- LAN — UNDERGROUND LAN CABLE

HEATING AND AIR SYSTEM
- 12" T/A 175 (S) 6" T/A (R)16" T/A — SERVICE MAIN

FIRE ALARM SYSTEM
- 1-2 TW PR SHL'D #18 FA — UNDERGROUND FIRE ALARM CABLE
- FIRE ALARM STATION
- FIRE ALARM CONTROL PANEL
- WATER CONTROL SWITCH
- UTILITY CUTOFF

GENERAL LEGEND

- SITE INVESTIGATION BOUNDARY
- GP — SOIL BORING LOCATION
- EXISTING BUILDING

REFERENCE NOTE:
BASE MAP ADOPTED FROM PHASE 1 & PHASE 2 SITE CHARACTERIZATION & RISK ASSESSMENT, DRAWING C-101, TITLED SITE PLAN PROVIDED BY USAG-DTA

NTH Consultants, Ltd.
Infrastructure Engineering and Environmental Services

Northville, MI	248.553.6300
Detroit, MI	313.237.3900
Lansing, MI	517.484.6900
Grand Rapids, MI	616.957.3690
Exton, PA	610.524.2300
Lehigh Valley, PA	484.893.1440
Cleveland, OH	216.334.4040
Indianapolis, IN	317.735.7649

SUBMITTAL

REV	DESCRIPTION	DATE	BY

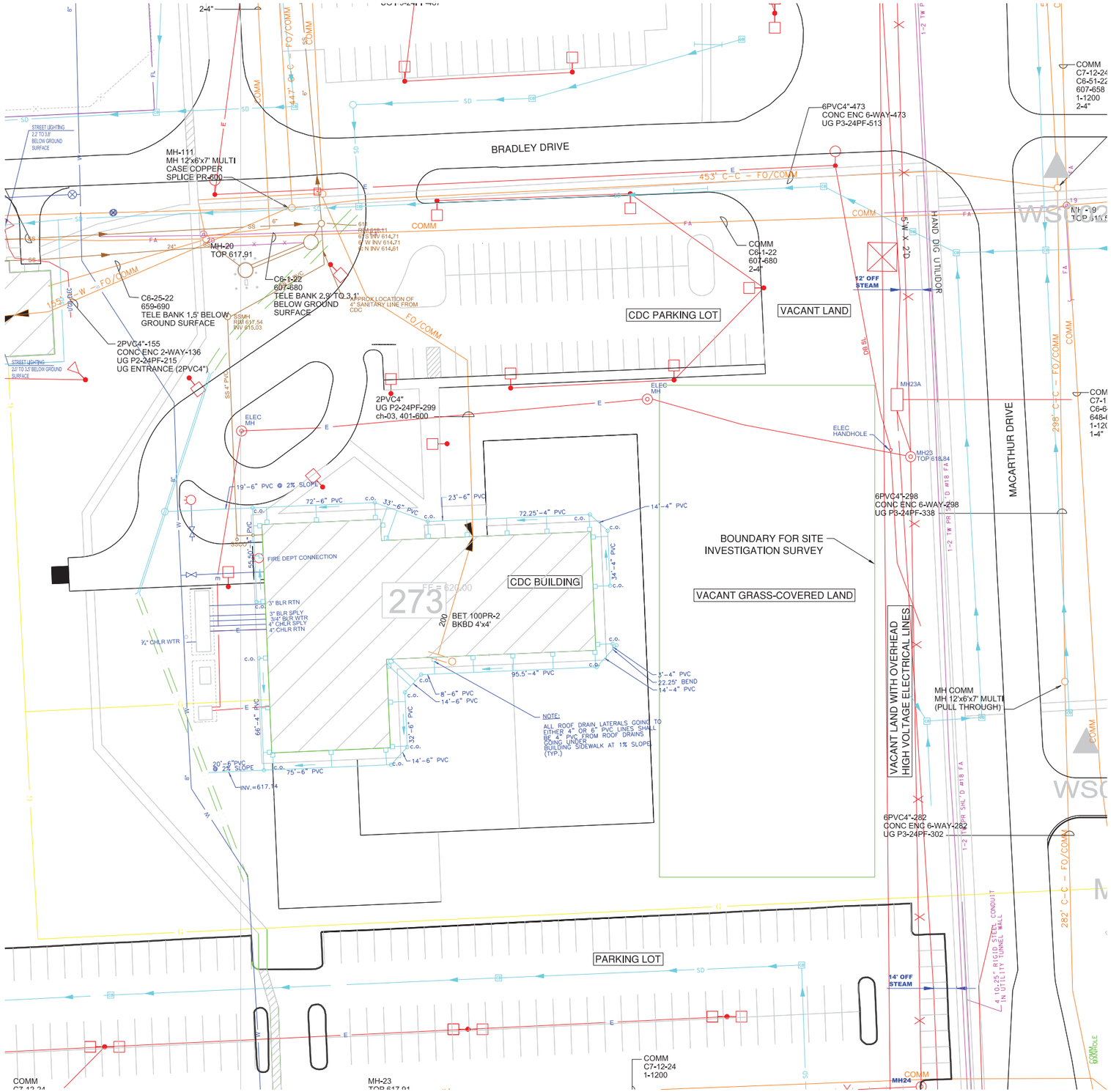
PROJECT NAME:
CHILD DEVELOPMENT CENTER ADDITION PROPERTY

PROJECT LOCATION:
WARREN, MICHIGAN

NTH PROJECT NO.: 61-110632	CAD FILE NAME: 110632-SBL
DESIGNED BY: CJA	INCEP DATE: 6/21/2011
DRAWN BY: CWS	DRAWING SCALE: 1" = 30'
CHECKED BY: BCM	SUBMITTED DATE: ----

SHEET TITLE:
BORING LOCATION PLAN

FIGURE NUMBER:
3



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Indianapolis, IN	317.735.7649

SUBMITTAL

REV	DESCRIPTION	DATE	BY

PROJECT NAME:
CHILD DEVELOPMENT CENTER ADDITION PROPERTY

PROJECT LOCATION:
WARREN, MICHIGAN

NTH PROJECT NO.: 61-110632	CAD FILE NAME: 110632-LAY
DESIGNED BY: CJA	INCEP DATE: 6/21/2011
DRAWN BY: CWS	DRAWING SCALE: 1" = 30'
CHECKED BY: BCM	SUBMITTED DATE: ----

SHEET TITLE:
SITE PLAN

FIGURE NUMBER:
2

Appendix F

Conceptual Aesthetic Considerations

Exterior Elevation (North)

Exterior Elevation (Northeast)

Interior - Activity Room

Interior - Activity Room

Interior - Activity Room

Interior - Activity Room

Interior - Activity Room

Interior Lobby (Public Space)

Interior - Activity Room

Interior - Corridor

APPENDIX G
GIS Data

(Not Applicable)

APPENDIX H
Exterior Signage

~~11.3.17 Monuments, Memorials, and Military Equipment Static Displays~~

~~Monuments and Static Displays~~
~~Monuments and static displays should be carefully designed and placed in prominent locations to serve as visual focal points within the installation. Static displays of equipment should be consolidated in one location to create a central museum or exhibition facility within the installation. Building names should not give away the building purpose. Knowing that a building serves telecommunications, for example, can allow a terrorist to strike that building first, potentially limiting communications during the remainder of an attack.~~

~~Memorials~~
~~Memorials will conform to the guidance set forth in Army Regulation (AR) 1-33, Memorial Programs.~~

~~11.3.18 Drinking Fountains~~

~~Outdoor drinking fountains should not be provided, except to support larger playgrounds, outdoor recreation facility complexes, and outlying recreation areas if convenient to a potable water supply line. Steps should be provided for children and meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and Uniform Federal Accessibility Standards (UFAS)http://www.ccb.org/ufgs/ufgs.htm standards.~~

11.4 SIGNS

11.4.1 Purpose

Signs are used to visually communicate information. They are highly visible features that should be attractive and compatible with their surroundings. Careful consideration must be given to what a sign says, how it is said, its visual appearance and organization, its location, structural support system, and relation to other signs within the installation. Standardized signage systems facilitate movement, provide a sense of orientation, and reinforce standards of excellence. Signage creates a unifying element throughout the installation that visually ties the installation themes together and builds a reference and continuity that translates into confidence and reassurance when traveling throughout the installation. The standards to apply for signage color, type, and sizing is found in Technical Manual (TM) 5-807-10, Signage.

Signs should specify the expected and acceptable behaviors, i.e., no parking. The purpose of such signage is to make those not following the expected and acceptable behaviors stand out so they can be addressed.

11.4.2 Sign System Characteristics

There are several basic design characteristics that, by serving to convey necessary information clearly and attractively, are an integral part of any successful signage system.

Simplicity
An effective strategy provides only needed information, avoids redundancy, and eliminates over-signing with resultant clutter and visual confusion. Sign messages must be clear, simple, and easy for motorists to process quickly.

Continuity
It is essential that the system be applied uniformly and consistently throughout the entire installation. The importance of consistent implementation extends from the larger issues of sign type and size down to accurate color continuity and matching typestyles.

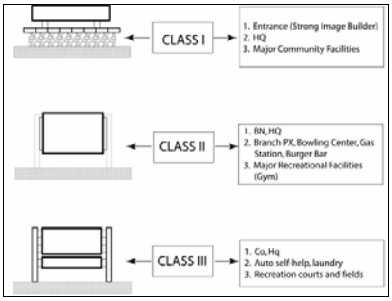

Figure 11-6 Signs can be Organized Into Classes Within the Visual Hierarchy

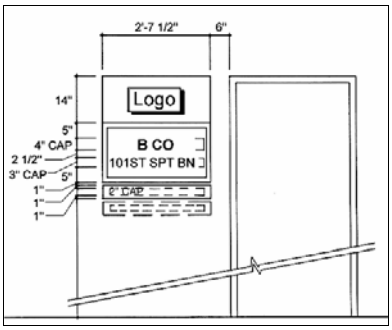

Figure 11-7 Building Mounted Information Sign

Visibility

Sign location is a very important ingredient within the system. Signs must be located at significant decision points and oriented to provide clear sight lines for the intended user. Close coordination of locations with respect to landscaping, utilities, adjacent signage, and various other street design elements is important to ensure long-term maximum visibility.

Legibility

Sign typestyle, line spacing, color, and size all combine to create the crucial design characteristics of legibility. This aspect of sign design should take into consideration users such as motorist, pedestrians, or bicyclists, and the relative travel speed at which each type of user will be traveling when viewing the signs.

11.4.3 Vocabulary-Communications

A common language has been created for establishing a signing system. The different components that create the sign package have been named and referred to within the total signing system.

The creation of a "signing language" helps generate a unified bond within sign types that make up a signing family.

- Reference
- Information/Message
- Presentation
- Architectural Influence
- Graphic Architecture

11.4.4 Visual Hierarchy

The entire signing system must communicate, through a range of sign and typestyle sizes, the relative importance of the individual activity that the sign identifies. The system should follow a logical progression from a point of origin to the desired destination.

A stated ranking method (Figure 11-6) supports the visual standard of hierarchy within the signing system. Signs can be organized within assigned classes with emphasis on the function and image of the installation.

Within each class, the level of architectural influence evokes the importance of the sign to the installation. This is also critical to the idea of progression. The importance of a sign must be presented in its size and level of detail.

As individuals move closer to their destination on the installation, the scale of the sign becomes progressively smaller and the level of the message more detailed.

11.4.5 Types of Signs

Information / Identification Signs

These are signs that identify entrances to the installation, areas within the installation, major tenants, buildings, and organizational or functional components (Figure 11-7). They identify a location, and greet the visitor to that location. They should be compatible in scale and character with the architecture and also blend with the natural surroundings. These signs are designed to include the following:

- Typeface

  Lettering is self-adhesive backing material.

  Building Title: Helvetica Medium, Upper and lower case

  Building Numbers: Helvetica regular

  Building Addresses: Helvetica Medium, Upper and lower case

- Color:

  Panel: Dark Brown

  Lettering: White

  Post: Dark Brown

  Exposed panel backs and edges: Dark Brown

  All paint: Semi gloss

- Materials:

  Panel: Double-face 1/8" thick aluminum

  Post: Steel Pipe

  Foundation: Concrete pier or direct burial

- Building Identification

  o Street Addresses (Figure 11-8)

  The addressing procedures prescribed in DoD 4525.8-M, DoD Official Mail Manual are mandatory for use by all DoD components. DoD 4525.8-M, Chapter 3 prescribes the following:

  All DoD address shall be assigned so they are compatible with the United States Postal Services automated delivery point sequencing (C3.3).

  The DoD installation is responsible for assigning city-style, street address on the installation (C3.3.2.2).

  Street addresses shall be assigned and used even though a DoD activity may deliver the mail to the addressee (C3.3.2.2.1).

  Only geographically locatable civilian-style street address (such as 4102 Cindy Avenue,) shall be used (C3.3.2.2.4).

  Installations shall not use one street address for the entire installation and then use secondary unit designators such as "Building 123" to designate the delivery addresses on the installation (C3.3.2.2.5).

  Addresses such as "Building 123 Roberts Street" are not a valid address format and shall not be used (C3.3.2.2.6).

  Address Placement

  Place addresses by the front entrance of the building so they can be seen (C3.3.2.3.1) (Figure 11-9).

  Place both the street name and address number on the building if both the building number and street address are visible from the street.

  Building identification signs will use street addresses.

Figure 11-8 Use of Street Addresses on all Building Identification Signs

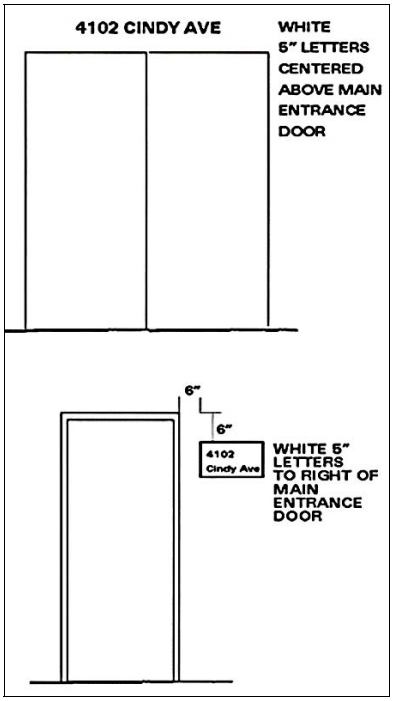

Figure 11-9 Street Address Location at Entrance Doors

Figure 11-10 Installation Entrance Signs

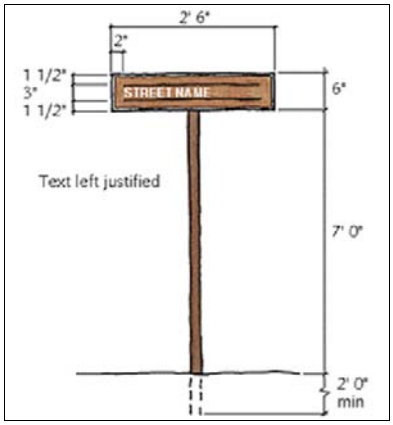

Figure 11-11 Typical street Signs

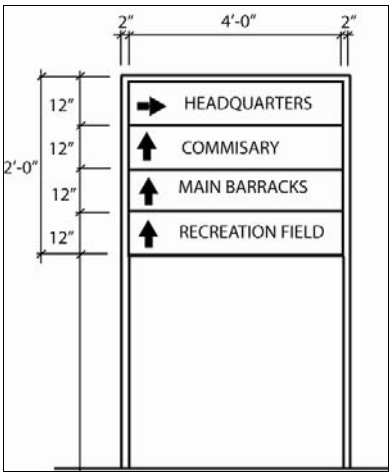

Figure 11-12 Direction Sign

Buildings without identification signs shall have the address number and street name centered above the main entrance or located to the right side.

- Housing Areas

  The sign should be complimentary to the architectural setting of the housing area and approved by the installation Real Property Planning Board.

  Housing numbers should be placed on the curb in front of the respective house and on the house where lighting will effectively light the numbering.

- Installation Identification Signs

  Installation identification signs name the installation and display the official US Army plaque. The designation "United States Army" must appear at the top of the sign in accordance with AR 420-70, para 2-7h. Every installation entrance shall have an installation identification sign displaying only the US Army plaque, with the words "United States Army, Fort (Name of Fort), and gate name as indicated in Figure 11-10. The placement of Senior Mission Commander logo, unit crest, and other installation identification signs, monuments, or displays shall be located inside the installation beyond the cleared area of the Access Control Point (ACP) of entry. When used service-wide, these signs convey a uniform image of strength and stability to the public. Emblems, branch colors, unit mottos, names, and titles of individuals are not to be displayed.

  Installation identification signs consist of three types:

  Sign type A1, main entrance sign, identifies the principal visitor entrance (Figure 11-10).

  Sign type A2, secondary entrance sign, identifies entry points with relatively high volumes of visitor traffic.

  Sign type A3, limited access entry gate signs, identifies entry points with limited public access.

  See Technical Manual (TM) 5-807-10, Signage, paragraph 3-3, for sign specifications and paragraph 3-11 for sign placement guidelines.

- Street Signs

  Street name identification signs should be designed with the same lettering, color, and materials as other information signs (Figure 11-11).

- Wheeled Electrical Signs

  Wheeled electrical signs will have an attractive presentation. Temporary landscape elements should be used whenever possible. The siting of this type of sign will be approved by the RPPB. No sign of this type will be left in place for longer than six (6) months. After which time, the sign will be removed or turned into a permanent sign.

Directional Signs

These signs guide the motorist or pedestrian in, around, and out of the installation (Figure 11-12). The legibility and placement of these signs, as well as the ordering of information, is critical to their effectiveness. These signs should be placed in central locations and at major decision points along circulation routes. " The guidelines for design, fabrication, and placement of warning signs are found in Technical Manual (TM) 5-807-10, Signage, para 3-10.

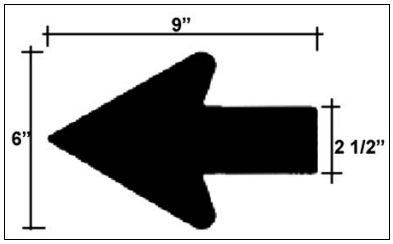

Figure 11-13 Typical Arrow for Use On All Destination Signs

Regulatory Signs

These signs provide the rules for travel and parking on the installation. They include speed signs, turning and lane use signs, warning signs, parking control signs, etc. (Figure 11-14). Related to these signs are pavement markings and traffic signals. The guidelines for design, fabrication, and placement of warning signs are found in Technical Manual (TM) 5-807-10, Signage, para 3-9.

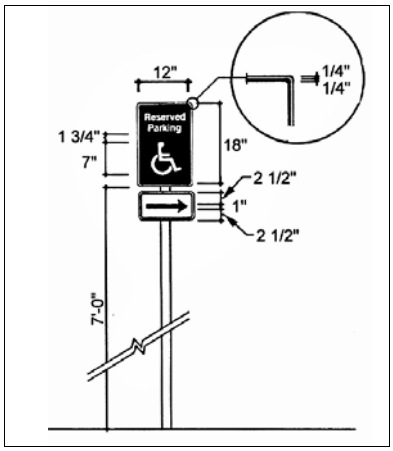

Figure 11-14 Regulatory Sign

Traffic Control Signs

- CONUS Installations

  National highway standards will be used for signs to regulate vehicular traffic on CONUS installation (AR 420-72, Transportation Infrastructure and Dams, Para 2-15f). These standards are described in the Manual of Uniform Traffic Control Devices (MUTCD). Also see MTMC Pamphlet 55-14, Traffic Engineering for Better Signs and Markings. This pamphlet clarifies existing standards and provides definite guidelines for installation officials to conform to the MUTCD. These standards shall be used installation wide to include installation Access Control Points.

- OCONUS Installations

  OCONUS installation streets and roads are to be considered extensions of the road system of the host nation and shall use traffic control device standards and criteria of the host nation (AR 420-72, Transportation Infrastructure and Dams, Para 2-15e).

Prohibitory (Warning) Signs

This category of signage is intended to maintain security and safety on the installation perimeter and at other specific secure areas. These signs notify visitors of restrictions, as well as other security procedures. The guidelines for design, fabrication, and placement of warning signs are found in Technical Manual (TM) 5-807-10, Signage, para 3-9.

11.4.6 Electronic Exterior Signs

All exterior flashing signs, traveling lights, or signs animated by lights of changing degrees of intensity or color are prohibited.

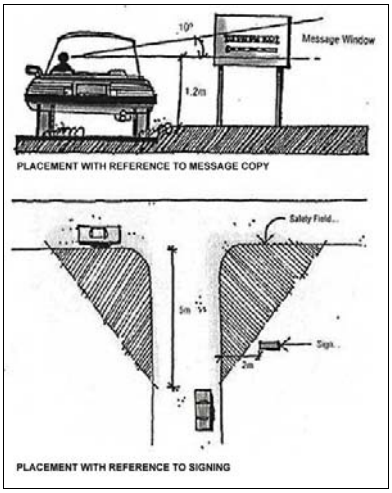

Figure 11-15 Placement is Critical to Ensure Easy Readability

11.4.7 Sign Placement

Placement of signs differs according to the type of sign and the specific site constraints. The following guidelines apply to placement of the majority of signs.

Do not place more than one sign at any location. Traffic rules are the exception to this rule.

Place signs in areas free of visual clutter and landscape materials.

Place signs in locations that allow enough time for the user to read and react to the message.

Signs should not be placed to block sight lines at intersections.

Place signs approximately 1.2 meters (4 feet) above ground level to be within 10 degrees the driver's line of vision (Figure 11-15). Provide proper placement to avoid a hazard to children.

11.4.8 Sign System Typography.

Military Emblems

The Army has a rich tradition of military heraldry. Military emblems are an important part of the soldiers' identity and the emblems have been carefully crafted over the years to express unit pride and unique history and function of the unit. The care and use of organizational emblems in a signage system can add visual interest as well as build pride and a sense of history. However, the overuse of miscellaneous emblems can lead to clutter and a dilution of their importance. Colors for military emblems must be in accordance with the Institute of Heraldry.

Department of the Army Plaque

The plaque should be displayed on installation identification signage to emphasize the heritage and professionalism of the United States Army. The design of the plaque must be in accordance with Army Regulation (AR) 840-1, Department of the Army Seal, and Department of the Army Emblem and Branch of Service Plaques, and must be reproduced in full color.

Insignias

The use of branch insignia, shoulder sleeve insignia, coat of arms and/or distinctive insignia on headquarters signs is permitted. All military emblems must appear in full color. Motivational symbols or motifs will not be used.

11.4.9 Reduce Visual Clutter

Over-signing detracts form a uniform sign system and if left uncontrolled will eventually destroy the integrity of the system.

Clutter creates confusion and ineffectiveness. Often motorist and pedestrians are confused by the bombardment of messages that have no relationship to each other, or the communication is on such a minimal level that the sign serves no purpose.

11.4.10 Location Maps

The location map is an integral element of an installation entrance. The location map display provides information and sense of place to the viewer. The design and construction should be of compatible architectural materials found throughout the installation. Do not place these maps on open bases as they communicate where an attack can be made.

The location map should contain the following characteristics within the design.

- Plexiglas covered map for protection
- Architectural compatible materials used for the base
- Paved walk-up area
- Litter receptacle
- Provide parking adjacent
- Provide current takeaway maps

APPENDIX I
Acceptable Plant List

Acceptable Plants List:
Rain Garden / Butterfly Garden Species
Building Addition – B273
Child Development Center
Detroit Arsenal, Warren, Michigan

Tree Species List

1. Red Maple — *Acer rubrum*
2. Sugar Maple — *Acer saccharum*
3. Eastern Cottonwood — *Populus deltoids*
4. Eastern Redbud — *Cercis canadensis*

Shrub Species List

1. Shrubby Cinquefoil — *Dasiphora fruticosa*
2. Leadplant — *Amorpha canescens*
3. New Jersey Tea — *Ceanothus americanus*
4. Meadowsweet — *Spirea alba var. latifolia*
5. Steeplebush — *Spirea tomentosa*

Wildflower/Perennial Species List

1. Bee-Balm (Wild Bergamot) — *Monarda fistulosa*
2. Black-Eyed Susan — *Rudbeckia hirta*
3. Coreopsis — *Coreopsis palmata*
4. Indian Paint Brush — *Castilleja coccinea*
5. Blue Giant Hyssop — *Agastache foeniculum*
6. New England Aster — *Aster novae-angliae*
7. Purple Coneflower — *Echinacea pallid*
8. Orange Coneflower — *Echinacea 'Tiki Torch'*
9. Catmint — *Nepeta spp.*
10. Tussock Sedge — *Carex stricta*
11. Sweet Flag — *Acorus clamus*
12. Rough Goldenrod — *Solidago rugosa*

Appendix O Plant Palette

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN		FORM					USE					CONDITION					FOLIAGE			FEATURE				HEIGHT			GROWTH		
	Native	Introduced	Irregular	Oval/Round	Upright	Pyramidal	Vase	Street Tree	Accent/Residential	Woodland Infill	Barrier, Buffer/Screen	Erosion Control	Sun	Partial Shade	Shade	Drought	Wet Conditions	Deciduous	Coniferous	Evergreen/Semi	Fragrance	Fruit/Nut/Herb	Fall Color/Interesting Bark	Flower	Small	Medium	Large	Slow	Medium	Fast
Evergreen Trees																														
Abies balsamea Balsam Fir	●					●			●				●	●					●	●							●	●		
Juniperus virginiana Eastern Red Cedar	●					●			●		●		●	●		●			●							●			●	
Larix deciduas European Larch		●	●			●			●		●		●					●	●							●	●		●	
Pseudotsuga menziesii Douglas Fir	●			●					●		●		●	●					●	●						●		●		
Picea abies Norway Spruce		●		●					●		●		●	●					●	●				●			●			
Picea glauca White Spruce	●					●			●		●		●	●		●			●	●							●		●	
Picea mariana Black Spruce	●					●			●	●	●		●	●	●				●	●						●		●		
Pinus banksiana Jack Pine	●					●					●		●						●	●		●				●	●			●
Pinus resinosa Red Pine	●			●						●	●		●						●	●							●			●
Pinus strobus White Pine	●					●				●	●		●	●					●		●						●			●
Pinus sylvestris Scotch Pine		●	●			●			●	●	●		●						●	●							●			●
Taxodium distichum Bald Cypress	●				●	●			●	●			●	●			●	●	●			●					●		●	
Thuja occidentalis Northern White Cedar	●			●					●		●		●						●	●						●		●		
Tsuga canadensis Hemlock	●					●			●		●		●						●	●						●	●	●	●	

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN		FORM					USE					CONDITION					FOLIAGE			FEATURE				HEIGHT			GROWTH		
	Native	Introduced	Irregular	Oval/Round	Upright	Pyramidal	Vase	Street Tree	Accent/Residential	Woodland Infill	Barrier, Buffer/Screen	Erosion Control	Sun	Partial Shade	Shade	Drought	Wet Conditions	Deciduous	Coniferous	Evergreen/Semi	Fragrance	Fruit/Nut/Herb	Fall Color/Interesting Bark	Flower	Small	Medium	Large	Slow	Medium	Fast
Deciduous Trees																														
Acer ginnala Amur Maple		●		●					●		●		●	●				●			●	●	●		●					●
Acer negundo Box Elder	●		●	●					●				●	●		●		●					●			●				●
Acer saccharinum Silver Maple	●		●	●					●		●		●	●		●	●	●					●				●			●
Acer saccharum Sugar Maple	●		●	●					●	●	●		●	●		●	●	●					●				●	●		
Acer rubrum Red Maple	●		●	●				●		●			●	●				●				●	●				●		●	●
Acer spicatum Mountain Maple	●			●						●			●	●				●						●	●			●		
Aesulus flava Yellow Buckeye	●			●					●				●	●				●				●	●				●		●	
Amelanchier Serviceberry	●			●	●				●				●	●			●	●				●		●	●				●	
Betula nigra River Birch	●		●	●					●	●	●			●			●	●					●			●				
Betula papyrifera White Birch	●					●			●				●	●			●	●				●	●			●			●	
Carpinus caroliniana American Hornbeam	●			●				●	●	●			●	●	●		●	●					●		●	●		●		
Carya cordiformis Bitternut Hickory	●				●				●	●			●	●	●			●					●				●	●		
Carya ovata Shagbark Hickory	●								●	●	●		●					●					●				●			●
Celtis occidentalis Hackberry	●			●					●				●	●		●		●					●		●				●	
Cercis canadensis Eastern Redbud	●			●					●				●	●				●				●	●	●	●				●	
Cotinus coggygria Smoketree		●		●					●				●					●					●	●	●				●	
Cornus florida Flowering Dogwood	●			●					●	●			●	●			●	●				●	●	●	●			●	●	
Crataegus phaenopyrum Washington Hawthorn	●			●	●			●	●		●		●	●				●				●	●			●			●	

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN		FORM					USE					CONDITION					FOLIAGE			FEATURE				HEIGHT			GROWTH		
	Native	Introduced	Irregular	Oval/Round	Upright	Pyramidal	Vase	Street Tree	Accent/Residential	Woodland Infill	Barrier, Buffer/Screen	Erosion Control	Sun	Partial Shade	Shade	Drought	Wet Conditions	Deciduous	Coniferous	Evergreen/Semi	Fragrance	Fruit/Nut/Herb	Fall Color/Interesting Bark	Flower	Small	Medium	Large	Slow	Medium	Fast
Fagus grandifolia American Beech	●				●								●	●			●	●					●				●		●	●
Fraxinus americana White Ash	●			●	●	●			●	●			●					●					●			●	●	●		
Fraxinus pennsylvanica Green Ash	●			●	●			●	●				●	●				●					●				●			●
Ginko biloba Ginko		●			●			●	●				●	●				●					●			●		●		
Gleditsia triacanthose Imperial Honeylocust	●			●				●					●					●					●			●			●	
Gleditsia triacanthose Skyline Honeylocust		●				●		●					●	●				●					●			●			●	
Gymnocladus dioicus Kentucky Coffeetree	●				●				●	●			●				●	●					●				●		●	
Hamamelis virginiana Witch Hazel	●		●	●					●	●	●		●	●				●					●		●			●		
Juglans cinerea White Walnut	●								●				●					●					●			●		●		
Juglans nigra Black Walnut	●			●						●	●		●					●				●					●			●
Larix laricina Tamarack	●				●								●				●	●	●								●			●
Liquidambar styraciflua Sweetgum	●					●			●	●			●					●			●	●	●				●		●	●
Liriodendron tulipifera Tulip Poplar	●			●	●				●				●					●					●	●		●				●
Magnolia soulangiana Saucer Magnolia		●		●					●	●			●					●						●	●				●	
Malus floribunda Flowering Crabapple		●		●					●				●					●			●	●		●	●				●	
Nyssa sylvatica Black Gum	●			●		●		●	●		●		●				●	●					●			●			●	
Ostrya virginiana Iron wood	●			●		●		●			●		●	●				●					●	●		●		●		
Platanus occidentalis Sycamore	●				●	●		●	●				●	●		●	●	●					●				●			●
Populus deltoids Eastern Cottonwood	●				●					●		●		●			●	●								●	●			●
Populus grandidentata Big-toothed Aspen	●		●		●			●	●		●		●					●								●				●

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN		FORM					USE					CONDITION					FOLIAGE			FEATURE				HEIGHT			GROWTH		
	Native	Introduced	Irregular	Oval/Round	Upright	Pyramidal	Vase	Street Tree	Accent/Residential	Woodland Infill	Barrier, Buffer/Screen	Erosion Control	Sun	Partial Shade	Shade	Drought	Wet Conditions	Deciduous	Coniferous	Evergreen/Semi	Fragrance	Fruit/Nut/Herb	Fall Color/Interesting Bark	Flower	Small	Medium	Large	Slow	Medium	Fast
Populus tremuloides Quaking Aspen	●		●										●					●								●				●
Prunus americana Wild Plum	●		●	●						●	●		●			●		●			●	●		●	●				●	
Prunus nigra Canada Plum	●								●				●					●				●		●		●		●		
Prunus pennsylvania Pin Cherry	●		●	●					●		●		●					●				●				●				●
Prunus sargentii Sargent Cherry		●		●	●	●			●		●		●	●				●					●	●			●		●	
Prunus serotina Black Cherry	●			●					●	●	●		●					●				●		●			●			●
Ptelea trifoliate Common Hoptree	●								●		●		●	●				●			●		●	●	●			●		
Pyrus calleryana Peartree		●		●	●	●		●	●				●	●		●		●					●	●		●				●
Quercus alba White Oak	●			●	●	●		●	●				●	●				●					●	●			●	●	●	
Quercus bicolor Swamp White Oak	●			●	●	●				●			●			●	●	●				●	●				●	●	●	
Quercus macrocarpa Bur Oak	●			●					●	●			●			●		●									●	●		
Quercus muhlenebergii Chinkapin Oak	●			●					●		●		●			●		●					●				●		●	
Quercus palustrus Pin Oak	●					●		●	●				●				●	●				●	●				●			●
Quercus rubra Northern Red Oak	●			●	●			●	●				●					●				●	●				●			●
Quercus velutina Black Oak	●		●						●		●		●	●				●					●			●	●		●	
Robinia pseudoacacia Black Locust	●		●	●					●	●	●	●	●			●		●			●			●		●	●			●
Salix amygdaloides Peachleaf Willow	●		●		●				●		●		●	●				●									●		●	
Salix nigra Black Willow	●			●					●				●	●			●	●					●			●			●	
Sassafras albidum Sassafras	●		●	●					●	●			●			●		●					●			●		●		
Sassafras verifolium Sassafras	●		●			●			●	●			●	●				●			●		●				●		●	●

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN		FORM					USE					CONDITION					FOLIAGE			FEATURE				HEIGHT			GROWTH		
	Native	Introduced	Irregular	Oval/Round	Upright	Pyramidal	Vase	Street Tree	Accent/Residential	Woodland Infill	Barrier, Buffer/Screen	Erosion Control	Sun	Partial Shade	Shade	Drought	Wet Conditions	Deciduous	Coniferous	Evergreen/Semi	Fragrance	Fruit/Nut/Herb	Fall Color/Interesting Bark	Flower	Small	Medium	Large	Slow	Medium	Fast
Sorbus americana Mountain Ash	●			●					●	●			●					●				●	●		●				●	
Tilia americana American Linden	●		●	●					●		●		●	●		●		●			●		●	●			●		●	
Tilia cordata Little Leaf Linden	●				●	●		●					●	●				●					●			●			●	
Ulmus americana American Elm	●			●					●				●			●		●					●		●					●
Ulmus rubra Red Elm	●						●	●	●		●		●	●				●								●	●			●
Zelkova serrata Green Vase Zelkova		●				●	●	●	●		●		●					●					●				●		●	
Shrubs																														
Amelanchier arborea Serviceberry	●			●					●	●	●		●	●	●			●						●		●	●		●	
Amorpha canescens Leadplant	●			●					●				●	●	●	●		●						●	●				●	
Aronia prunifolia Black Chokecherry	●			●					●	●			●	●				●						●		●	●			
Ceanothus americanus NJ Tea	●		●						●				●	●	●			●						●	●			●		
Ceanothus sanguineus Red Stem Ceanthus	●			●					●				●	●		●		●						●		●	●	●		
Cephalanthus occidentalis Button Bush	●			●					●				●	●	●	●		●						●		●	●		●	
Cornus alternafolia Alternate Leaved Dogwood	●		●	●					●	●				●	●			●						●	●				●	
Cornus amomum Silky Dogwood		●			●	●				●	●			●	●	●		●						●			●			●
Cornus racemosa Grey Dogwood	●		●		●					●	●	●	●	●	●			●						●	●				●	
Cornus stolonifera Red Twig Dogwood	●			●					●	●		●		●				●					●	●	●	●			●	
Euonymus atropurpurea Burning Bush	●			●					●	●	●		●	●	●	●		●					●	●		●	●	●		
Gaultheria procumbens Checker Berry	●		●						●	●	●		●	●	●					●	●	●		●	●			●		

PLANT SELECTION LIST Plant Material Suitability Matrix	ORIGIN		FORM					USE					CONDITION					FOLIAGE			FEATURE				HEIGHT			GROWTH		
	Native	Introduced	Irregular	Oval/Round	Upright	Pyramidal	Vase	Street Tree	Accent/Residential	Woodland Infill	Barrier, Buffer/Screen	Erosion Control	Sun	Partial Shade	Shade	Drought	Wet Conditions	Deciduous	Coniferous	Evergreen/Semi	Fragrance	Fruit/Nut/Herb	Fall Color/Interesting Bark	Flower	Small	Medium	Large	Slow	Medium	Fast
Ilex verticillata Winterberry	●			●	●				●		●		●	●				●				●				●	●	●		
Juniperus communis Common Juniper	●		●						●	●	●		●			●				●						●		●		
Juniperus horizontalis Creeping Juniper	●		●						●			●	●							●		●			●			●		
Juniperus prostrate Prostrate Juniper	●		●						●		●	●	●							●				●	●					●
Juniperus chinensis Chinese Juniper		●		●	●				●	●	●		●			●			●						●	●	●	●	●	
Lindera benzoin Spicebush	●			●						●				●	●		●	●			●	●	●	●		●	●	●	●	
Prunus virginiana Choke Cherry	●		●						●	●			●					●					●	●		●	●			●
Sambucus canadensis American Elderberry	●			●						●				●			●	●				●		●			●		●	●
Rhus glabra Smooth Sumac	●			●						●	●	●	●					●				●	●	●			●		●	
Rhus typhina Sumac	●			●						●		●	●	●				●				●	●				●			●
Rosa Scarlet Medland Rose		●	●	●					●	●	●	●	●					●				●		●	●					●
Taxus canadensis Canadian Yew	●		●										●	●	●					●						●			●	
Taxus sp. Yew		●			●				●		●		●	●						●		●			●	●	●			●
Thuja occidentalis American Arborvitae		●				●			●		●		●			●	●		●			●					●	●	●	
Viburnum acerifolium Maple Leaf Viburnum	●		●	●					●	●	●		●	●		●		●				●	●	●		●		●		
Viburnum dentatum Arrowwood	●		●	●					●	●	●		●	●				●						●		●	●		●	
Viburnum lentago Black Haw	●		●		●				●	●	●		●	●	●	●		●				●		●			●	●		
Viburnum opulus Cranberry Viburnum		●		●					●	●	●		●	●			●	●				●		●		●	●		●	
Viburnum prunifolium Blackhaw Viburnum	●				●				●	●	●		●	●	●	●		●				●	●	●			●	●	●	

APPENDIX J
Drawings

US Army Corps
of Engineers
Louisville District

DESIGN-BUILD REQUEST FOR PROPOSAL

BUILDING ADDITION - B273
CHILD DEVELOPMENT CENTER
(CDC) FOR DETROIT ARSENAL

WARREN MICHIGAN

JULY 13, 2011

PROJECT NO. - 33447
P2 #353254

SHEET COUNT			SHEET REFERENCE NUMBER	SHEET TITLE
GENERAL:				
1	OF	15	G-001	COVER SHEET AND DRAWING INDEX
CIVIL/SITE:				
2	OF	15	C-001	GENERAL NOTES AND LEGEND
3	OF	15	C-002	HAUL ROUTE
4	OF	15	VF-101	EXISTING CONDITIONS PLAN
5	OF	15	CD-101	SITE DEMOLITION PLAN
6	OF	15	CS-101	SITE LAYOUT PLAN
7	OF	15	CS-102	STAFF PARKING PLAN
8	OF	15	CG-101	SITE GRADING AND DRAINAGE PLAN
9	OF	15	CU-101	SITE UTILITIES PLAN
10	OF	15	C-301	SANITARY SEWER PROFILES
11	OF	15	C-501	DETAILS
12	OF	15	C-502	DETAILS
13	OF	15	E-101	ELECTRICAL SITE PLAN
14	OF	15	L-101	LANDSCAPE PLAN
15	OF	15	L-501	LANDSCAPE DETAILS

A. Security Requirement: CONDITIONS FOR RELEASE of Plans to Contractor;

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5. All information and drawing provided shall not be posted on any Internet web site.

6. The responsible USG POC for coordination of release and return of USG engineering drawings / information at the Detroit Arsenal, MI, is Mr. Eddie D. Morris @ (586) 282-5282.

B. Distribution authorized to US government agencies and contractors associated with TACOM Life Cycle Management Command (LCMC) or the United States Army Garrison - Detroit Arsenal in accordance with Army Regulation AR 530-1. For Official Use Only (FOUO) caveat is assigned so as not to place US personnel at risk, or compromise security procedures, or DOD information (Critical Infrastructure Technology).

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US Army Corps of Engineers® Louisville District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC Barge, Waggoner, Sumner & Cannon, Inc.

DESIGNED BY: Y. YERETZIAN
DATE: 16 JUN 2011
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SOLICITATION NO.:
SUBMITTED BY: BWSC
CONTRACT NO.: P2 #353254
PLOT SCALE: 1:1 ANSI D
PLOT DATE: 7/8/2011
FILE NUMBER: 1
SIZE: ANSI D
FILE NAME: DETARS_CDC-G-8501---dgn

BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

COVER SHEET
AND DRAWING INDEX

SHEET IDENTIFICATION
G-001
SHEET 1 OF 15

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7/8/2011 4:31:58 PM

DPW WORK ORDER # IMA325181J
ERC # 11-023

GENERAL NOTES:

A. TOPOGRAPHIC SURVEY, SHOWN ON SHEET VF-101, WAS PERFORMED BY BARGE, WAGGONER, SUMNER & CANNON, INC., DATED JUNE 2011.

B. POC: STEPHEN SCHULTZ
8280 YANKEE STREET
DAYTON, OHIO 45458-1806
TEL (937) 438-0378

C. GAS DISTRIBUTION AND SERVICE LINES BELONG TO CONSUMERS ENERGY

CONSUMERS ENERGY
35350 KELLY ROAD
CLINTON TWP., MI 48035

POC: STEPHEN COURNOYER
TEL (586) 307-3267

D. PRIOR TO CONNECTING TO OR CROSSING UNDER ANY UTILITIES LOCATED BY OTHERS, THE CONTRACTOR SHALL LOCATE THE EXISTING PIPES OR UTILITIES BOTH AS TO LINE AND GRADE PRIOR TO ANY WORK OR EXCAVATION IN THESE AREAS. NOTE THAT CROSSING PARRIED UTILITIES WITH HEAVY CONSTRUCTION EQUIPMENT MAY CAUSE DAMAGE TO THE UNDERGROUND UTILITIES. THE CONTRACTOR SHALL CONTACT THE UTILITY OWNER FOR DETAILS ON HOW TO PROTECT THE UTILITIES FROM DAMAGE. THE CONTRACTOR SHALL NOT BACK FILL EXPOSED UNDERGROUND UTILITIES UNTIL THE UTILITY OWNER HAS INSPECTED ITS FACILITIES AND PERFORMED ANY MAINTENANCE AND/OR ADJUSTMENTS THAT MAY BE REQUIRED. NO UTILITIES SHALL BE TAKEN OUT OF SERVICE AT ANY TIME WITHOUT PRIOR CONSENT AND APPROVAL FROM THE UTILITY OWNER.

E. THE EXISTING CDC FACILITY WILL BE FULLY OPERATIONAL DURING THE CONSTRUCTION OF THE NEW BUILDING ADDITION. THE CONTRACTOR SHALL MINIMIZE IMPACT ON EXISTING CDC BUILDING OPERATION AND PROVIDE UNINTERRUPTED ACCESS TO EXISTING LOTS "E" AND "E-1", CDC CHILD DROP- OFF AREA, DUMPSTER AND FIRE TRUCK ACCESS DRIVES AT ALL TIMES DURING THE CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL MAINTAIN VEHICULAR TRAFFIC ON ALL ROADS AND PEDESTIAN TRAFFIC ON ALL SIDEWALKS.

F. AN EXISTING STEAM TRENCH IS LOCATED ALONG MACARTHER DRIVE AND TO THE EAST OF THE NEW BUILDING ADDITION. CARE SHALL BE TAKEN SO AS NOT TO DAMAGE THIS STRUCTURE DURING CONSTRUCTION OPERATIONS.

G. THE BUILDING LAYOUT SHOWN ON THE SITE DRAWINGS IS FOR THE BUILDING ADDITION LAYOUT FOR THE BID OPTION. THE DESIGN BUILD CONTRACTOR SHALL MAKE THE NECESSARY MODIFICATIONS TO THE SITE PLANS TO ACCOMMODATE THE BASE BID.

H. AN EXISTING UTILITY TOWER IS LOCATED AT THE NORTHEAST CORNER OF THE SITE. CARE SHALL BE TAKEN SO AS NOT TO DAMAGE THIS STRUCTURE DURING CONSTRUCTION OPERATIONS.

I. WATER DISTRIBUTION LINES WITHIN DTA BELONGS TO THE INSTALLATION

POC: DON HUDGENS
TEL (586) 282-8469

POC: MARC D. POINT
TEL (586) 282-8349

J. CONTRACTOR MAY CONTACT DTA DPW FOR ADDITIOANL AS-BUILT DRAWINGS.

POC: DON HUDGENS
TEL (586) 282-8469

K. FOR THE NEW CDC BUILDING ADDITION CONCEPTUAL FLOOR PLANS, PLEASE REFER TO SECTION 01 10 00, ATTACHMENT "F" OF THE RFP DOCUMENTS

LEGEND

EXISTING

- POST/BOLLARD
- SIGN
- BUMPER BLOCK
- SATELLITE DISH
- TRAFFIC CONTROL BOX
- UNKNOWN MANHOLE
- STORM SEWER
- STORM SEWER MANHOLE
- CATCH BASIN
- CATCH BASIN WITH DOME GRATE
- TRENCH DRAIN
- SANITARY SEWER
- SANITARY SEWER MANHOLE
- WATER LINE
- WATER MANHOLE
- WATER VALVE
- WATER LINE MARKER
- FIRE HYDRANT
- MONITORING WELL
- STEAM LINE
- STEAM PIT
- GAS LINE
- GAS METER
- GAS VENT
- GAS MARKER
- COMMUNICATIONS/TELEPHONE LINE
- TELEPHONE MANHOLE
- COMMUNICATIONS MANHOLE
- TELEPHONE PEDESTAL
- COMMUNICATIONS VAULT
- ELECTRIC LINE
- ELECTRIC MANHOLE
- ELECTRIC PULLBOX
- ELECTRIC METER
- UTILITY POLE
- HEDGE ROW
- DECIDUOUS TREE
- CONIFEROUS TREE
- BUSH
- GUARDRAIL
- FENCE
- MAJOR CONTOUR
- MINOR CONTOUR
- SOIL BORING
- SURVEY CONTROL MONUMENT
- SURVEY CONTROL POINT

NEW

- WATER
- GAS
- STORM
- SANITARY
- ELECTRIC DUCT BANK
- CATCH BASIN
- STORM MANHOLE
- SANITARY MANHOLE
- FIRE HYDRANT
- SANITARY CLEAN OUT
- METER
- SETBACK - AT/FP STANDOFF
- WATER VALVE
- GAS VALVE
- BOLLARDS
- PLAY AREA FENCE
- CONCRETE WALK
- ASPHALT PAVEMENT

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5. All information and drawing provided shall not be posted on any Internet web site.

6. The responsible USG POC for coordination of release and return of USG engineering drawings / information at the Detroit Arsenal, MI, is Mr. Eddie D. Morris @ (586) 282-5282.

B. Distribution authorized to US government agencies and contractors associated with TACOM Life Cycle Management Command (LCMC) or the United States Army Garrison - Detroit Arsenal in accordance with Army Regulation AR 530-1. For Official Use Only (FOUO) caveat is assigned so as not to place US personnel at risk, or compromise security procedures, or DOD information (Critical Infrastructure Technology).

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US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

DESIGNED BY: Y. YERETZIAN
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SUBMITTED BY: BWSC
DATE: 16 JUN 2011
SOLICITATION NO.:
CONTRACT NO.: F2 F63C254
PLOT SCALE: AS NOTED
PLOT DATE: 7/08/2011
FILE NUMBER: 1
SIZE: ANSI D
FILE NAME: DETARS_CDC-C-001.DGN

BWSC BARGE WAGGONER SUMNER & CANNON, INC.

BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

GENERAL NOTES & LEGEND

SHEET IDENTIFICATION
C-001
SHEET 2 OF 15

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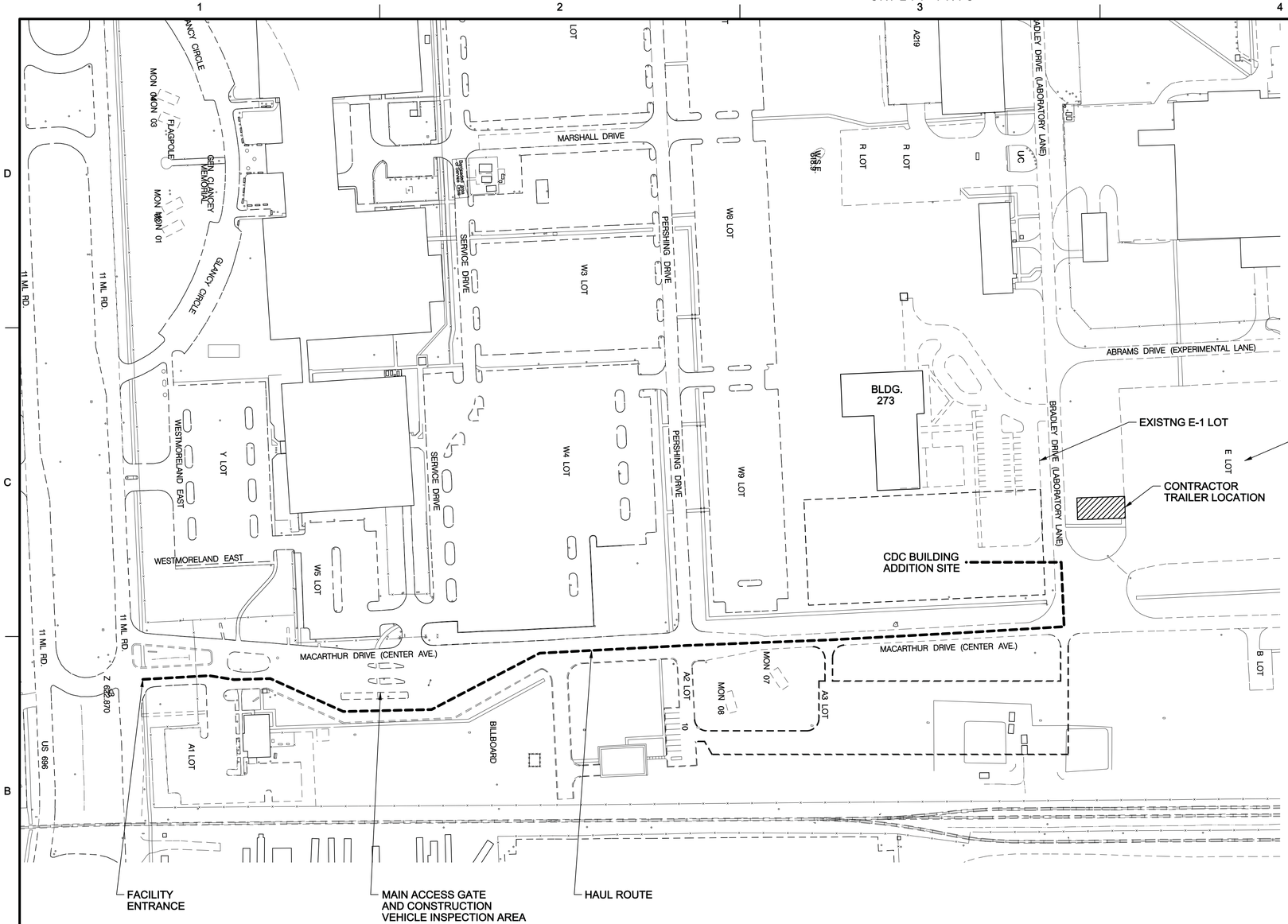
DPW WORK ORDER # IMA325181J
ERC # 11-023



LEGEND

HAUL ROUTE

NOTES:

A. FOR LEGEND AND GENERAL NOTES, SEE SHEET C-001.

B. THE HAUL ROUTE AND THE ACCESS CONTROL POINT (ACP) WILL CHANGE AFTER SEPTEMBER 30, 2011. THE DESIGN BUILD CONTRACTOR SHALL COORDINATE THE LOCATION OF THE NEW ACP AND THE HAUL ROUTE WITH DPW.

C. REFER TO THE RFP FOR THE REQUIREMENTS AND RESTRICTIONS REGARDING CONTRACTOR STAGING AND STOCKPILE AREA.

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N

100' 50' 0' 100' 200'
SCALE: 1 INCH = 100 FEET

SCALE: 1" = 100'-0"

01

HAUL ROUTE

US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

DESIGNED BY: Y. YERETZIAN
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SUBMITTED BY: BWSC
DATE: 16 JUN 2011
SOLICITATION NO.:
CONTRACT NO.: P2 #835254
PLOT SCALE: AS NOTED
PLOT DATE:
FILE NUMBER: 1
SIZE: ANSI D
FILE NAME: DETARS_CDC-C-002.dgn

BWSC
BARGE WAGGONER SUMNER & CANNON, INC.

BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

HAUL ROUTE

SHEET IDENTIFICATION
C-002
SHEET 3 OF 15

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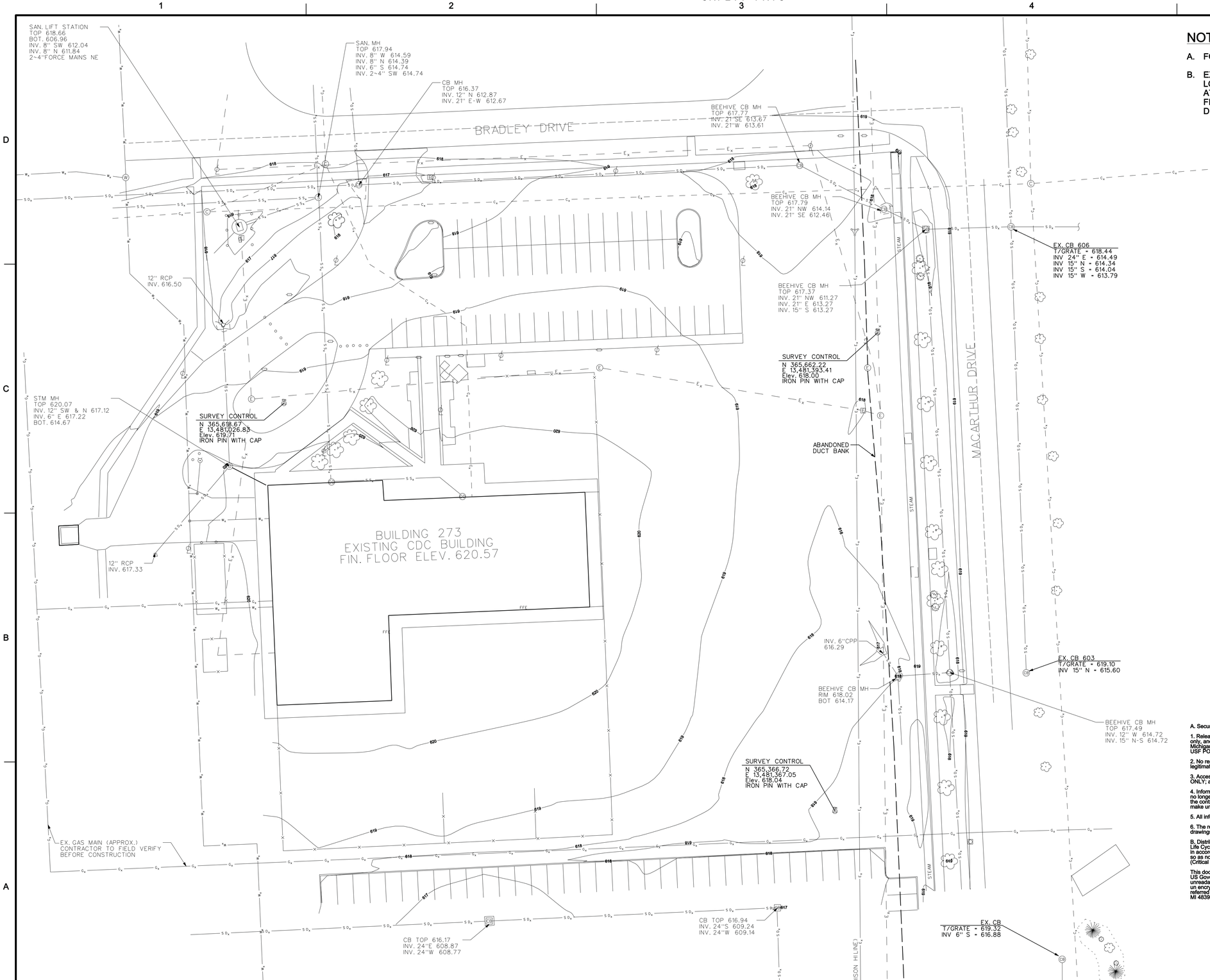
DPW WORK ORDER # IMA325181J
ERC # 11-023



NOTES:

A. FOR LEGEND AND GENERAL NOTES SEE SHEET C-001.

B. EXISTING UTILITIES SHOWN ARE AT APPROXIMATE LOCATIONS BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF THE SURVEY. THE CONTRACTOR SHALL FIELD VERIFY AS TO THEIR ACTUAL LOCATIONS AND DEPTHS.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
FOR FREE LOCATION OF PUBLIC UTILITY LINES

NOTE: ALL EXISTING UTILITIES ARE SHOWN APPROXIMATE ONLY.

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EXISTING CONDITIONS PLAN

30' 15' 0' 30' 60'
SCALE: 1 INCH = 30 FEET

SCALE: 1" = 30'-0"

01

US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.

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U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

DESIGNED BY: Y. YERETZIAN
DATE: 16 JUN 2011
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SOLICITATION NO.:
SUBMITTED BY: BWSC
CONTRACT NO.: PZ #353254
PLOT SCALE: AS NOTED
PLOT DATE: 7/8/2011
FILE NUMBER:
SIZE: ANSI D
FILE NAME: DETARS_CDC-VF-101.DGN

BWSC
BARGER WINCHESTER BUHNER & DANNON, INC.

BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

EXISTING CONDITIONS PLAN

SHEET IDENTIFICATION
VF-101
SHEET 3 OF 15

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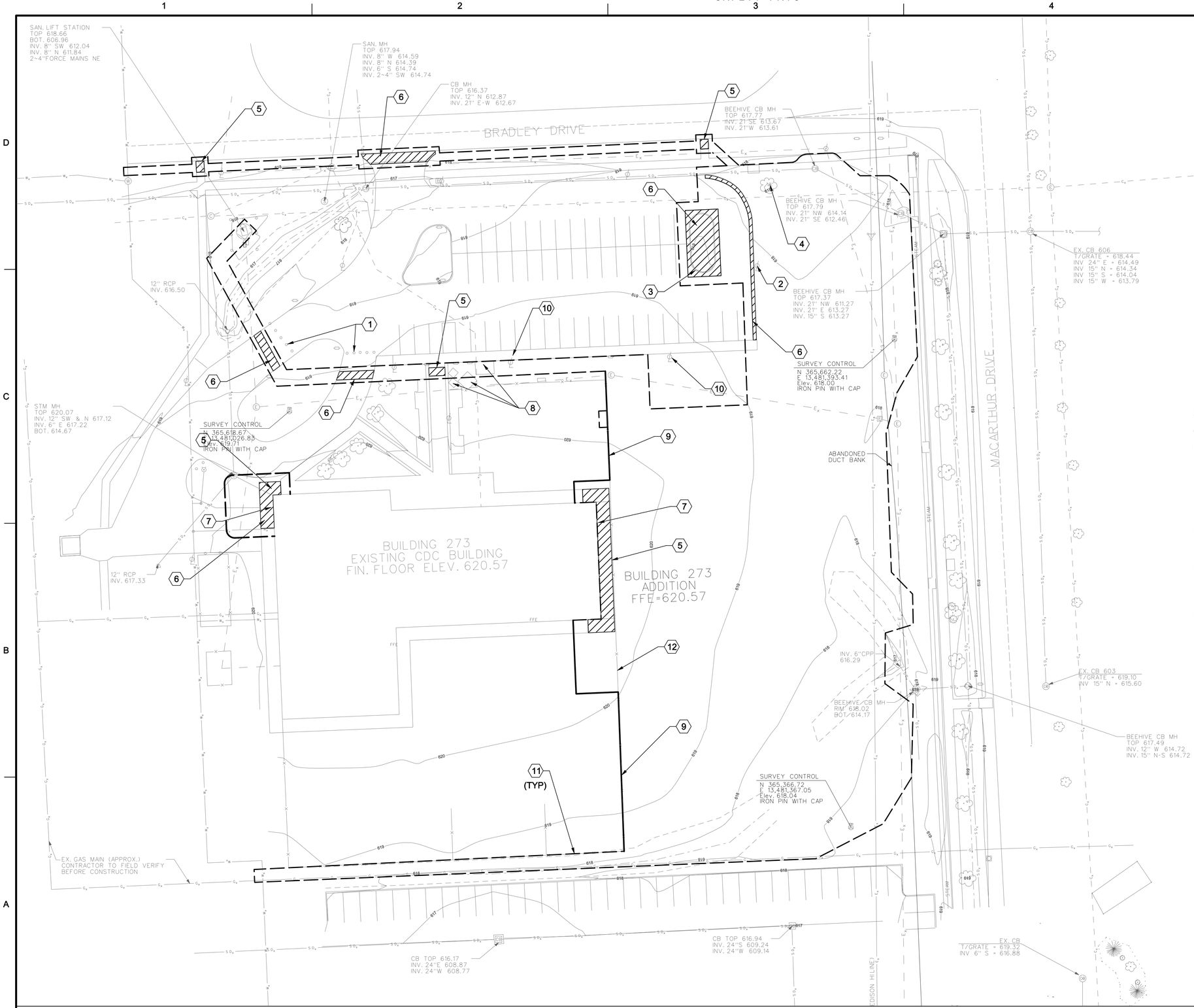
DPW WORK ORDER # IMA325181J
ERC # 11-023



KEYED NOTES:

1. DO NOT DISTURB EXISTING AT/FP BOLLARDS.
2. REMOVE EXISTING LIGHT POLE AND STORE FOR RELOCATION. SEE ELECTRIC SITE PLAN FOR NEW LIGHT POLE LOCATIONS.
3. REMOVE EXISTING CURBED TRAFFIC ISLAND.
4. REMOVE EXISTING TREE.
5. SAW CUT AND REMOVE EXISTING CONCRETE WALK
6. SAW CUT AND REMOVE EXISTING ASPHALT PAVEMENT
7. REMOVE EXISTING DOWNSPOUTS AND UNDERGROUND COLLECTION SYSTEM PIPING, AS NEEDED, TO CONSTRUCT THE NEW BUILDING ADDITION
8. REMOVE EXISTING PLANTERS AS NEEDED FOR THE ROUTING OF THE SANITARY SEWER LINE
9. APPROXIMATE LOCATION OF WOOD CONSTRUCTION FENCE. COORDINATE WITH LOCATION OF EXISTING CHAIN LINK FENCE AND EXISTING CDC CHILD CARE ROOM DOORS. AVOID BLOCKING ANY EXISTING WINDOWS OR EXITS.
10. DO NOT DISTURB EXISTING LIGHT POLES
11. WORK LIMITS
12. EXISTING FENCE, CUT AND RELOCATE AS NECESSARY FOR PROPOSED PLAY AREA FENCE CONSTRUCTION AND THE CONSTRUCTION FENCE. FENCES SHALL BE MAINTAINED FOR PLAYGROUND ENCLOSURES.

NOTES:

A. FOR GENERAL NOTES AND LEGEND, SEE SHEET C-001.

B. WHEN SAW CUTTING THE EXISTING ASPHALT PAVEMENT EDGES ENSURE THAT THE SAW CUT IS AT A SOUND BASE TO ALLOW THE PROPER CONSTRUCTION OF THE PAVEMENT EXTENSION. THE PLANS SHOW A 2-FT WIDE STRIP, THE CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION.

C. SAW CUT EXISTING SIDEWALKS TO BE REMOVED AT THE NEAREST JOINT.

D. SAW CUT PAVEMENTS AND WALKS ALONG THE NEW SANITARY SEWER AND WATER LINE ROUTE TO THE MINIMUM WIDTH NEEDED TO ALLOW FOR AN OPEN TRENCH INSTALLATION.

E. PROPERLY DISPOSE OFF ALL MATERIALS ASSOCIATED WITH DEMOLITION WORK TO A LOCATION OFF THE INSTALLATION IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REQUIREMENTS.

F. WHEN DEMOLISHING EXISTING ROOF DRAIN COLLECTION SYSTEM, REMOVE AND CAP, AS APPROPRIATE, TO THE NEAREST JUNCTION BOX. DO NOT LEAVE EXISTING PIPING UNDER THE FOOTPRINT OF THE NEW BUILDING ADDITION.

G. PLACE TEMPORARY CONSTRUCTION FENCE SO AS TO MAINTAIN DOOR CLEARANCE REQUIREMENTS ON THE EXISTING CDC FACILITY.

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N

30' 15' 0' 30' 60'
SCALE: 1 INCH = 30 FEET

SCALE: 1" = 30'-0"

01

US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.

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DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SOLICITATION NO.:
SUBMITTED BY: BWSC
CONTRACT NO.: P2 #835254
PLOT SCALE: AS NOTED
PLOT DATE: 7/8/2011
FILE NUMBER: 1
SIZE: ANSI D
FILE NAME: DETARS_CDC-CD-101.DGN

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC
BARGER WARDWHEIER BUHNER & DANNON, INC.

BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

SITE DEMOLITION PLAN

SHEET IDENTIFICATION
CD-101
SHEET 4 OF 15

SITE DEMOLITION PLAN

DPW WORK ORDER # IMA325181J
ERC # 11-023

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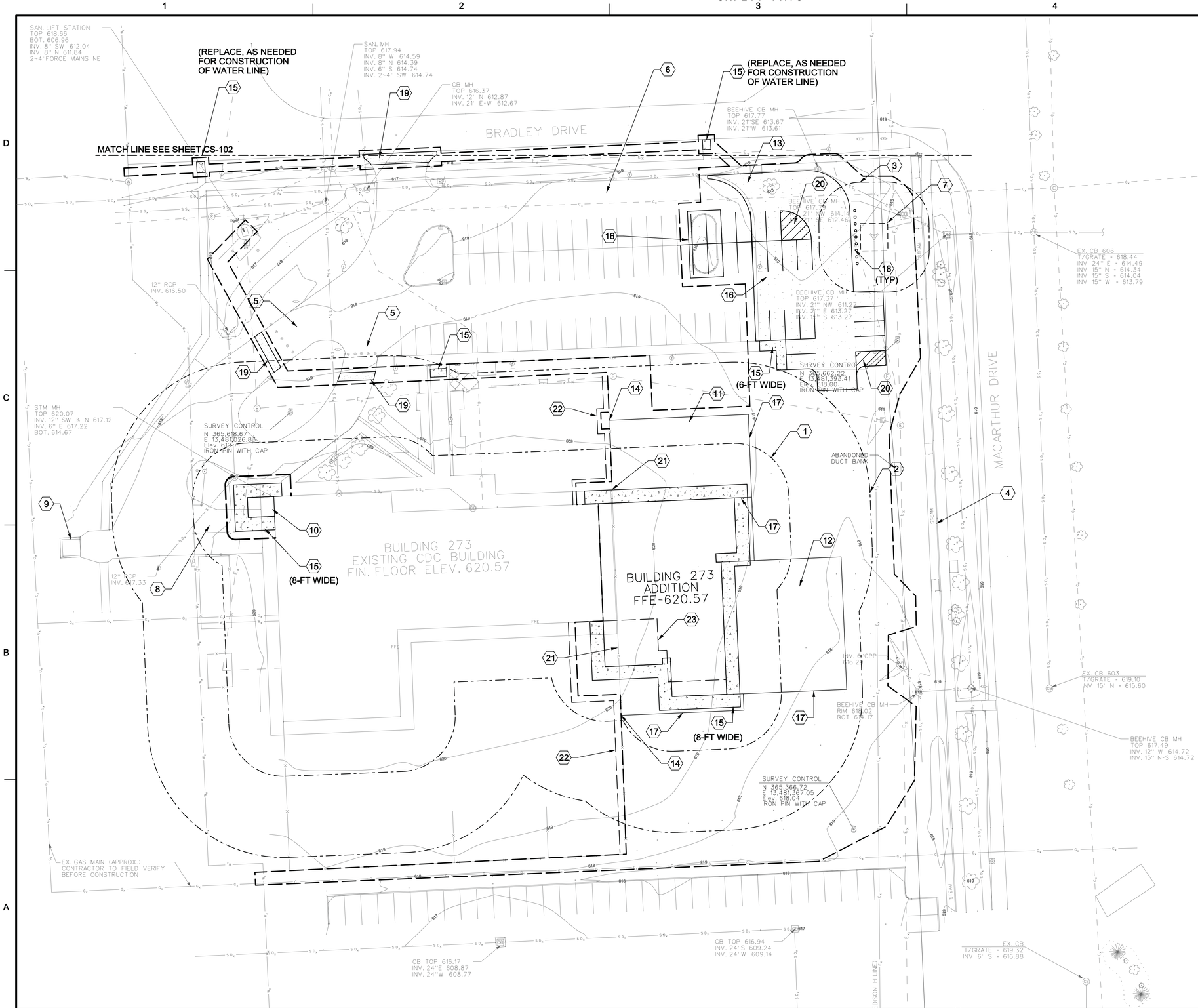

KEYED NOTES:

1. 33-FT AT/FP UNOBSTRUCTED DISTANCE
2. 82-FT AT/FP STANDOFF DISTANCE
3. 25-FT STANDOFF DISTANCE FROM POWER TRANSMIT ION TOWER.
4. EXISTING STEAM TRENCH
5. EXISTING DROP OFF AREA
6. EXISTING E-1 LOT
7. EXISTING POWER TRANSMISSION TOWER
8. EXISTING FIRE AND EMERGENCY VEHICLE ACCESS DRIVE
9. EXISTING DUMPSTER PAD AND ENCLOSURE
10. DRY STORAGE ADDITION TO EXISTING BUILDING. FFE=620.57
11. NORTH PLAY AREA; 4,200 S.F. (50-FT X 84-FT)
12. EAST PLAY AREA; 5,800 S.F. (72.50-FT X 80-FT)
13. PARKING LOT E-1 EXPANSION, TOTAL OF 24 NEW POV STALLS.
14. CONNECT TO EXISTING PLAY AREA FENCE
15. SIDEWALK. SEE DETAIL 04/C-501
16. ASPHALT PAVEMENT, SEE DETAIL 01/C-501
17. PLAY AREA FENCE
18. BOLLARDS
19. PATCH EXISTING ASPHALT PAVEMENT. SEE DETAIL 01/C-501
20. STRIPED TRAFFIC ISLAND
21. REPLACE EXISTING PLAY AREA FENCE REMOVED FOR THE CONSTRUCTION OF THE BUILDING ADDITION
22. TEMPORARY CONSTRUCTION FENCE
23. FOOTPRINT OF BASE BID

NOTES:

A. PARKING STALLS SHALL BE 9-FT BY 18-FT.

B. TRAFFIC ISLES SHALL BE 24-FT WIDE.

C. THE EXISTING CDC FACILITY WILL BE OPERATIONAL DURING THE CONSTRUCTION OF THE NEW BUILDING ADDITION.

D. PROVIDE UNINTERRUPTED ACCESS TO THE EXISTING CHILD DROP-OFF AREA, DUMPSTER PAD, EXISTING PARKING LOTS (E AND E-1) AND FIRE TRUCK ACCESS.

E. THE CONTRACTOR SHALL ENSURE THAT CONSTRUCTION OPERATIONS DO NOT DAMAGE EXISTING UTILITY STRUCTURES, IN PARTICULAR THE EXISTING STEAM TRENCH LOCATED TO THE EAST OF THE EXISTING CDC FACILITY ALONG MACARTHER DRIVE AND THE EXISTING POWER TRANSMISSION TOWER LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF MACARTHER AND BRADLEY DRIVE.

F. CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE EXISTING PLAY AREA FENCING REMOVED FOR THE NEW BUILDING ADDITION.

G. FOR THE NEW CDC BUILDING ADDITION CONCEPTUAL FLOOR PLANS, PLEASE REFER TO SECTION 01 10 00, ATTACHMENT "F" OF THE RFP DOCUMENT.

H. FOR GENERAL NOTES AND LEGEND, SEE SHEET C-001.

A. Security Requirement: CONDITIONS FOR RELEASE of Plans to Contractor;

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N

30' 15' 0' 30' 60'
SCALE: 1 INCH = 30 FEET

SCALE: 1" = 30'-0"

01

SITE LAYOUT PLAN

US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY: Y. YERETZIAN
DATE: 18 JUN 2011
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SOLICITATION NO.:
SUBMITTED BY: BWSC
CONTRACT NO.: P2 #353254
PLOT SCALE: AS NOTED
PLOT DATE: 7/8/2011
FILE NUMBER:
SIZE: ANSI D
FILE NAME: DETARS_CDC-CS-101.DGN

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BARGE, WASSMER, BUHNER & DANNUNZIO, INC.
BWSC

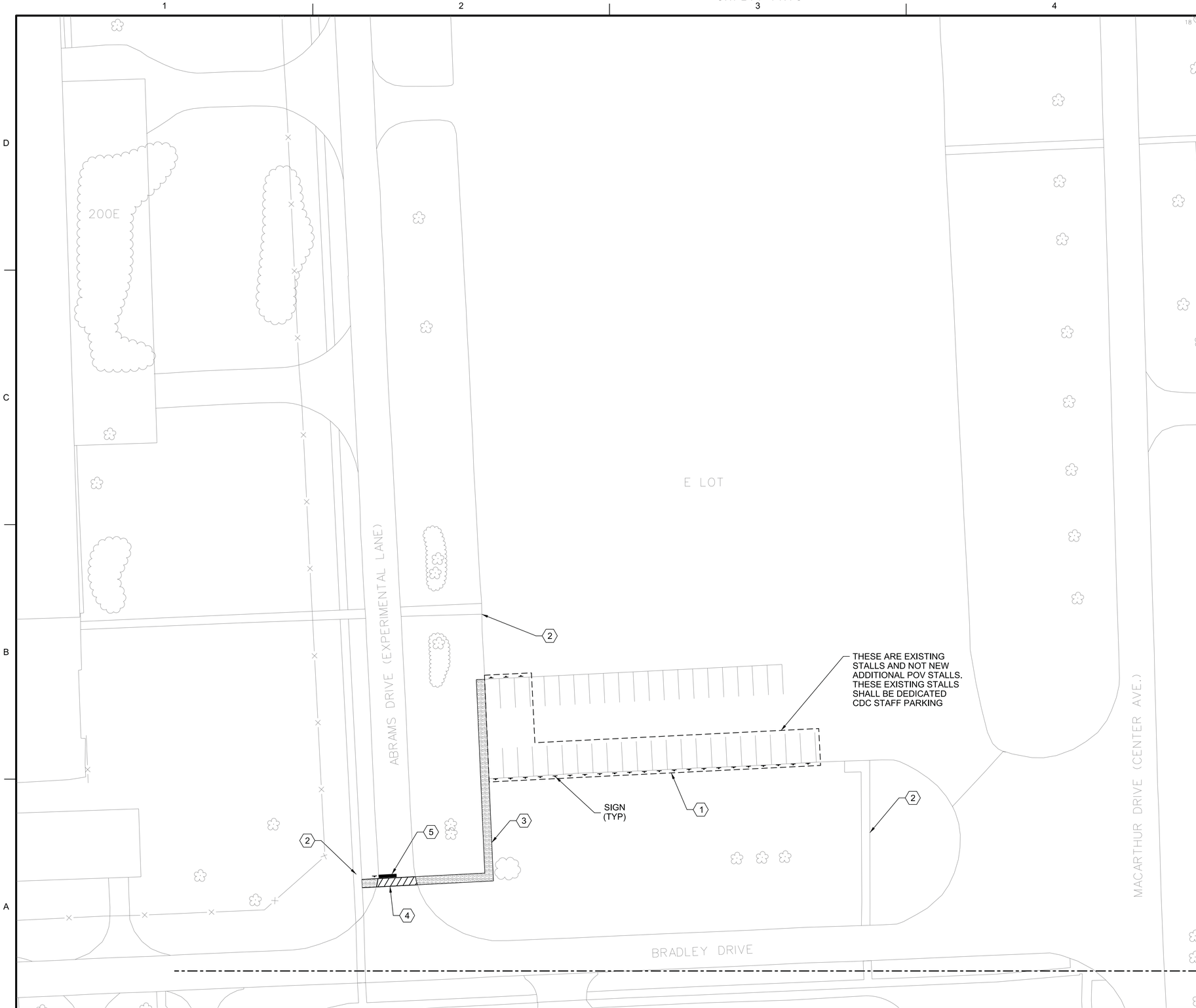
BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

SITE LAYOUT PLAN

SHEET IDENTIFICATION
CS-101
SHEET 6 OF 15

F:\34\34734\34734759\DSC\PLINE\CIVIL\DETARS_CDC-CS-101.DGN
7/8/2011 5:11:34 PM

DPW WORK ORDER # IMA325181J
ERC # 11-023



SITE LAYOUT PLAN

SCALE: 1" = 30'-0"

01

KEYED NOTES:

1. LOCATION OF STAFF PARKING.
2. LOCATIONS OF EXISTING SIDEWALKS
3. 6' WIDE CONCRETE WALK. SEE NOTE "G" THIS SHEET AND DETAIL 04/C-501.
4. CROSS WALK
5. STOP BAR AND STOP SIGN

NOTES:

A. THIS DRAWING IS BASED ON GIS INFORMATION AND IS NOT SURVEYED.

B. A TOTAL OF 25 EXISTING PARKING STALLS IN "E" LOT SHALL BE DEDICATED TO THE CDC STAFF PARKING.

C. THE LOCATIONS OF THE DEDICATED CDC STAFF PARKING SHALL BE CLOSEST TO BRADLEY DRIVE

D. PROVIDE SIGNS FOR EACH OF THE DEDICATED STALLS WITH THE FOLLOWING MARKINGS: "CDC STAFF PARKING ONLY"

E. PROVIDE PEDESTRIAN WALK CONNECTING THE "E" LOT TO THE EXISTING CDC FACILITY

F. CONTRACTOR TO ENSURE POSITIVE DRAINAGE IS MAINTAINED ACROSS THE AREA WHERE THE NEW SIDEWALK IS ADDED.

G. THE LOCATION OF THE NEW WALK SHOWN THIS SHEET IS CONCEPTUAL IN NATURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE NEW WALK TO MEET ALL DESIGN GUIDELINES FOR A SAFE AND EFFICIENT PEDESTRIAN CIRCULATION.

H. FOR GENERAL NOTES AND LEGEND, SEE SHEET C-001.

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US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

DESIGNED BY: Y. YERETZIAN
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SUBMITTED BY: BWSC
DATE: 16 JUN 2011
SOLICITATION NO.:
CONTRACT NO.: P2 #83234
PLOT SCALE: 1:1
PLOT DATE: 7/20/11
FILE NUMBER: 1
ASSISTED BY: SITE
FILE NAME: DETARS_CDC-CS-102.dgn
ANSI D

BWSC
Barge Waggoner Sumner & Cannon, Inc.

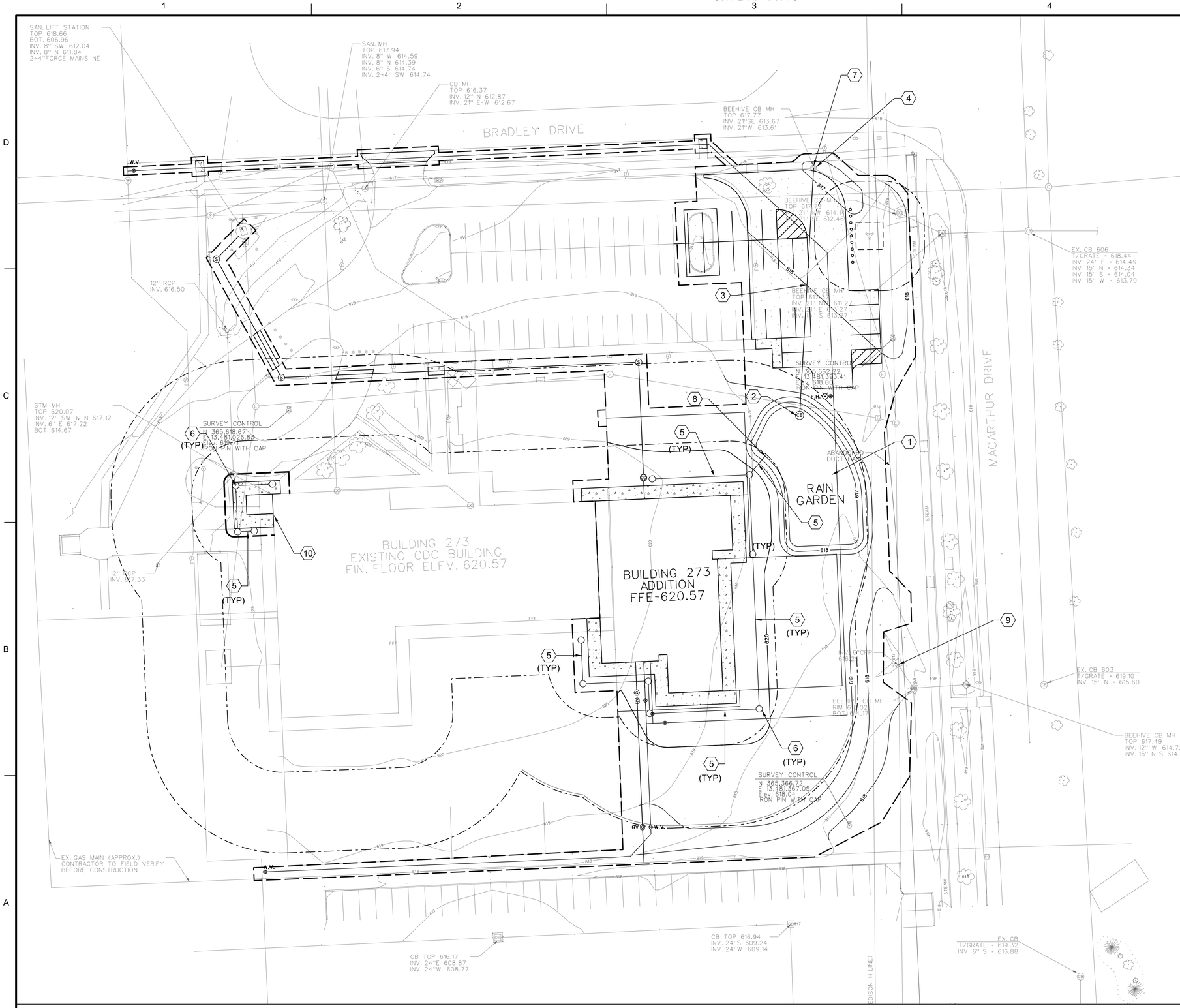
CHILD DEVELOPMENT CENTER (CDC)
BUILD ADDITION - B273
DETROIT ARSENAL, WARREN, MICHIGAN

STAFF PARKING PLAN

SHEET IDENTIFICATION
CS-102
SHEET 7 OF 15

DGN $TIME$
$DATE$

DPW WORK ORDER # IMA325181J
ERC # 11-023



KEYED NOTES:

1. RAIN GARDEN, SEE SHEET L-101 AND DETAIL 04 ON SHEET L-501
2. CATCH BASIN, WITH GRATE PLACED 12-INCH ABOVE SURROUNDING GRADE. GRATE ELEV. =618.00, INVERT=614.36
3. 12-IN STORM SEWER PIPE. LENGTH=150-FT SLOPE=0.50%
4. CONNECT TO EXISTING CATCH BASIN. INVERT=613.61
5. 6-IN ROOF DRAIN COLLECTION SYSTEM.
6. ROOF DRAIN COLLECTION SYSTEM CLEAN-OUT
7. ADJUST EXISTING CATCH BASIN TO GRADE. GRATE ELEVATION 616.90
8. OUTLET 6-IN DRAIN COLLECTION INVERT ELEV.=617.00. PROVIDE RIPRAP AT OUTLET, AS NEEDED.
9. DO NOT DISTURB EXISTING 6-IN CPP PIPE
10. CONNECT DOWNSPOUTS FROM THE DRY STORAGE ADDITION TO THE EXISTING ROOF DRAINAGE COLLECTION SYSTEM. PROVIDE NEW CLEAN OUTS AS NEEDED.

NOTES:

A. FOR GENERAL NOTES AND LEGEND, SEE SHEET C-001.

B. EARTH CUT AND FILL SLOPES SHALL NOT EXCEED 3 HORIZONTAL TO 1 VERTICAL.

C. PROVIDE 4-INCH UNDERDRAIN SYSTEM TO DRAIN THE RAIN GARDEN. DEPTH OF SYSTEM TO BE A MINIMUM OF 2-FT BELOW THE BOTTOM OF THE RAIN GARDEN. CONNECT THE UNDERDRAIN SYSTEM TO THE CATCH BASIN LOCATED IN THE RAIN GARDEN. INVERT ELEVATION AT POINT OF CONNECTION TO THE CATCH BASIN IS 614.36

D. THE DIFFERENCE IN GRADE BETWEEN THE FINISH FLOOR ELEVATION (FFE) AND THE GROUND SURFACE IMMEDIATELY ADJACENT TO THE BUILDING SHALL BE A MINIMUM OF 6-INCHES, EXCEPT AT DOORS. THE GROUND OUTSIDE THE BUILDING, EXCEPT FOR THE PLAY AREAS, SHALL HAVE A 5% SLOPE AWAY FROM ALL EXTERIOR WALLS FOR THE FIRST 10-FT AND POSITIVE DRAINAGE THEREAFTER. THE PLAY AREAS SHALL BE GRADED TO DRAIN AWAY FROM THE BUILDING WITH A MAXIMUM GRADE NOT TO EXCEED 2%.

E. PROVIDE AN UNDERDRAIN SYSTEM FOR THE POV PARKING PAVEMENT. DESIGN THE UNDERDRAIN SYSTEM PER USACE UFC 3-250-01FA. OUTLET THE UNDERDRAIN SYSTEM TO THE EXISTING CATCH BASIN LOCATED AT THE NORTHEAST CORNER OF THE POV LOT.

F. FOR RAIN GARDEN DETAILS, INCLUDING PLANT MATERIAL SELECTION, REFER TO THE LANDSCAPING PLANS.

G. PROVIDE FROST FREE STOOPS AT ALL DOORS.

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N

30' 15' 0' 30' 60'
SCALE: 1 INCH = 30 FEET

SCALE: 1" = 30'-0"

01

SITE GRADING & DRAINAGE PLAN

US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC
Barnes, Wagner & Sunderman, Inc.

DESIGNED BY: Y. YERETZIAN
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SUBMITTED BY: BWSC
DATE: 16 JUN 2011
SOLICITATION NO.:
CONTRACT NO.: W912QR-11-C-0211
PZ #353254
PLOT SCALE: AS NOTED
PLOT DATE: 7/20/2011
FILE NUMBER:
SIZE: ANSI D
FILE NAME: DETARS_CDC-CG-101.DGN

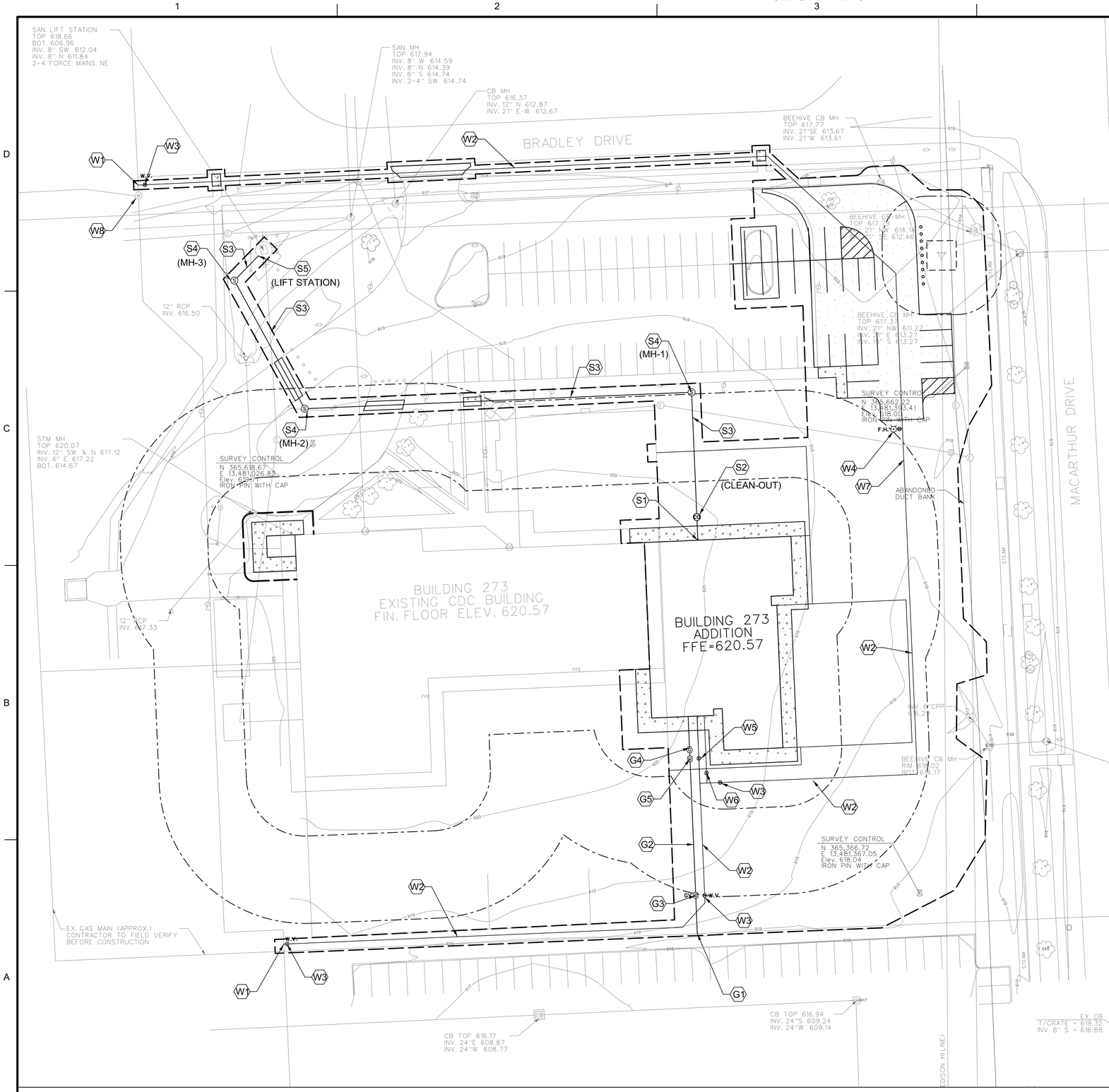
BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

SITE GRADING & DRAINAGE PLAN

SHEET IDENTIFICATION
CG-101
SHEET 8 OF 15

DGN $TIMES
$DATE$

DPW WORK ORDER # IMA325181J
ERC # 11-023



WATER KEYED NOTES:

W1. CONNECT TO EXISTING 8-IN WATER MAIN. USE 8"x8"x8" TEE INSIDE A WELL. DO NOT MAKE NEW CONNECTION UNTILL NEW LINE HAS PASSED HAS PASSED BOTH PRESSURE AND BACTERIOLOGICAL TEST.

W2. 8-INCH WATER LINE

W3. 8-INCH GATE VALVE AND WELL

W4. 8-INCH FIRE HYDRANT AND VALVE

W5. WATER SHUT- OFF VALVE

W6. 8-INCH FIRE LINE, PIV VALVE AND BACKFLOW PREVENTER. BACKFLOW PREVENTER INSIDE BUILDING.

W7. LOWER WATER LINE AT RAIN GARDEN, AS NEEDED TO MEET FROST DEPTH REQUIREMENTS
T/GRATE = 618.44
INV 15" S = 614.04
INV 15" W = 613.79

W8. EXITING TAPPING SLEEVE AND VALVE

NATURAL GAS KEYED NOTES:

G1. POINT OF CONNECTION TO EXISTING NATURAL GAS LINE

G2. NATURAL GAS SERVICE LINE

G3. NATURAL GAS VALVE

G4. GAS METER AND REGULATOR

G5. NATURAL GAS SHUT- OFF VALVE

SANITARY SEWER KEYED NOTES:

S1. SANITARY SEWER POINT OF CONNECTION

S2. SANITARY SEWER CLEAN OUT

S3. 8-INCH SANITARY SEWER LATERAL

S4. SANITARY SEWER MANHOLE

S5. CONNECT TO EXISTING SANITARY SEWER LIFT STATION

NOTES:

A. FOR GENERAL NOTES AND LEGEND, SEE SHEET C-001.

B. FOR STORM SEWERS SEE GRADING AND DRAINAGE PLANS

C. FOR SANITARY SEWER PROFILES, SEE SHEET C-301.

D. FOR SITE ELECTRICAL INFORMATION, SEE SITE ELECTRIC PLAN.

E. PLACE WATER LINES BELOW THE FROST DEPTH. MINIMUM DEPTH OF WATER LINES SHALL BE 6-FT.

F. NATURAL GAS POINT OF CONNECTION IS SHOWN ON THIS DRAWING. CONSUMER'S ENERGY WILL MAKE THE NATURAL GAS CONNECTION, INSTALL THE SERVICE LINE, PROVIDE AND INSTALL THE GAS METER AND REGULATOR, THE CONTRACTOR SHALL CONNECT THE BUILDING ADDITION LINES TO METER AND REGULATOR AND INSTALL PIPING IN THE BUILDING.

G. FIRE HYDRANTS SHALL BE DRY BARREL TYPE, WEEP HOLES ARE NOT ALLOWED AND SHALL HAVE TWO NATIONAL STANDARD 2½-" OUTLETS AND ONE NATIONAL STANDARD 4½" THREAD FIRE DEPARTMENT CONNECTION. THE 4½" OUTLET SHALL BE FACED TOWARD THE HARD SURFACED AREA IMMEDIATELY ADJACENT TO THE HYDRANT, AND OPEN WITH A COUNTER CLOCKWISE TURN, AND BE EQUIPPED WITH "STORTZ" ADAPTER WITH BLIND CAP.

H. FOR THE BACKFLOW PREVENTER, PROVIDE A TEST CONNECTION, OUTSIDE THE BUILDING DOWNSTREAM OF ALL BACKFLOW PREVENTION VALVES FOR FLOW TESTS.

I. THE WATER SERVICE SHUT- OFF VALVE SHALL BE POSITIONED TO MAKE IT ACCESSIBLE TO MAINTENANCE AND EMERGENCY PERSONNEL.

J. PROVIDE "SMART" WATER METER WHICH IS COMPATIBLE WITH AND READ AND WRITE PROGRAMMABLE WITH TRIDIUM SYSTEM UMCS.

K. WATER VALVE BOXES SHALL BE CAST IRON. BOXES SHALL BE EXTENSION -TYPE WITH SLIDE TYPE ADJUSTMENT AND WITH FLARED BASE. THE WORD "WATER" SHALL BE CAST IN THE COVER. THE BOXES SHALL BE SUCH LENGTH AS WILL BE ADOPTED WITHOUT FULL EXTENSION TO THE DEPTH OF COVER REQUIRED OVER THE PIPE AT THE VALVE LOCATION. VALVE BOXES SHALL BE SUITABLE FOR VEHICLE TRAFFIC TO ACCOMMODATE THE LOADING OF AN AASHTO WB-40 VEHICLE AND SHALL BE BONDED WITH THE FERROUS VALVE AND THE CATHODICALLY PROTECTED, IF REQUIRED. THE VALVE BOX SHALL HAVE A PROTECTIVE COATING APPLIED USING A COAL TAR EPOXY.

L. PROVIDE WATER METER INSIDE THE MECHANICAL ROOM.

M. PROVIDE BACKFLOW PREVENTERS INSIDE THE MECHANICAL ROOM.

N. THE CONTRACTOR SHALL FOLLOW THE CITY OF WARREN, MI WATER MAIN DETAILS.

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N

30' 15' 0' 30' 60'
SCALE: 1 INCH = 30 FEET

SCALE: 1" = 30'-0"

01

SITE UTILITIES PLAN

US Army Corps of Engineers
Louisville District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY:
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SUBMITTED BY: BWSC
PLOT SCALE: AS NOTED
PLOT DATE: 7/19/2011
DATE: 16 JUN 2011
SOLICITATION NO.:
CONTRACT NO.: P2 #352254
FILE NUMBER:
SIZE: ANSI D
FILE NAME: DETARS_CDC-CU-101.DGN

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC BARGE WASHER SLUNKER & CHANDLER, INC.

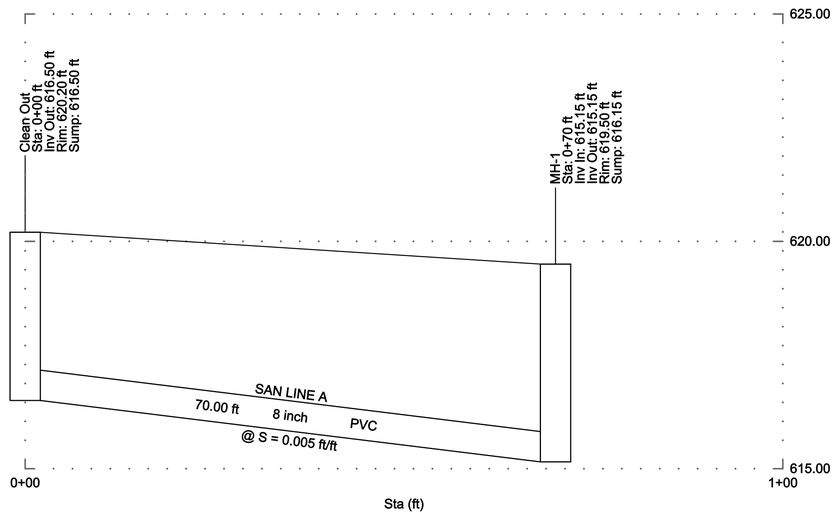
BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

SITE UTILITIES PLAN

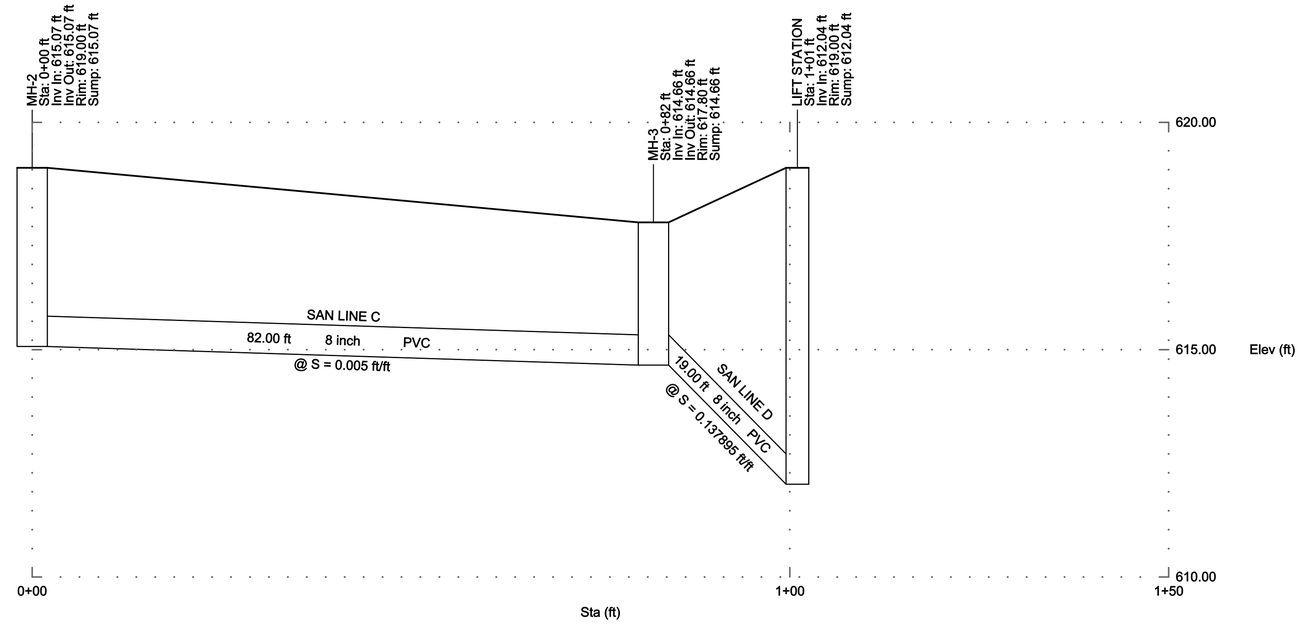
SHEET IDENTIFICATION
CU-101
SHEET 9 OF 15

DGN $TIME$
$DATE$

DPW WORK ORDER # IMA325181J
ERC # 11-023



CLEAN OUT TO MH1



MH2 TO LIFT STATION

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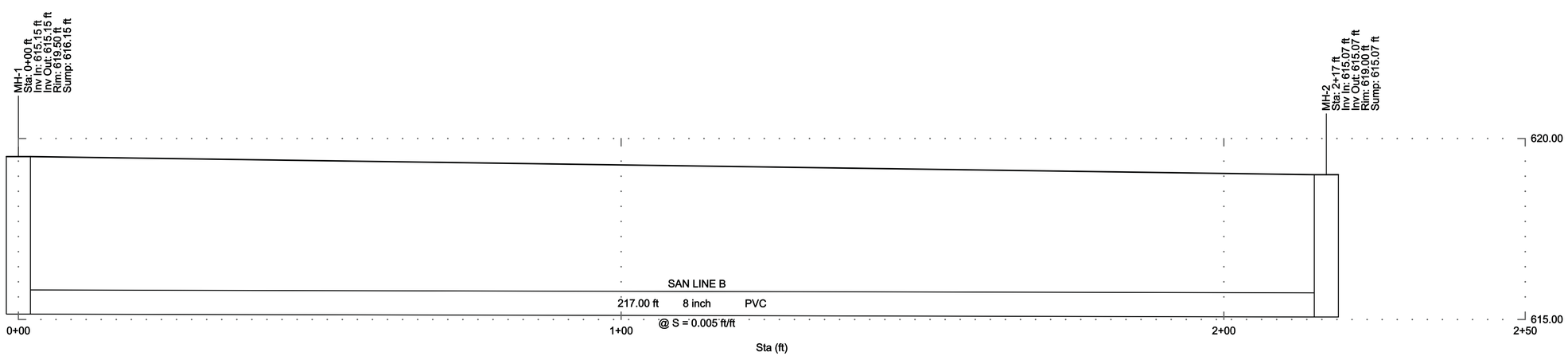

MH1 TO MH2

US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.

MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC Barge Waggoner Sumner & Cannon, Inc.

DESIGNED BY: Y. TERETZIAN
DATE: 18 JUN 2011
DWN BY: A. MCGUIRE
CKD BY: S. SCHULTZ
SOLICITATION NO.:
SUBMITTED BY: BWSC
CONTRACT NO.: P2 R353254
PLOT SCALE: AS NOTED
PLOT DATE: 7/8/2011
FILE NUMBER:
SIZE: ANSI D
FILE NAME: DETAIRS_CDC-C-301.DGN

BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

SANITARY SEWER PROFILES

SHEET IDENTIFICATION
C-301
SHEET 10 OF 15

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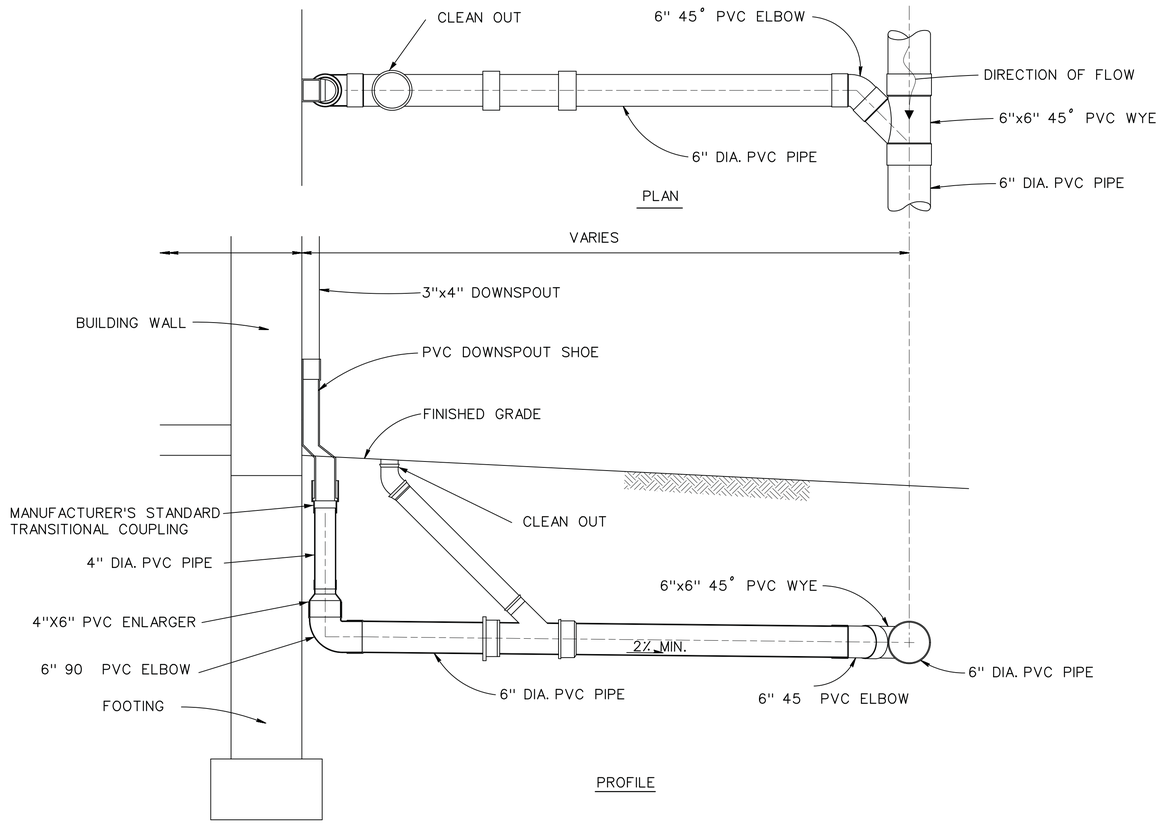
DPW WORK ORDER # IMA325181J
ERC # 11-023

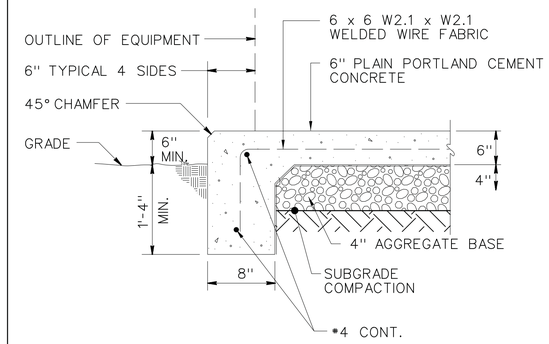


NOTES:

1. DEPTH OF COLLECTION SYSTEM SHALL MEET THE FROST DEPTH REQUIREMENT OF 6-FT MINIMUM.
2. PROVIDE OVERFLOW MECHANISM AT EACH AND EVERY DOWNSPOUT CONNECTED TO THE COLLECTION SYSTEM.

TYPICAL ROOF DRAIN DETAIL

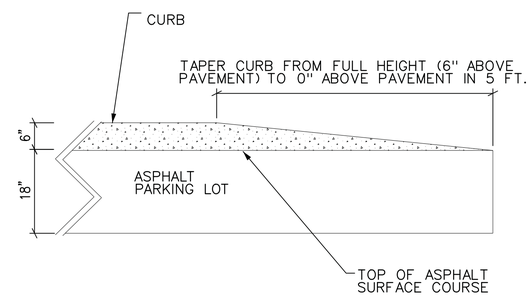
N.T.S | 03



NOTE: FINAL OVERALL DIMENSIONS SHALL BE DETERMINED BY THE SIZE OF EQUIPMENT TO BE INSTALLED.

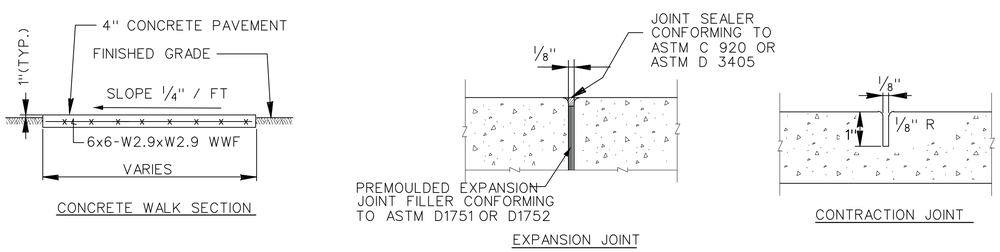
EQUIPMENT PAD

N.T.S. | 03



TAPERED CURB

N.T.S | 02

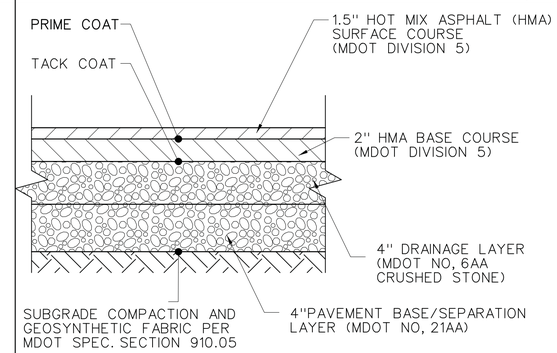


NOTES:

1. CONTRACTION JOINTS AT 6' INTERVALS.
2. EXPANSION JOINTS AT 50' INTERVALS OR WHERE WALK ABUTS BUILDING OR OTHER CONCRETE.
3. FOR THE NEW SIDEWALK CONNECTING THE EXISTING "E" LOT TO THE CDC FACILITY PROVIDE 4-INCH AGGREGATE BASE.
4. ALL JOINTS SHALL BE TOOLED JOINTS

SIDEWALK

N.T.S | 04



NOTES:

1. THE NO. 6AA AGGREGATE DRAINAGE LAYER MAY BE "CHOKED OFF" WITH MDOT NO. 34R OR 34G CRUSHED STONE TO FACILITATE PAVING OPERATIONS.

ASPHALT PAVEMETN

N.T.S | 01

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US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC Barge Waggoner Sumner & Cannon, Inc.

DESIGNED BY: Y. YERETZIAN | DATE: 16 JUN 2011
DWN BY: A. MCGUIRE | CKD BY: S. SCHULTZ | SOLICITATION NO.:
SUBMITTED BY: BWSC | CONTRACT NO.: W912QR-11-C-0014
PLOT SCALE: 2:1 UNLESS NOTED | PLOT DATE: 7/20/2011 | FILE NUMBER:
SIZE: ANSI D | FILE NAME: DETAILS_CDC-C-501.DGN

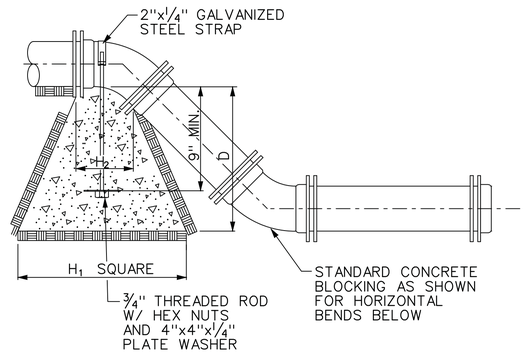
BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

DETAILS

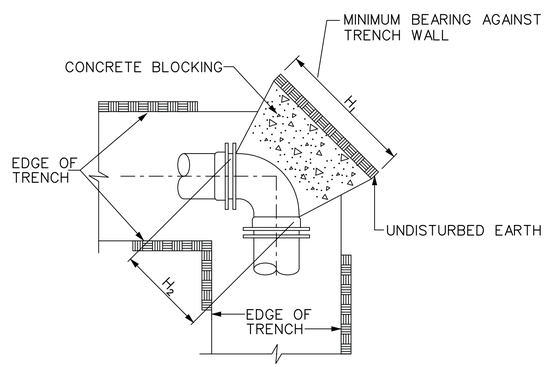
SHEET IDENTIFICATION
C-501
SHEET 11 OF 15

$DGNS $TIME$
$DATE$

DPW WORK ORDER # IMA325181J
ERC # 11-023



VERTICAL BENDS

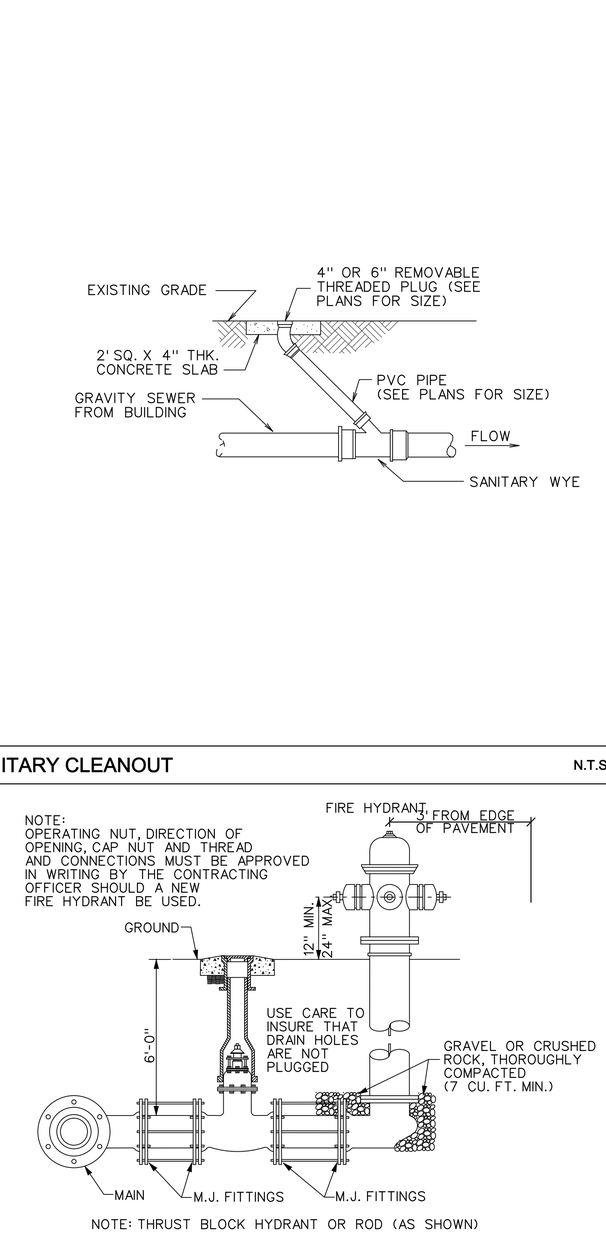


HORIZONTAL BENDS

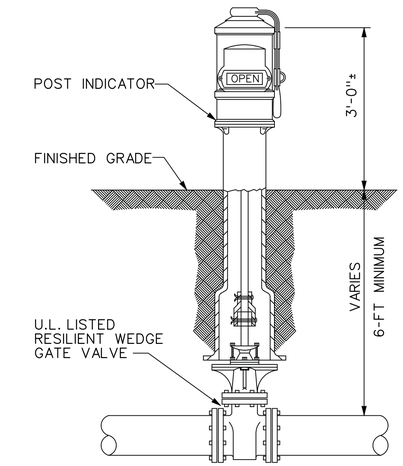
TABLE OF DIMENSIONS FOR CONCRETE BLOCKING																											
SIZE	TEES, PLUGS & CROSSES					90° BENDS					45° BENDS					22½° BENDS					1 1¼° BENDS					SIZE
PIPE	H_1	H_2	V	D	CU. FT.	H_1	H_2	V	D	CU. FT.	H_1	H_2	V	D	CU. FT.	H_1	H_2	V	D	CU. FT.	H_1	H_2	V	D	CU. FT.	PIPE
3"&4"	24"	12"	12"	18"	2.3	24"	12"	12"	18"	2.3	18"	8"	12"	18"	1.6	18"	8"	12"	18"	1.6	18"	8"	12"	18"	1.6	3"&4"
6"	24"	16"	18"	18"	3.5	30"	16"	18"	18"	4.1	24"	10"	16"	18"	3.2	24"	10"	16"	18"	3.2	24"	10"	16"	18"	3.2	6"
8"&10"	48"	24"	18"	24"	7.2	54"	32"	24"	18"	10.3	24"	18"	21"	18"	4.6	24"	18"	21"	18"	4.6	24"	18"	21"	18"	4.6	10"

THRUST BLOCKS N.T.S 05

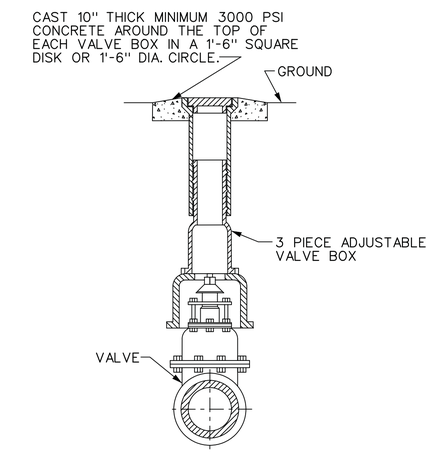
SANITARY CLEANOUT N.T.S 04



TYPICAL FIRE HYDRANT SETTING N.T.S 03



POST INDICATOR VALVE N.T.S. 02



TYPICAL VALVE BOX SETTING N.T.S. 01

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US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC
BARRIE WOODWORTH BUNNER & SANDERS, INC.

DESIGNED BY: Y. YEREETZIAN | DATE: 16 JUN 2011
DWN BY: A. MCGUIRE | CKD BY: S. SCHULTZ | SOLICITATION NO.:
SUBMITTED BY: BWSC | CONTRACT NO.: P2 #263234
PLOT SCALE: AS NOTED | PLOT DATE: 7/8/2011 | FILE NUMBER:
SIZE: ANSI D | FILE NAME: DETAILS_CDC-C-502.DGN

BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

DETAILS

SHEET IDENTIFICATION
C-502
SHEET 12 OF 15

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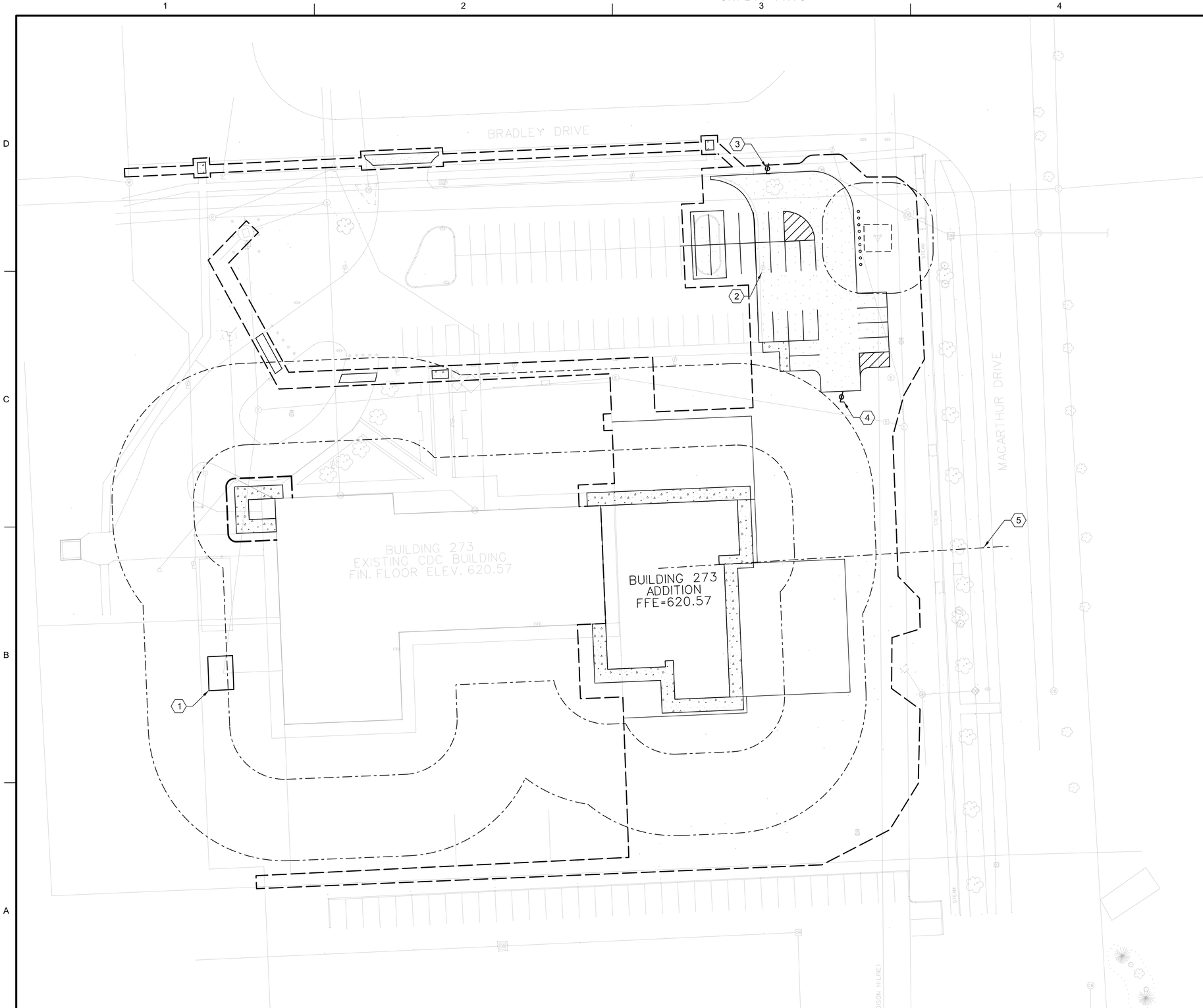
7/8/2011 5:16:50 PM

DPW WORK ORDER # IMA325181J
ERC # 11-023



KEYED NOTES:

1. EXISTING PAD MOUNTED TRANSFORMER.
2. EXISTING PARKING LOT LIGHT TO BE RELOCATED.
3. RELOCATED PARKING LOT LIGHT.
4. PROVIDE NEW PARKING LOT LIGHT FIXTURE, POLE AND BASE TO MATCH EXISTING.
5. CATV CONDUIT

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N

30' 15' 0' 30' 60'
SCALE: 1 INCH = 30 FEET

SCALE: 1" = 30'-0"

01

ELECTRICAL SITE PLAN

US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

DESIGNED BY: J. SLONE
DWN BY: J. SLONE
CKD BY: R. SIEBERTZ
SUBMITTED BY: BWSC
SOLICITATION NO.:
CONTRACT NO.: P2 #353254
DATE: 16 JUN 2011
FILE NUMBER:
PLOT SCALE: 1:1
PLOT DATE:
SIZE: ANSI D
FILE NAME: DETARS_CDC-E-101.DGN

BWSC BARGER WARTHMAN BUHNER & CANNON, INC.

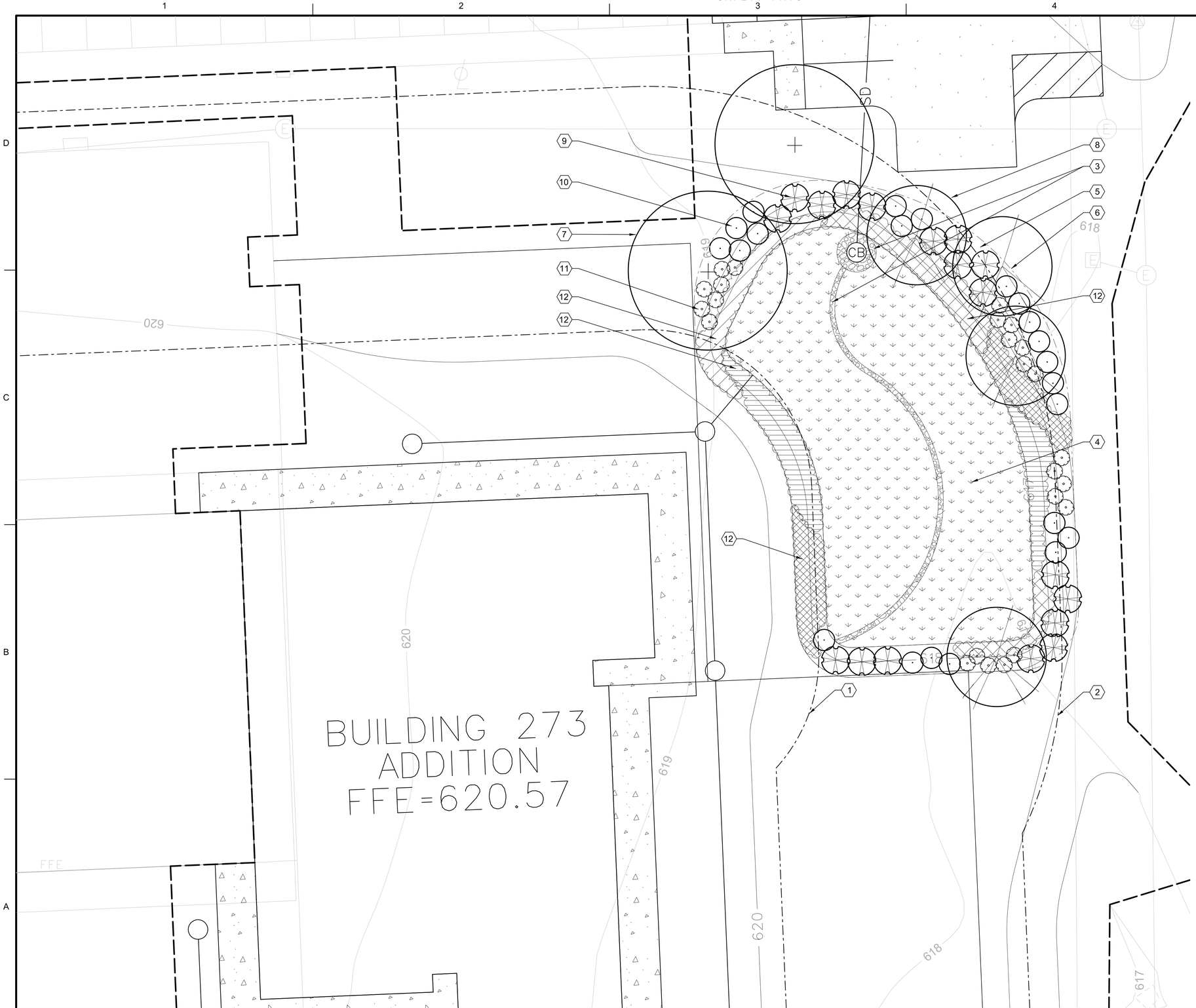
BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

ELECTRICAL SITE PLAN

SHEET IDENTIFICATION
E-101
SHEET XX OF 15

$DGNS $TIMES
$DATES

DPW WORK ORDER # IMA325181J
ERC # 11-023



KEYED NOTES:

1. 33-FT AT/FP UNOBSTRUCTED DISTANCE
2. 82-FT AT/FP STANDOFF DISTANCE
3. 4-8" ROUNDED RIVER STONE - SEE DETAIL 04/L-501
4. WET MEADOW / WATER TOLERANT PLANT MIX - AREA SHALL INCLUDE CONTAINER PLANTS SPACED AT 24" ON CENTER, MINIMUM CONTAINER SIZE SHALL BE 4 INCH POTS.
5. SHRUB AND GROUND COVER AREAS SHALL CONTAIN STONE MULCH.
6. EDGE OF PLANTING BED
7. CANOPY / SHADE TREE
8. ORNAMENTAL / FLOWERING TREE
9. LARGE SHRUB
10. MEDIUM SHRUB
11. SMALL SHRUB
12. GROUND COVER / PERENNIALS

NOTES:

A. REFER TO CIVIL DRAWINGS FOR GRADING AND STORM DRAINAGE DESIGN.

B. REFER TO CDC AND DTA IDG STANDARDS FOR LANDSCAPING REQUIREMENTS AND PLANT SELECTION. ALL PLANTS SHALL BE NATIVE TO MICHIGAN AND BE LOCALLY HARDY PLANTS THAT DO NOT REQUIRE SUPPLEMENTAL IRRIGATION.

C. REFER TO SPECIFICATIONS FOR RECOMMENDED RAIN GARDEN / BUTTERFLY GARDEN PLANT LIST.

D. INLET GRATE SHALL BE 6 INCHES ABOVE BOTTOM OF BASIN, AND SIZED TO CONTROL SPREAD FOR THE DESIGN STORM FREQUENCY.

E. IRRIGATION IS NOT REQUIRED FOR ALL LANDSCAPE AND TURF AREAS.

F. WEED CONTROL FABRIC SHALL BE PLACED UNDER ALL LANDSCAPED AREAS.

G. MULCH WITHIN THE RAIN GARDEN / BUTTERFLY GARDEN AREA SHALL BE 1-3" ROUNDED RIVER STONE.

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N

30' 15' 0' 30' 60'
SCALE: 1 INCH = 10 FEET

SCALE: 1" = 10'-0"

01

LANDSCAPE PLAN

US Army Corps of Engineers®
Louisville District

MARK	DESCRIPTION	DATE	APPR.	MARK	DESCRIPTION	DATE	APPR.

DESIGNED BY: J. SALYER
DWN BY: J. SALYER
CKD BY: M. STOVALL
SUBMITTED BY: BWSC
DATE: 16 JUN 2011
SOLICITATION NO.:
CONTRACT NO.: P2 #353254
FILE NUMBER:
PLOT SCALE: 1:1
PLOT DATE: 7/20/2011
FILE NAME: DETARS_CDC-L-101.DGN
AS NOTED
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC
BARGE WAGONER SUNNER & DAWSON, INC.

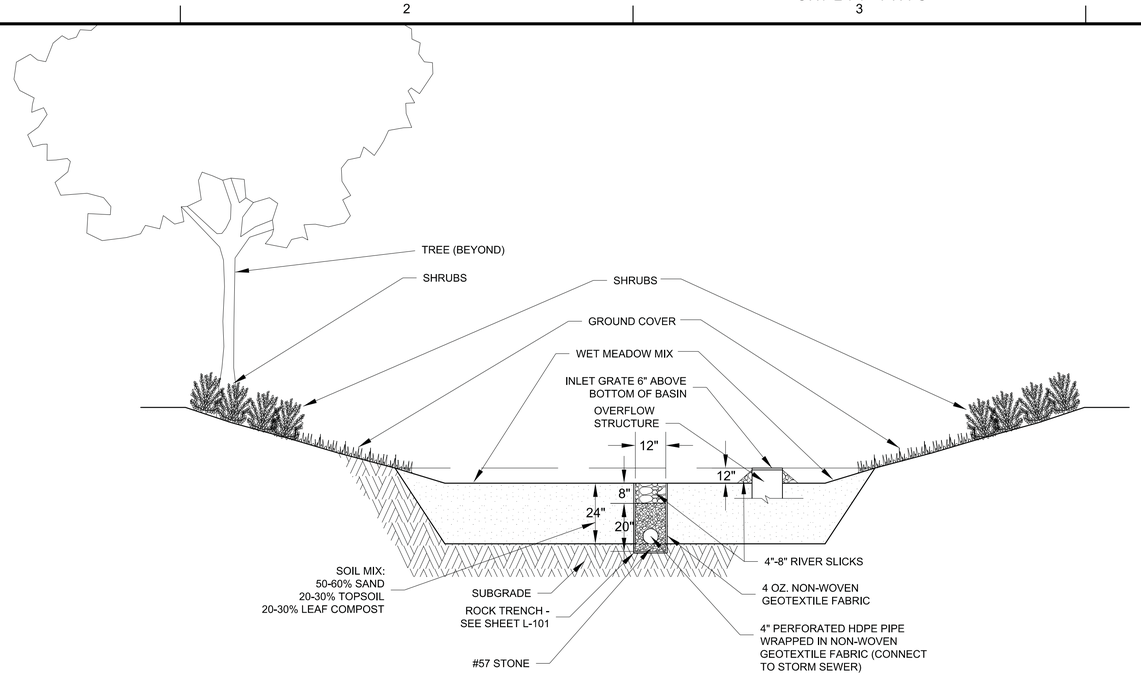
BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

LANDSCAPE PLAN

SHEET IDENTIFICATION
L-101
SHEET 14 OF 15

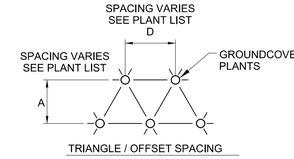
DGN $DATE$ $TIME$

DPW WORK ORDER # IMA325181J
ERC # 11-023



RAIN GARDEN SECTION

N.T.S | 04

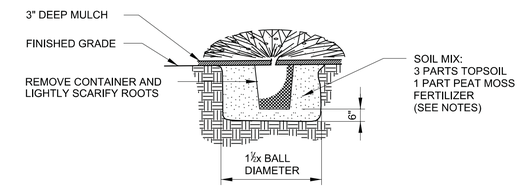


TRIANGLE / OFFSET SPACING

PLANT SPACING (D)	ROW SPACING (A)
6" O.C.	5.20"
8" O.C.	6.93"
10" O.C.	8.66"
12" O.C.	10.4"
15" O.C.	13.0"
18" O.C.	15.6"
24" O.C.	20.8"
30" O.C.	26.0"
36" O.C.	30.0"

TYPICAL GROUND COVER SPACING DETAIL

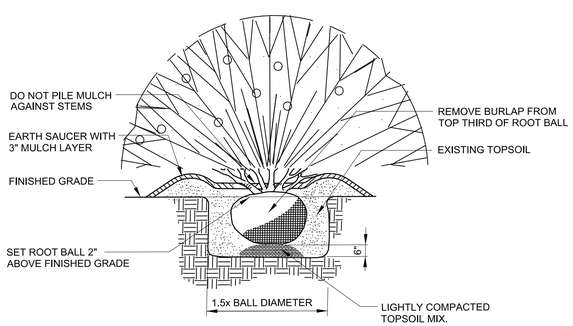
N.T.S | 02



7" MIN. FOR 2¼" POT
8" MIN. FOR PINT
12" MIN FOR 1 GAL. POT
OR HEAVY CLUMP

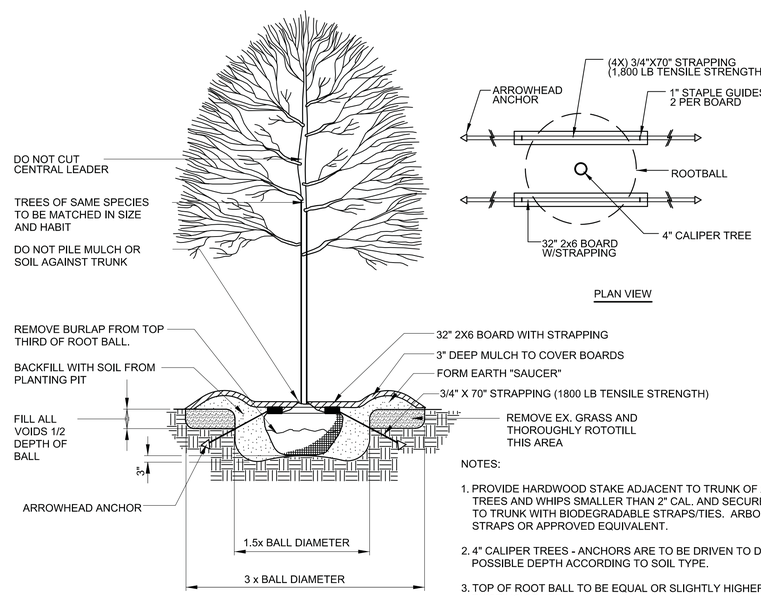
TYPICAL GROUND COVER PLANTING DETAIL

N.T.S | 01



TYPICAL SHRUB PLANTING DETAIL

N.T.S | 05



NOTES:

1. PROVIDE HARDWOOD STAKE ADJACENT TO TRUNK OF ALL TREES AND WHIPS SMALLER THAN 2" CAL, AND SECURE STAKE TO TRUNK WITH BIODEGRADABLE STRAPS/TIES. ARBORTIE STRAPS OR APPROVED EQUIVALENT.
2. 4" CALIPER TREES - ANCHORS ARE TO BE DRIVEN TO DEEPEST POSSIBLE DEPTH ACCORDING TO SOIL TYPE.
3. TOP OF ROOT BALL TO BE EQUAL OR SLIGHTLY HIGHER THAN EXISTING GRADE.
4. DO NOT PIERCE ROOT BALL WITH STAKES.
5. PRUNE TREE UNDER DIRECTION OF LANDSCAPE ARCHITECT.
6. SUBMIT ALTERNATE TREE DETAIL TO LANDSCAPE ARCHITECT FOR APPROVAL, PRIOR TO STAKING TREES.
7. ARROWHEAD ANCHOR TO BE AS MANUFACTURED BY TREE FROG ENVIRONMENTAL PRODUCTS (407-362-1030) OR ARBORBRACE (305-992-4104), OR APPROVED EQUAL.

TYPICAL TREE PLANTING DETAIL

N.T.S | 03

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US Army Corps of Engineers®
Louisville District

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DWN BY: J. SALYER
CKD BY: M. STOVALL
SUBMITTED BY: BWSC
DATE: 16 JUN 2011
SOLICITATION NO.:
CONTRACT NO.: P2 #330234
PLOT SCALE: AS NOTED
PLOT DATE: 1
FILE NUMBER:
SIZE: ANSI D
FILE NAME: DETAILS_CDC-L-501.DGN

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
LOUISVILLE, KENTUCKY

BWSC
Barge Waggoner Sumner & Cannon, Inc.

BUILD ADDITION - B273
CHILD DEVELOPMENT CENTER (CDC)
DETROIT ARSENAL, WARREN, MICHIGAN

LANDSCAPE DETAILS

SHEET IDENTIFICATION
L-501
SHEET 15 OF 15

DGN $TIME$
$DATE$

DPW WORK ORDER # IMA325181J
ERC # 11-023

APPENDIX K
Fuel Cost Information

The following utility rates for this installation are provided for design

Electrical:
Demand Charge - $ 14.99 per kilowatt (kW)

Energy Charge - $ 0.05 per kilowatt-hour (kWh) Blended Rate - $ 0.08 per kilowatt-hour (blended annual energy and demand cost)

Natural Gas:
Commodity Charge Rate - $ 8.86 per thousand cubic feet (KCF)

Water:
Commodity Charge Rate - $ 1.958 per hundred cubic feet (CCF)

Sewer:
Commodity Charge Rate - $ 1.917 per hundred cubic feet (CCF)

Purchased/Central Steam:
Not available or Applicable

Purchased High Temperature Water:
Not available or Applicable

Purchased Chilled Water:
Not available or Applicable

APPENDIX L
LEED Project Credit Guidance

APPENDIX L

LEED Project Credit Guidance (DEC 10)

This spreadsheet indicates Army required credits, Army preferred credits, project-specific ranking of individual point preferences, assumptions guidance for individual credits, and references to related language in the RFP for individual credits.

LEED Credit Paragraph	LEED Project Credit Guidance	**Army Guidance:** Required - Preferred - Avoid	**Project Preference Ranking**: (1=most preferred, blank=no preference, X=preference not applicable to this credit, Rqd=required)	
PAR	**FEATURE**			**REMARKS**
SUSTAINABLE SITES				
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
SS1	Site Selection		X	See paragraph LEED CREDITS COORDINATION.

SS2	Development Density & Community Connectivity - OPTION 1 DENSITY		X	See paragraph LEED CREDITS COORDINATION.
	Development Density & Community Connectivity - OPTION 2 CONNECTIVITY		X	See paragraph LEED CREDITS COORDINATION.
SS3	Brownfield Redevelopment		X	See paragraph LEED CREDITS COORDINATION.
SS4.1	Alternative Transportation: Public Transportation Access		X	See paragraph LEED CREDITS COORDINATION.
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	Pref		Assume that non-transient building occupants are NOT housed on Post unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1			Requires provision of vehicles, which cannot be purchased with construction funds. Assume Government will not provide vehicles unless indicated otherwise. Assume that 50% of GOV fleet is NOT alternative fuel vehicles unless indicated otherwise.
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	Pref		
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3			Requires provision of vehicle refueling stations. Installation must support type of fuel and commit to maintaining/supporting refueling stations.
SS4.4	Alternative Transportation: Parking Capacity	Pref		

SS5.1	Site Development: Protect or Restore Habitat			
SS5.2	Site Development: Maximize Open Space	Pref		Assume AGMBC option for aggregated open space at another location on the installation is not available to the project unless indicated otherwise.
SS6.1	Stormwater Design: Quantity Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS6.2	Stormwater Design: Quality Control	Pref		See paragraph STORMWATER MANAGEMENT.
SS7.1	Heat Island Effect: Non-Roof			
SS7.2	Heat Island Effect: Roof	Pref		Coordinate with nearby airfield requirements, which may preclude this credit.
SS8	Light Pollution Reduction	Pref		
WATER EFFICIENCY				
WEPR1	Water Use Reduction (Version 3 only)	Rqd	Rqd	All LEED prerequisites are required to be met.
WE1.1	Water Efficient Landscaping: Reduce by 50%	Pref		See paragraph IRRIGATION. Project must include landscaping to be eligible for this credit.
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	Pref		Project must include landscaping to be eligible for this credit.
WE2	Innovative Wastewater Technologies - OPTION 1			
WE2	Innovative Wastewater Technologies - OPTION 2			
WE3	Water Use Reduction	Pref		See paragraph BUILDING WATER USE REDUCTION.

ENERGY AND ATMOSPHERE				
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR2	Minimum Energy Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EA1	Optimize Energy Performance	Rqd	1	Earning of LEED EA1 points as indicated in paragraph ENERGY CONSERVATION, as a minimum, is required.
EA2.1	On-Site Renewable Energy	Pref		See paragraph ENERGY CONSERVATION.
EA3	Enhanced Commissioning	Rqd		See paragraph COMMISSIONING. The Commissioning Authority may be provided through the Design-Build Contractor only if in accordance with USGBC Credit Interpretation Ruling (CIR) dated 9/15/06. Commissioning Authority activities begin during design phase and continue well beyond beneficial occupancy. Assume Government will not provide CxA post-occupancy activities unless indicated otherwise.
EA4	Enhanced Refrigerant Management			
EA5	Measurement & Verification			Assume Government will not provide post-occupancy activities unless indicated otherwise.
EA6	Green Power		X	See paragraph LEED CREDITS COORDINATION.

MATERIALS AND RESOURCES				
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Coordinate with Installation during design development on collection service and receptacles.
MR1	Building Reuse			
MR2.1	Construction Waste Management: Divert 50% From Disposal	Pref		See paragraph CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.
MR2.2	Construction Waste Management: Divert 75% From Disposal	Pref		
MR3	Materials Reuse			
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	Pref		See paragraph RECYCLED CONTENT.
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	Pref		
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally			
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally			

MR6	Rapidly Renewable Materials	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS and paragraph FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM.
MR7	Certified Wood	Pref		See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS.
INDOOR ENVIRONMENTAL QUALITY				
EQPR1	Minimum IAQ Performance (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met.
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	Rqd	Rqd	All LEED prerequisites are required to be met. Assume all buildings are smoke free unless indicated otherwise (family housing, barracks and other lodging are facility types where smoking may be permitted in some cases). Except where indicated otherwise, provide an outdoor designated smoking area (with signage but no structure) which will be at least 50 feet from common points of ingress/egress, building air intakes and operable windows. Designated smoking area will not be located in an area that is commonly used by nonsmokers.
EQ1	Outdoor Air Delivery Monitoring	Pref		
EQ2	Increased Ventilation			
EQ3.1	Construction IAQ Management Plan: During Construction	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	Pref		See paragraph CONSTRUCTION IAQ MANAGEMENT.

EQ4.1	Low Emitting Materials: Adhesives & Sealants	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.2	Low Emitting Materials: Paints & Coatings	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.3	Low Emitting Materials: Carpet/Flooring Systems	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	Pref		See paragraph LOW-EMITTING MATERIALS.
EQ5	Indoor Chemical & Pollutant Source Control	Pref		System requiring weekly cleaning to earn this credit is not a permitted option unless indicated otherwise.
EQ6.1	Controllability of Systems: Lighting			
EQ6.2	Controllability of Systems: Thermal Comfort			
EQ7.1	Thermal Comfort: Design	Rqd		See paragraph HEATING, VENTILATING AND AIR CONDITIONING.
EQ7.2	Thermal Comfort: Verification			Project must earn credit EQ7.1 to be eligible for this credit. Assume Government will not provide post-occupancy activities unless indicated otherwise.
EQ8.1	Daylight & Views: Daylight 75% of Spaces	Pref		See paragraph DAYLIGHTING.
EQ8.2	Daylight & Views: Views for 90% of Spaces	Pref		
INNOVATION & DESIGN PROCESS				
IDc1.1	Innovation in Design			See paragraph INNOVATION AND DESIGN CREDITS. Assume Government will not provide any activities associated with ID credits.
IDc1.2	Innovation in Design			
IDc1.3	Innovation in Design			
IDc1.4	Innovation in Design			
IDc2	LEED Accredited Professional	Rqd	Rqd	LEED AP during design

				and construction is required.
REGIONAL PRIORITY CREDITS (Version 3 only)				See paragraph LEED CREDITS COORDINATION.

APPENDIX M
LEED Owner's Project Requirements

Not Used

APPENDIX N
LEED Requirements for Multiple Contractor Combined Projects

(Not Applicable)

APPENDIX O
LEED Strategy Tables

LEED Credit Paragraph	**LEED Multiple Contractor Responsibilities Table**	CTR Substitution Permitted	**Required Points Strategy**	NIC=Not in Contract N/A=Not Applicable R=Required
PROJECT: Detroit Arsenal CDC Addition				
PAR	**FEATURE**			**REMARKS**
CATEGORY 1 – SUSTAINABLE SITES				
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	NO	R	Required.
SS1	Site Selection	NO	1	
SS2	Development Density & Community Connectivity	N/A	0	Project site does not comply with requirements.
SS3	Brownfield Redevelopment	N/A	0	Not Applicable to the scope of the project.
SS4.1	Alternative Transportation: Public Transportation Access	YES		
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	NO		Not Allowed
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 1	NO		Not Allowed
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 2	No		Not Allowed
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles - OPTION 3	NO		Not Allowed
SS4.4	Alternative Transportation: Parking Capacity	NO		Not Applicable to the scope of the project.
SS5.1	Site Development: Protect or Restore Habitat	NO	0	Not Applicable to the scope of the project.
SS5.2	Site Development: Maximize Open Space	YES		
SS6.1	Stormwater Design: Quantity Control	NO	1	Required.
SS6.2	Stormwater Design: Quality Control	NO	1	Required.
SS7.1	Heat Island Effect: Non-Roof	YES		
SS7.2	Heat Island Effect: Roof	NO	1	Required.
SS8	Light Pollution Reduction	NO	1	Required.
CATEGORY 2 – WATER EFFICIENCY				
WEPR1	**Water Use Reduction (v3 only)**	**NIC**	**N/A**	**Building CTR responsible.**
WE1	Water Efficient Landscaping: Reduce by 50% OPTION 1	NO	1	Required.
WE1	Water Efficient Landscaping: No Potable Water Use or No Irrigation OPTION 2	NO	1	Required.

LEED Credit Paragraph	**LEED Multiple Contractor Responsibilities Table**	CTR Substitution Permitted	**Required Points Strategy**	NIC=Not in Contract N/A=Not Applicable R=Required
PROJECT: Detroit Arsenal CDC Addition				
PAR	**FEATURE**			**REMARKS**
WE2	Innovative Wastewater Technologies - OPTION 1	NO		Not Applicable to the scope of the project.
WE2	Innovative Wastewater Technologies - OPTION 2	NO		Not Applicable to the scope of the project.
WE3	Water Use Reduction	NIC	2	Required by ECB 2011-1.
CATEGORY 3 – ENERGY AND ATMOSPHERE				
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	NO	R	Required.
EAPR2	Minimum Energy Performance (PREREQUISITE)	NIC	R	Required.
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	NIC	R	Required.
EA1	Optimize Energy Performance	YES	15	Required by ECB 2011-1.
EA2	On-Site Renewable Energy	YES		
EA3	Enhanced Commissioning	NO	2	Required by ECB 2011-1.
EA4	Enhanced Refrigerant Management	YES		
EA5	Measurement & Verification	NO	3	Required by ECB 2011-1.
EA6	Green Power	YES		
CATEGORY 4 – MATERIALS AND RESOURCES				
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	NIC	R	Required.
MR1	Building Reuse	N/A		Not Applicable to the scope of the project.
MR2.1	Construction Waste Management: Divert 50% From Disposal	NO	1	Required.
MR2.2	Construction Waste Management: Divert 75% From Disposal	YES		
MR3.1	Materials Reuse: 5%	N/A	0	Not Applicable to the scope of the project.
MR3.2	Materials Reuse: 10%	N/A	0	Not Applicable to the scope of the project.

LEED Credit Paragraph	**LEED Multiple Contractor Responsibilities Table**	CTR Substitution Permitted	**Required Points Strategy**	NIC=Not in Contract N/A=Not Applicable R=Required
PROJECT: Detroit Arsenal CDC Addition				
PAR	**FEATURE**			**REMARKS**
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	NO	1	Required.
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	YES		
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally	YES	1	
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally	YES		
MR6	Rapidly Renewable Materials	YES		Correlates to USDA BioPreferred requirements. See other sections of the RFP.
MR7	Certified Wood	NO	1	Required.
CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY				
EQPR1	Minimum IAQ Performance (PREREQUISITE)	NIC	R	Required.
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	NO	R	
EQ1	Outdoor Air Delivery Monitoring	YES		
EQ2	Increased Ventilation	YES		
EQ3.1	Construction IAQ Management Plan: During Construction	NO	1	Required.
EQ3.2	Construction IAQ Management Plan: Before Occupancy	NO	1	Required.
EQ4.1	Low Emitting Materials: Adhesives & Sealants	NO	1	Required.
EQ4.2	Low Emitting Materials: Paints & Coatings	NO	1	Required.
EQ4.3	Low Emitting Materials: Carpet/Flooring Systems	NO	1	Required.
EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	NO	1	Required.
EQ5	Indoor Chemical & Pollutant Source Control	NO	0	Walk-off mats are not allowed in Activity Rooms.
EQ6.1	Controllability of Systems: Lighting	YES		
EQ6.2	Controllability of Systems: Thermal Comfort	YES		
EQ7.1	Thermal Comfort: Design	NO	1	Required.
EQ7.2	Thermal Comfort: Verification	NO	0	Not allowed.

LEED Credit Paragraph	**LEED Multiple Contractor Responsibilities Table**	CTR Substitution Permitted	**Required Points Strategy**	NIC=Not in Contract N/A=Not Applicable R=Required
PROJECT: Detroit Arsenal CDC Addition				
PAR	**FEATURE**			**REMARKS**
EQ8.1	Daylight & Views: Daylight 75% of Spaces	YES		
EQ8.2	Daylight & Views: Views for 90% of Spaces	YES		
CATEGORY 6 – INNOVATION IN DESIGN				
IDc1.1	Innovation in Design	YES		TBD by CTR.
IDc1.2	Innovation in Design	YES		TBD by CTR.
IDc1.3	Innovation in Design	YES		TBD by CTR.
IDc1.4	Innovation in Design	YES		TBD by CTR.
IDc2	LEED Accredited Professional	NO	1	Required.
CATEGORY 7 – REGIONAL PRIORITY CREDITS (v3 only)				
		YES		TBD by CTR.
		YES		TBD by CTR.
		YES		TBD by CTR.
		YES		TBD by CTR.
	TOTAL		41	

APPENDIX P

LEED Registration of Army Projects

15 April 2010

Number of Registrations
Each building must be registered separately, except multiple instances of a standard building on a shared site may be registered as a single project. If a single registration for multiple buildings is chosen, all buildings under the single registration must earn exactly the same points. Do not register buildings that are exempt from a specific LEED achievement requirement.

Typical Registration Procedure
1. Login, complete the online registration form (see guidance below) at the GBCI LEED Online website http://www.gbci.org/DisplayPage.aspx?CMSPageID=174 and submit it online.
2. Pay the registration fee via credit card (USACE staff: credit card PR&C is funded by project design or S&A funds).
3. GBCI will follow up with a final invoice, the LEED-online passwords and template information.
4. The individual who registers the project online is, by default, the Project Administrator.

Completing the Registration Form

BEFORE YOU BEGIN:
Create a personal account with USGBC if you do not have one.
You will need the following information:
Project name as it appears in P2 (obtain from USACE Project Manager)
Building number/physical address of project
Zip code for Installation/project location
Anticipated construction start and end dates
Total gross area all non-exempt buildings in registration
Total construction cost all non-exempt buildings only (see Project Details Section instructions below)

ACCOUNT/LOGIN INFORMATION
1. The person registering the project **must have an account with USGBC** (login and password) to complete the form. Go to http://www.gbci.org/ , click on “register a project” at the drop-down menu for project certification (at the top of the page) and select “register now for LEED 2009” to start the project registration process. If you have an account, login with your email address and password and select “register new project” to proceed. If you do not have an account, you may select “register a new account” and follow the instructions. It is recommended that you create an account separately on the USGBC website before you start the form. IMPORTANT: USACE team members are members of USGBC and are eligible for Member prices. USACE team members registering projects should be sure to include the USACE Corporate Access ID in their personal account profile (if you do not have it contact richard.l.schneider@usace.army.mil or judith.f.milton@usace.army.mil for the number).
2. The Account/Login Information section is filled out by the person registering the project. It may be a Contractor or a USACE staff member.

ELIGIBILITY SECTION
Follow directions (accepting the terms and conditions)
Review your profile information and make corrections if needed

RATING SYSTEM SELECTION SECTION
Select single project registration and I know which rating system.
Select the rating system - currently only LEED-NC and LEED for Homes are approved for Army use without special approval.
LEED Minimum Program Requirements: select YES

RATING SYSTEM RESULTS SECTION

Confirm selected rating system.

PROJECT INFORMATION SECTION

Project Title: Begin the project title with a one-word identifier for the Installation. Do not include the word "Fort". After this match the project name used in P2 (contact the USACE Project Manager for this information) and identify the building being registered. Example: "Stewart 4th IBCT - DFAC".
Project Address 1 and 2: This is the physical location of the project. Provide building number, street address, block number or whatever is known to best describe the location of the project on the Installation.
Project City: Installation Name
State, Country, Zip Code: Self-explanatory
Anticipated Construction Start and End Dates: Self-explanatory – give your best guess if unknown. Note that required data entry format is: 1 or 2 digit month/1 or 2 digit date/4 digit year (example 3/23/2010)
Gross Square Footage: Provide total area all buildings in LEED project. Exclude the area of any buildings that are exempt from the LEED achievement requirement (for example, exclude an unconditioned storage shed to be constructed with a barracks complex).
Is Project Confidential: Indicate NO except, if project has security sensitivity (elements that are FOUO or higher security), indicate YES.
Notification of Local Chapter: Indicate NO unless Government/USACE Project Manager requests you to indicate YES.
Anticipated Project Type: Select the most appropriate option from the drop-down menu.
Anticipated Certification Level: Select the applicable option from the drop-down menu (Silver is the usual level).

PROJECT OWNER INFORMATION SECTION

Project Owner First Name, Last Name, email, phone, address: The Project Owner is the USACE Project Manager. Obtain this info from the USACE Project Manager.
Organization: U.S. Army Corps of Engineers. This field MUST be completed this way because it will be used as a search field by higher HQ to find all USACE registered projects. You may supplement it with district name at the end but DO NOT revise or use an acronym.
May we publish Owner information: Indicate NO
Owner Type: Pick Federal Government from drop-down menu.
Project Owner Assertion: Check the box

PAYMENT INFORMATION

Self-explanatory

APPENDIX Q
REV 2.1 – 30 SEP 2010
AREA COMPUTATIONS

Computation of Areas: Compute the "gross area" and "net area" of facilities (excluding family housing) in accordance with the following subparagraphs:

(1) Enclosed Spaces: The "gross area" is the sum of all floor spaces with an average clear height ≥6'-11" (as measured to the underside of the structural system) and having perimeter walls which are ≥4'-11". The area is calculated by measuring to the exterior dimensions of surfaces and walls.

(2) Half-Scope Spaces: Areas of the following spaces shall count as one-half scope when calculating "gross area":

- Balconies
- Porches
- Covered exterior loading platforms or facilities
- Covered but not enclosed spaces, canopies, training, and assembly areas
- Covered but not enclosed passageways and walks
- Open stairways (both covered and uncovered)
- Covered ramps
- Interior corridors (Unaccompanied Enlisted Personnel Housing Only)

(3) Excluded Spaces: The following spaces shall be excluded from the "gross area" calculation:

- Crawl spaces
- Uncovered exterior loading platforms or facilities
- Exterior insulation applied to existing buildings
- Open courtyards
- Open paved terraces
- Uncovered ramps
- Uncovered stoops
- Utility tunnels and raceways
- Roof overhangs and soffits measuring less than 3'-0" from the exterior face of the building to the fascia

(4) Net Floor Area: Where required, "net area" is calculated by measuring the inside clear dimensions from the finish surfaces of walls. If required, overall "assignable net area" is determined by subtracting the following spaces from the "gross area":

- Basements not suited as office, special mechanical, or storage space
- Elevator shafts and machinery space
- Exterior walls
- Interior partitions
- Mechanical equipment and water supply equipment space
- Permanent corridors and hallways
- Stairs and stair towers
- Janitor closets
- Electrical equipment space
- Electronic/communications equipment space

RMS SUBMITTAL REGISTER INPUT FORM

CONTRACT NUMBER

DELIVERY ORDER

TITLE AND LOCATION

Button <-----Right click for Instructions

SECTION	PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL											CLASSIFICATION						REVIEWING OFFICE					
			01 - PRECON SUBMITTALS	02 - SHOP DRAWINGS	03 - PRODUCT DATA	04 - SAMPLES	05 - DESIGN DATA	06 - TEST REPORTS	07 - CERTIFICATES	08 - MFRS INSTRUCTIONS	09 - MFRS FIELD REPORT	10 - O&M DATA	11 - CLOSEOUT SUBMITTALS	FIO - FOR INFORMATION ONLY	GA - GOVERNMENT APPROVED	DA - DESIGNER OF RECORD APPROVAL	CR - CONFORMANCE REVIEW	DA / CR	DA / GA	DO - DISTRICT OFFICE	AO - AREA OFFICE	RO - RESIDENT OFFICE	PO - PROJECT OFFICE	DR - DESIGNER OF RECORD	AE - ARCHITECT / ENGINEER
00 72 00	52.236-13	Accident Prevention Plan	X														X				X				
00 73 00	1.11	Dev. From Accept. Design. No Deviation from Contract					X											X			X			X	
00 73 00	1.11	Dev. From Accepted Design - Deviates from Contract					X												X		X			X	
00 73 00	1.17	Supplemental Price Breakdown	X											X							X				
00 73 00	1.18	SSHO Qualifications	X												X						X				
01 10 00	5.2.3.1	(if concrete pavement) Joint Layout Plan with design drawings					X										X								
01 10 00	5.5.2	Building Envelope Sealing Performance Testing						X						X							X				
01 10 10	***	Tests as Req by Codes - DOR Develops Test Program						X						X							X			X	
01 10 00	5.8.3	BAS Review Information		X														X		X	X			X	
01 10 00	5.8.3	BAS Performance Verification Test						X						X							X			X	
01 10 00	5.8.4	Testing Adjusting and Balancing						X						X							X			X	
01 10 00	5.8.5	Commissioning						X						X							X			X	
01 10 00	6.15	Environmental As Required for Site Specific					X										X				X			X	
01 10 00	6.16	Permits as required for Site specific					X										X				X			X	
01 10 00	5.10.2	Fire Protection Tests						X	X					X							X			X	
01 32 01.00 10	3.4.1	Preliminary Project Schedule	X												X						X				
01 32 01.00 10	3.4.2	Initial Project Schedule	X												X						X				
01 32 01.00 10	3.4.3	Design Package Schedule	X												X						X				
01 32 01.00 10	3.6.1	Periodic schedule updates from the Contractor	X												X						X				
01 32 01.00 10	3.7	Time Extension Request (Schedule)	X												X						X				
01 33 00	1.8	Submittal Register - DOR Input Required	X												X						X			X	
01 33 00	1.8	Submittal Register Updates (Design Packages, etc.)	X												X						X			X	
01 33 00	1.3.1	Substitution of Manuf or Model Named in Proposal		X	X													X			X			X	
01 33 16	1.2	Identify Designer(s) of Record	X												X						X				
01 33 16	1.1.2 / 3.2.4	Fast Track Design Package(s)					X										X			X	X				
01 33 16	1.2	Identification of all Designers of Record	X														X				X				
01 33 16	3.2.1	Site and Utility Des Package, incl. Substantiation					X										X			X	X				
01 33 16	3.2.2/3.5	Interim Des Subm Package(s), incl. Substantiation					X										X			X	X				
01 33 16	3.5.1	Drawings					X										X			X	X				
01 33 16	3.5.2.2	Sitework Design Analyses					X										X			X	X				
01 33 16	3.5.2.3	Structural Design Analyses					X										X			X	X				
01 33 16	3.5.2.4	Security Design Analyses					X										X			X	X				
01 33 16	3.5.2.5	Architectural Design Analyses					X										X			X	X				
01 33 16	3.5.2.6	Mechanical Design Analyses					X										X			X	X				
01 33 16	3.5.2.7	Life Safety Design Analyses					X										X			X	X				
01 33 16	3.5.2.8	Plumbing Design Analyses					X										X			X	X				
01 33 16	3.5.2.9	Elevator Design Analyses (as Applicable)					X										X			X	X				
01 33 16	3.5.2.10	Electrical Design Analyses					X										X			X	X				
01 33 16	3.5.2.11	Telecommunications Design Analyses					X										X			X	X				
01 33 16	3.5.2.12	Cathodic Protection Design Analyses					X										X			X	X				
01 33 16	3.5.3	Geotechnical Investigations and Reports					X										X			X	X				
01 33 16	3.5.4	LEED Submittals					X										X			X	X				
01 33 16	3.5.5	Energy Conservation Documentation					X										X			X	X				
01 33 16	3.5.6	Specifications					X										X			X	X				
01 33 16	3.5.7	Building Rendering					X										X			X	X				
01 33 16	3.2.4/3.7	Final Des Submittal Package(s), incl. Substantiation					X										X			X	X				
01 33 16	3.7.5	DD Form 1354 (Transfer of Real Property)											X				X				X				
01 33 16	3.7	Independent Technical Review					X										X			X	X				
01 33 16	3.2.5/3.8	Design Complete Submittal Package(s)					X										X			X	X				
01 33 16	3.3.3	Design and Code Review Checklists					X										X			X	X				
01 33 16	A-2.0	SID - Interim and Final (as applicable)			X	X	X								X						X				
01 33 16	B-2.0	FFE (as Applicable)					X								X						X				
01 33 16	F-3.1.3	BIM Model and data					X										X			X	X				
01 33 29.00 06	1.4	LEED Implementation Plan	X												X									X	
01 33 29.00 06	1.3.1	LEED AP BD+C	X												X									X	
01 33 29.00 06		LEED Final Design Documentation	X												X									X	
01 33 29.00 06	1.3	LEED Correction Plan					X								X									X	
01 33 29.00 06		LEED Documentation Notebook											X		X									X	
01 33 29.00 06		LEED Plaque											X		X									X	
01 45 04.00 10	3.2	Design and Construction QC Plan	X														X				X				
01 57 20.00.10	1.2	Environmental Protection Plan	X														X				X				
01 57 23		Storm Water Inspection Reports for General Permit						X						X										X	
01 78 02.00 10	1.2.1	Final as-Built Drawings/ BIM Model											X		X										
01 78 02.00 10	1.2.3.11	Non-Hazardous Solid Waste Diversion Reports							X					X							X				
01 78 02.00 10	1.2.7	Provide final as-built CADD and BIM Model files											X		X						X				
01 78 02.00 10	1.2.9	Provide scans of all other docs in Adobe.pdf format											X		X						X				
01 78 02.00 10	1.3.1	Equip-in-Place list of all installed equip and cost											X		X						X				
01 78 02.00 10	1.3.2	Data on equip not addressed in O&M manuals											X		X						X				
01 78 02.00 10	1.3.3	Final as-built specs - electronic files											X		X						X				
01 78 02.00 10	1.4.2.1	Warranty management plan - FAR 52.246-21											X		X						X				
01 78 02.00 10	1.4.2.1	Certificates of Warranty for extended warranty items											X		X						X				
01 78 02.00 10	1.4.2.1	Contractor's POCs for implementing warranty process											X		X						X				
01 78 02.00 10	1.4.2.1	List of each warranted equip, item, feature or system											X		X						X				
01 78 02.00 10	1.5	See also Section 01 10 00 par. 5.8.4 and 5.8.5											X		X						X				
01 78 02.00 10	1.6.1.2	Equipment O&M Manuals - 1 electronic / 2 hard copies											X		X						X				
01 78 02.00 10	1.7	Field Training DVD Videos										X		X							X				
01 78 02.00 10	1.8	Pricing of CF/CI and GF/CI Property											X	X							X				

01 78 02.00 10	1.11	List of Completed Cleanup Items											X				X				X				
01 78 02.00 10	1.12	Interim Form DD 1354											X				X				X				
26 56 00	1.4.1.1	Luminaire drawings		X											X									X	
26 56 00	1.4.1.2	Poles		X											X									X	
26 56 00	1.6.2	Energy Efficiency			X									X										X	
26 56 00	2.2	Luminaires			X										X									X	
26 56 00	2.2.1	Lamps			X										X									X	
26 56 00	2.2.2	Ballasts			X										X									X	
26 56 00	2.3	Lighting contactor			X										X									X	
26 56 00	2.4	Time switch			X										X									X	
26 56 00	2.5	Photocell switch			X										X									X	
26 56 00	2.6.2	Steel poles			X										X									X	
26 56 00	2.7	Brackets			X									X										X	
26 56 00	1.4.2	Design Data for luminaires					X								X									X	
26 56 00	3.2	Operating test						X						X										X	
26 56 00	2.6.1	Concrete poles								X				X										X	
26 56 00		Fiberglass poles								X				X										X	
26 56 00		Operational Service										X		X										X	
31 11 00	3.6.1	Nonsaleable Materials			X									X										X	
31 23 00.00 20	1.6.1	Shoring and Sheeting Plan	X											X										X	
31 23 00.00 20	1.6.2	Dewatering work plan	X											X										X	
31 23 00.00 20		Borrow Site Testing						X							X									X	
31 23 00.00 20	3.14.2.1	Fill and backfill						X						X										X	
31 23 00.00 20	3.14.2.2	Select material						X						X										X	
31 23 00.00 20	3.14.2.3	Porous fill						X						X										X	
31 23 00.00 20	3.14.2.4	Density tests						X						X										X	
31 23 00.00 20	3.14.2.5	Moisture Content Tests						X						X										X	
31 31 16	3.3.6	Termiticide Application Plan			X										X									X	
31 31 16	2.1	Termiticides			X									X										X	
31 31 16	3.3.3	Foundation Exterior			X									X										X	
31 31 16	3.3.4	Utilities and Vents			X									X										X	
31 31 16	3.3.5	Crawl and Plenum Air Spaces			X									X										X	
31 31 16	3.1	Verification of Measurement			X									X										X	
31 31 16	3.4.1	Application Equipment			X									X										X	
31 31 16	1.6	Warranty			X									X										X	
31 31 16	2.1	Termiticides				X								X										X	
31 31 16	3.4.1	Equipment Calibration and Tank Measurement						X						X										X	
31 31 16	1.5.1	Soil Moisture						X						X										X	
31 31 16	1.3	Quality Assurance						X						X										X	
31 31 16	1.3.1	Qualifications							X					X										X	
32 05 33	2.4	Integrated Pest Management Plan	X												X									X	
32 05 33	1.6.1	Local/Regional Materials			X									X										X	
32 05 33	2.1	Fertilizer			X										X									X	
32 05 33		Hose			X									X										X	
32 05 33	2.3	Mulches Topdressing			X									X										X	
32 05 33	2.3.2	Organic Mulch Materials			X									X										X	
32 05 33	3.5.1	Maintenance inspection report							X					X										X	
32 05 33	3.5.2	Plant quantities							X						X									X	
32 05 33	1.7	Maintenance										X		X										X	
32 05 33	3.5.3	Tree, staking and guying removal											X	X										X	
32 11 26	2.4.1	Job-Mix Formula (JMF)			X									X										X	
32 11 26		Waybills and delivery tickets			X									X										X	
32 11 26	2.1.5	Sources of Aggregates			X									X										X	
32 11 26	2.1.5	Sources of Aggregates				X								X										X	
32 11 26	2.1.5	Sources of Aggregates						X						X										X	
32 11 26	2.2	Bituminous Materials						X						X										X	
32 11 26	1.4.1	Sampling and testing						X						X										X	
32 12 10		Waybills and Delivery Tickets			X									X										X	
32 12 10	3.7	Sampling and Testing						X						X										X	
32 12 17		Bituminous pavement				X								X										X	
32 12 17	1.3.2	Job-mix formula					X							X										X	
32 12 17	2.2	ASPHALT CEMENT BINDER					X							X										X	
32 12 17	2.3	MIX DESIGN					X							X										X	
32 12 17	2.4.1	Specific gravity test of asphalt						X						X										X	
32 12 17	2.4.1	Coarse aggregate tests						X						X										X	
32 12 17	2.4.1	Weight of slag test						X						X										X	
32 12 17	2.4.1	Percent of crushed pieces in gravel						X						X										X	
32 12 17	2.4.1	Fine aggregate tests						X						X										X	
32 12 17	2.4.1	Specific gravity of mineral filler						X						X										X	
32 12 17	2.4.1	Bituminous mixture tests						X						X										X	
32 12 17	3.5.2.1	Aggregates tests						X						X										X	
32 12 17	3.5.2.2	Bituminous mix tests						X						X										X	
32 12 17	3.5.2.3	Pavement courses						X						X										X	
32 16 13	2.1	Concrete			X									X										X	
32 16 13	3.8	Field Quality Control						X						X										X	
32 92 00.98		Laboratory Analysis			X									X										X	
32 92 00.98		Grass Seed			X									X										X	
32 92 00.98		Proposed Top Soil			X									X										X	
32 92 19	2.5.3	Wood cellulose fiber mulch			X									X										X	
32 92 19	2.4	Fertilizer			X									X										X	
32 92 19	2.2.3	Topsoil composition tests						X						X										X	
32 92 19	2.1	seed							X					X										X	
32 92 19	2.7	Erosion Control Materials								X				X										X	
32 93 00	1.4.3	State Landscape Contractor's License	X											X										X	
32 93 00	1.6	Time Restrictions and Planting Conditions	X											X										X	
32 93 00	1.8.1	Local/Regional Materials			X									X										X	
32 93 00	2.3.5	Peat			X									X										X	

32 93 00	2.3.8	Composted Derivatives			X									X										X	
32 93 00	2.3.11	Rotted Manure			X									X										X	
32 93 00	2.8.2	Organic Mulch Materials			X									X										X	
32 93 00	2.3.9	Gypsum			X									X										X	
32 93 00	2.7	Drainage Pipe			X									X										X	
32 93 00	2.8	Mulch			X									X										X	
32 93 00	2.9.1.2	Ground Stakes			X									X										X	
32 93 00	2.9.1.2	Ground Stakes			X									X										X	
32 93 00	2.5	Fertilizer			X									X										X	
32 93 00	1.5.2.4	Weed control fabric			X									X										X	
32 93 00	2.9.1	Staking Material			X									X										X	
32 93 00	2.9.7	Metal anchors			X									X										X	
32 93 00	2.11	Antidesiccants			X									X										X	
32 93 00	2.12	Erosion control materials			X									X										X	
32 93 00	1.4.4	Photographs			X									X										X	
32 93 00	2.8	Mulch				X									X									X	
32 93 00	1.4.1	Topsoil composition tests						X						X										X	
32 93 00	2.2.4	Topsoil composition tests						X						X										X	
32 93 00	1.4.5	Percolation Test						X						X										X	
32 93 00	1.8.3	Forest Stewardship Council (FSC) Certification							X					X										X	
32 93 00	1.4.2	Nursery certifications							X					X										X	
32 93 00	2.1.1	Nursery certifications							X					X										X	
32 93 00	1.8.2	Plastic Identification										X		X										X	
33 11 00	2.1.1	Piping Materials			X									X										X	
33 11 00	2.2	Water service line			X									X										X	
33 11 00		Hydrants			X									X										X	
33 11 00		Indicator posts			X									X										X	
33 11 00	2.2.2.1	Corporation stops			X									X										X	
33 11 00	2.1.2.6	Valve boxes			X									X										X	
33 11 00	2.2.2.10	Valve boxes			X									X										X	
33 11 00	2.2.2.12	Disinfection						X						X										X	
33 11 00	2.1	Water distribution main							X					X										X	
33 11 00	2.2	Water service line							X					X										X	
33 11 00		hydrants							X					X										X	
33 11 00	1.4	Delivery, storage, and handling								X				X										X	
33 11 00	3.1.1	Installation								X				X										X	
33 11 23	2.6	Valve box			X									X										X	
33 11 23	2.4	Valves			X									X										X	
33 11 23	2.7	Warning and identification tape			X									X										X	
33 11 23	2.2.2	Risers			X									X										X	
33 11 23	2.2.3	Transition fittings			X									X										X	
33 11 23	1.4.1	Welder's qualifications							X					X										X	
33 11 23	1.4.2	PE welder's qualifications							X					X										X	
33 11 23	1.4.1	Welder's identification symbols							X					X										X	
33 11 23	2.2.1	PE pipe and fittings								X				X										X	
33 30 00		Existing Conditions	X											X										X	
33 30 00	1.4.2	Drawings		X										X										X	
33 30 00	2.3.1	Precast concrete manhole		X										X										X	
33 30 00	2.3.4	Metal items		X										X										X	
33 30 00	2.3.4.1	Frames, covers, and gratings		X										X										X	
33 30 00	2.1	Pipeline materials			X									X										X	
33 30 00	2.4	Reports						X						X										X	
33 30 00		Portland Cement							X					X										X	
33 30 00		Gaskets							X					X										X	
33 40 00	3.3	Placing Pipe			X									X										X	
33 40 00	2.1	Pipe for Culverts and Storm Drains				X								X										X	
33 40 00	2.1.2	Resin Certification							X					X										X	
33 40 00	2.1.3	Resin Certification							X					X										X	
33 40 00	3.8	Pipeline Testing							X					X										X	
33 40 00	2.6	Hydrostatic Test on Watertight Joints							X					X										X	
33 40 00	3.7.5	Determination of Density							X					X										X	
33 40 00	2.3.6	Frame and Cover for Gratings							X					X										X	

RMS INPUT FORM 4288A

Export to RMS in CSV(MS-DOS) (*.csv) Format

Note: Reviewing Office Optional

Appendix S

Manufacturing Performance Requirements for Plumbing Fixtures From The Energy Policy Act of 1992 (PL 102-486)

Subtitle C--Appliance and Equipment Energy Efficiency Standards

SEC. 123. ENERGY CONSERVATION REQUIREMENTS FOR CERTAIN LAMPS AND PLUMBING PRODUCTS.

… (j) STANDARDS FOR SHOWERHEADS AND FAUCETS- (1) The maximum water use allowed for any showerhead manufactured after January 1, 1994, is 2.5 gallons per minute when measured at a flowing water pressure of 80 pounds per square inch. Any such showerhead shall also meet the requirements of ASME/ANSI A112.18.1M-1989, 7.4.3(a).

`(2) The maximum water use allowed for any of the following faucets manufactured after January 1, 1994, when measured at a flowing water pressure of 80 pounds per square inch, is as follows:

`Lavatory faucets: 2.5 gallons per minute

`Lavatory replacement aerators: 2.5 gallons per minute

`Kitchen faucets : 2.5 gallons per minute

`Kitchen replacement aerators: 2.5 gallons per minute

`Metering faucets: 0.25 gallons per cycle

`(k) STANDARDS FOR WATER CLOSETS AND URINALS- (1)(A) Except as provided in subparagraph (B), the maximum water use allowed in gallons per flush for any of the following water closets manufactured after January 1, 1994, is the following:

`Gravity tank-type toilets --1.6 gpf.

`Flushometer tank toilets --1.6 gpf.

`Electromechanical hydraulic toilets --1.6 gpf.

`Blowout toilets --3.5 gpf.

`(B) The maximum water use allowed for any gravity tank-type white 2-piece toilet which bears an adhesive label conspicuous upon installation consisting of the words `Commercial Use Only' manufactured after January 1, 1994, and before January 1, 1997, is 3.5 gallons per flush.

`(C) The maximum water use allowed for flushometer valve toilets, other than blowout toilets, manufactured after January 1, 1997, is 1.6 gallons per flush.

`(2) The maximum water use allowed for any urinal manufactured after January 1, 1994, is 1.0 gallon per flush.

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01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

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31 23 00.00 20 EXCAVATION AND FILL
31 31 16 SOIL TREATMENT FOR SUBTERRANEAN TERMITE CONTROL

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-- End of Project Table of Contents --

SECTION 01 02 00.15 48

PROJECT DESCRIPTION AND CONSTRUCTION REQUIREMENTS (NOT USED)

Amdt. #002
****

Not Used
****

01 33 29.00 06

LEED™ CERTIFICATION
03/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	(2009) Leadership in Energy and Environmental Design (tm)Green Building Rating System for New Construction

1.2 SUBMITTALS

Government approval/acceptance is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following that "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with LRL Section 01 33 00 Submittal Procedures:

SD-01 Preconstruction Submittals

LEED Implementation Plan; G

Six copies submitted to the Government on compact disk with the Design QC Plan.

LEED AP BD+C; G

Statement of qualifications of the LEED AP BD+C submitted to the Government with the QC Plan. Includes name and date of expiration of the current credential.

LEED Final Design Documentation; G

Six copies submitted to the Government on compact disk concurrent with the Final Design submittal

SD-05 Design Data

LEED Correction Plan; G

SD-11 Closeout Submittals

LEED Documentation Notebook; G

Six copies submitted to the Government on compact disk within 14 days of the issue of the LEED Rating for the project by the Green Building Certification Institute.

LEED Plaque; G

Submitted to the Government within 14 days of receipt by the Contractor.

1.3 CONTRACTOR RESPONSIBILITIES

This project shall be designed for a minimum rating of silver in accordance with LEED-NC version 2009. The Contractor shall be responsible for certifying the project at the designed LEED rating through the Green Building Certification Institute and shall bear all costs associated with the certification process. The contractor shall register the project with the Green Building Certification Institute. The Contractor shall be responsible for completing all activities necessary for LEED certification.

RFP Appendix O, LEED Strategy Tables, identifies the LEED credits and prerequisites that are designed into or required for this project. The Contractor shall be responsible for complying with the requirements of all credits and prerequisites identified including providing all associated documentation required by the Green Building Certification Institute for LEED certification.

This project shall be designed and constructed to achieve a rating of silver in accordance with LEED-NC version 2009. The Contractor shall be responsible for certifying the project at the required LEED rating through the Green Building Certification Institute and shall bear all costs associated with the certification process. The Contractor shall use the Split Design & Construction Review path. The Final Design Review Application shall be submitted to the Green Building Certification Institute within 30 days following the Final Design submittal to the Government. The Final Construction Review shall be completed and the final LEED rating shall be issued by the Green Building Certification Institute prior to Contract Completion.

The Contractor shall be responsible for designing and constructing the project to obtain the required LEED rating. Should there be a case where there is any current or projected problem meeting the full requirements of a LEED credit or prerequisite identified for this project, the Contractor shall notify the Contracting Officer in writing immediately. A LEED Correction Plan shall be submitted to the Government for acceptance detailing the method by which the LEED rating for the project will be preserved. The plan shall include the LEED credit or prerequisite impacted, the reason for non-compliance, the proposed correction or solution, an alternate credit, and a schedule for completion of the correction, solution, or alternate credit. If an alternate credit is proposed, associated documentation required by LEED certification requirements, and including a LEED Implementation Plan in accordance with paragraph LEED IMPLEMENTATION PLAN, shall be submitted with the LEED Correction Plan.

Deviations from the contract documents or accepted design may impact the LEED rating of the project. In any case where a pending action, either by the Contractor or the Government, may cause failure to meet the requirements of an attempted LEED credit or prerequisite, the Contractor shall bring this to the attention of the Contracting Officer immediately.

1.3.1 LEED Accredited Professional (LEED AP BD+C)

A LEED Accredited Professional with specialty in Building Design +

Construction (LEED AP BD+C), accredited by the Green Building Certification Institute, on the Contractor's staff shall be responsible for assembling documentation and ensuring that LEED credits and prerequisites are earned and/or documented as required by this specification section and also in accordance with LEED certification requirements. The LEED Accredited Professional shall be identified on the Contractor's Quality Control Staff in accordance with specification LRL Section 01 45 04.10 06 CONTRACTOR QUALITY CONTROL.

The LEED Accredited Professional shall review all requests for information, Contractor proposals, modifications, deviations from the design documents, or any other items that could potentially impact the LEED rating of the project.

1.3.2 Documentation

The project shall be registered with the Green Building Certification Institute on LEED Online by the Contractor. The Contractor shall coordinate with the Government to identify and grant access to representatives of the Government that will monitor documentation in LEED Online. The Contractor shall provide documentation using LEED Online. Documentation shall be completed in LEED Online in accordance with the schedule in the LEED Implementation Plan.

The LEED Final Design Documentation shall be submitted to the Government on compact disk. The LEED Final Design Documentation shall include the results of the Final Design Review performed by the Green Building Certification Institute along with all completed documentation in LEED Online.

A LEED Documentation Notebook shall be provided to the Government on compact disk within 14 days of the issue of the LEED Rating for the project by the Green Building Certification Institute and shall include a copy of all completed documentation in LEED Online including both Design Phase and Construction Phase documentation. All correspondence with the Green Building Certification Institute shall be included. A copy of each LEED Correction Plan shall be included in the LEED Documentation Notebook.

The Contractor shall submit a monthly LEED Progress Report that identifies the LEED credits and prerequisites completed and documented to date. The LEED Progress Report shall be submitted on the same day of each month. The Government will compare the LEED Progress Report and the documentation uploaded in LEED Online to the schedule in the LEED Implementation Plan. Failure to adhere to the schedule for completion of requirements for credits and prerequisites, including the associated documentation, in the LEED Implementation Plan shall be cause for withholding the monthly progress payment. Documentation in LEED Online and the LEED Documentation Notebook specified elsewhere in this section, shall be completed and submitted before final payment is made to the Contractor.

1.3.3 Innovation in Design Credits

The Contractor may choose to attempt Innovation in Design credits by using strategies that are not addressed by the existing LEED credits and prerequisites. Any such attempted credits shall be developed in accordance with the requirements of the Green Building Certification Institute for LEED certification. Innovation in Design credits shall conform to exemplary performance requirements or to the requirements of Credit Interpretation Rulings issued by the US Green Building Council or the Green

Building Certification Institute. Applicable Credit Interpretation Rulings are those that apply to the LEED version under which the project has been registered. Innovation in Design credits not covered by exemplary performance requirements or Credit Interpretation Rulings will be evaluated by the Government and accepted based on their merit. Innovation in Design credits that are not accepted by the Government shall not be submitted for LEED certification except when failure to achieve the points for the credit will not result in failure of the project to achieve the required LEED rating. The Government will not be obligated to accept credits that do not conform to exemplary performance requirements or Credit Interpretation Rulings.

The Contractor shall identify the intent of the credit, the requirements for compliance with the credit, the submittals necessary to demonstrate compliance, and the design approach or strategies that may be used to meet the requirements. The specific compliance path for this project to meet the requirements for the proposed Innovation in Design credit shall be indicated. The Innovation in Design description shall be submitted with the Final Design. The Innovation in Design credits developed shall be fully described in the LEED Implementation Plan.

1.3.4 Credit Interpretation Rulings

The Contractor shall apply existing US Green Building Council or Green Building Certification Institute Credit Interpretation Rulings when pursuing credits using non-standard compliance paths, or when there are special circumstances making compliance difficult. Applicable Credit Interpretation Rulings are those that apply to the LEED version under which the project has been registered. The Contractor may apply for a Credit Interpretation Request from the Green Building Certification Institute for any new proposed strategy, non-standard compliance path, or special circumstances. If a Credit Interpretation Ruling is to be used to substantiate compliance with attempted credits and prerequisites, a copy of the request and ruling, including the dates, must be included in the documentation on LEED Online and in the LEED Documentation Notebook for the associated credit or prerequisite. Compliance methods that are not addressed by existing or new Credit Interpretation Rulings shall not be submitted for LEED certification.

1.3.5 Government Coordination

The Government may provide assistance or resources to the Contractor in order to complete the compliance requirements for a credit or prerequisite; however, the Government is not obligated to provide this assistance or resources. The Contractor shall not select credits for which Government assistance or resources are required without written confirmation from the Government that such assistance or resource will be provided. The Contractor shall identify to the Government credit or prerequisite requirements for which Government assistance is sought. The Contractor shall obtain written confirmation from the Contracting Officer that the Government will comply with the identified requirements. Written confirmation and any supporting documentation shall be included in the documentation on LEED Online and in the LEED Documentation Notebook for the associated credit or prerequisite.

1.4 LEED IMPLEMENTATION PLAN

The LEED Implementation Plan shall be submitted [with the QC Plan][within 30 days after acceptance of the design and before the start of any

construction activity.] The plan shall provide a detailed description of all activities that relate to accomplishing project LEED requirements, including construction practices and procurement practices. The plans shall also include:

a. The name of the LEED Accredited Professional Building Design + Construction (LEED AP BD+C).

b. A copy of the contract with the Commissioning Agent. The contract shall indicate all requirements for LEED Energy & Atmosphere (EA) Prerequisite 1, Fundamental Commissioning of Building Energy Systems, for which the Commissioning Agent is responsible. If LEED EA Credit 3 is to be attempted, the contract shall indicate all additional requirements of the Commissioning Agent.

c. The schedule for completion of the requirements and documentation for each credit and prerequisite.

d. List all plans required by the attempted LEED credits and prerequisites and the proposed completion date of each plan. The plans shall be added to the LEED Implementation Plan as they are completed.

e. List all applicable Credit Interpretation Rulings that will be used to substantiate compliance with credits and prerequisites. The complete text of each Credit Interpretation Request and Ruling, and the date of each, shall be included.

f. For each credit or prerequisite requirement for which the Government has agreed to provide assistance or resources, provide a copy of written confirmation and any other associated supporting documentation.

g. The Innovation in Design credits attempted including the intent of the credit, the requirements for compliance with the credit, the submittals necessary to demonstrate compliance, and the design approach or strategies that may be used to meet the requirements. The specific compliance path for this project to meet the requirements for the proposed Innovation in Design credit shall be indicated. Any associated plans, construction practices, and procurement practices shall be described.

h. For fast-track design build projects with multiple stages of design, the specific information as indicated above shall be submitted for each stage of design within the time indicated in this paragraph.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

-- End of Section --

SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL
04/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 4439	(2004) Geosynthetics
ASTM D 4491	(1999a; R 2009) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2004; R 2009) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 832-R-92-005	(1992) Storm Water Management for Construction Activities Developing Pollution Preventions and Plans and Best Management Practices

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)

1.2 SYSTEM DESCRIPTION

The work consists of implementing the storm water pollution prevention measures to prevent sediment from entering streams or water bodies as specified in this Section in conformance with the requirements of Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

1.3 EROSION AND SEDIMENT CONTROLS

The controls and measures required of the Contractor are described below.

1.3.1 Stabilization Practices

The stabilization practices to be implemented include temporary seeding, mulching, sod stabilization, erosion control matts, protection of trees, preservation of mature vegetation, etc. On the daily CQC Report, record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, initiate stabilization practices as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

1.3.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases or is precluded by unsuitable conditions caused by the weather, initiate stabilization practices as soon as practicable after conditions become suitable.

1.3.1.2 Burnoff

Burnoff of the ground cover is not permitted.

1.3.1.3 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified, and protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

1.3.2 Erosion, Sediment and Stormwater Control

a. Submit a Storm Water Notice of Intent for NPDES coverage under the general permit for construction activities and a Storm Water Pollution Prevention Plan (SWPPP) for the project to the Contracting Officer prior to the commencement of work. The SWPPP shall meet the requirements of the [EPA][State of [_____]] general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate [Federal][State] agency for approval, a minimum of 14 calendar days prior to the start of any land disturbing activities. Maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, to reflect current site conditions. Include within the SWPPP:

(1) Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.

(2) Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.

(3) Ensure compliance with terms of the [EPA][State of [_____]] general permit for storm water discharge.

(4) Select applicable best management practices from EPA 832-R-92-005.

(5) Include a completed copy of the Registration Statement, BMP Inspection Report Template and Notice of Termination except for the effective date.

[(6) Storm Water Pollution Prevention Measures and Notice of Intent 40 CFR 122.26, EPA 832-R-92-005. Provide a "Storm Water Pollution Prevention Plan" (SWPPP) for the project. The SWPPP will meet the requirements of the [EPA][State of [_____]] general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate [Federal][State] agency for approval, a minimum of 14 calendar days prior to the start of construction. A copy of the approved SWPPP will be kept at the construction on-site office, and continually updated as regulations require to reflect current site conditions.]

1.3.3 Structural Practices

Implement structural practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement structural practices in a timely manner, during the construction process, to minimize erosion and sediment runoff. Include the following devices; Location and details of installation and construction are shown on the drawings.

1.3.3.1 Silt Fences

Provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Properly install silt fences to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Install silt fences in the locations indicated on the drawings. Obtain approval from the Contracting Officer prior to final removal of silt fence barriers.

1.3.4 Sediment Basins

Trap sediment in temporary sediment basins. Select a basin size to accommodate the runoff of a local 10-year storm. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs. Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare BMP Inspection Reports as required by the general permit. If required by the permit, include those inspection reports.

1.3.5 Vegetation and Mulch

a. Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

b. Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish a suitable stand of grass. The seeding operation will be as specified in Section 32 92 19 SEEDING.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Storm Water Inspection Reports for General Permit

1.5 DELIVERY, STORAGE, AND HANDLING

Identify, store and handle filter fabric in accordance with ASTM D 4873.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

Provide geotextile that complies with the requirements of ASTM D 4439, and consists of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and contains stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. Provide synthetic filter fabric that contains ultraviolet ray inhibitors and stabilizers to assure a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile	ASTM D 4632	100 lbs. min.
Elongation (percent)		30 percent max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Stakes and Posts

Use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 by 2 inches when oak is used and 4 by 4 inches when pine is used, and have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum

weight of 1.33 pounds/linear foot and a minimum length of 5 feet.

2.1.3 Mill Certificate or Affidavit

Provide a mill certificate or affidavit attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. Specify in the mill certificate or affidavit the actual Minimum Average Roll Values and identify the fabric supplied by roll identification numbers. Submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. Provide bales with a standard cross section of 14 by 18 inches. Wire-bound or string-tie all bales. Use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 by 2 inches in cross section and have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 3 feet.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Extend silt fences a minimum of 16 inches above the ground surface without exceeding 34 inches above the ground surface. Provide filter fabric from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, splice together filter fabric at a support post, with a minimum 6 inch overlap, and securely sealed. Excavate trench approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4 by 4 inch trench shall be backfilled and the soil compacted over the filter fabric. Remove silt fences upon approval by the Contracting Officer.

3.2 INSTALLATION OF STRAW BALES

Place the straw bales in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Install straw bales so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. Entrench and backfill the barrier. Excavate a trench the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), backfill the excavated soil against the barrier. Conform the backfill soil with the ground level on the downhill side and build up to 4 inches against the uphill side of the barrier. Scatter loose straw over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Securely anchor each bale by at least two stakes driven through the bale. Drive the first stake or steel post in each bale toward the previously laid bale to force the bales together. Drive stakes or steel pickets a minimum 18 inches deep into the ground to securely anchor the bales.

3.3 FIELD QUALITY CONTROL

Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

3.3.1 Silt Fence Maintenance

Inspect the silt fences in accordance with paragraph, titled "Inspections," of this section. Any required repairs shall be made promptly. Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, replace the fabric promptly. Remove sediment deposits when deposits reach one-third of the height of the barrier. Remove a silt fence when it is no longer required. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall [receive erosion control] [be seeded in accordance with Section 32 05 33 LANDSCAPE ESTABLISHMENT, except that the coverage requirements in paragraph, titled "Establishment" of this section do not apply].

3.3.2 Straw Bale Maintenance

Inspect straw bale barriers in accordance with paragraph, titled "Inspections". Pay close attention to the repair of damaged bales, end runs and undercutting beneath bales. Accomplish necessary repairs to barriers or replacement of bales in a promptly manner. Remove sediment deposits when deposits reach one-half of the height of the barrier. At the each end of each row turn bales uphill when used to retain sediment. Remove a straw bale barrier when it is no longer required. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. Seed the areas disturbed by this shaping in accordance with Section 32 92 19 SEEDING.

3.3.3 Diversion Dike Maintenance

Inspect diversion dikes in accordance with paragraph, titled "Inspections," of this section. Pay close attention to the repair of damaged diversion dikes and accomplish necessary repairs promptly. When diversion dikes are no longer required, shape to an acceptable grade. Seed the areas disturbed by this shaping in accordance with Section 32 92 19 SEEDING.

3.4 INSPECTIONS

3.4.1 General

Inspect disturbed areas of the construction site, areas that have not been finally stabilized used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Conduct inspections at least once every month where sites have been finally stabilized.

3.4.2 Inspections Details

Inspect disturbed areas and areas used for material storage that are exposed to precipitation for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan to ensure that they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

3.4.3 Inspection Reports

For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. Furnish the report to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

3.4.4 [Monthly Inspection Report and Certification Form

Complete, sign, and submit the original form, on the first working day of each month, to the State of [_____], [Office of Pollution Control (OPC)] at the following address:

Chief, [_____]

[_____]

[_____]

[_____]

A copy of the State of [_____]'s [Monthly Inspection Report and Certification Form for Erosion and Sediment Controls] is attached to the end of this section. Also furnish, on the first working day of each month, one copy of the form submitted to the [OPC] to the Contracting Officer as part of the Contractor's daily CQC Report and attach a copy of the completed form to the Plan. Unless otherwise notified by the [OPC], submit the [Monthly Inspection Report and Certification Forms] for an additional two months after the final completion of all storm water pollution prevention measures required in this contract have been implemented.]

-- End of Section --

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	(2002; R 2009) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)

1.2 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse. A minimum of 50 percent by weight of total project solid waste shall be diverted from the landfill.

1.3 MANAGEMENT

Develop and implement a waste management program. Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. The Environmental Manager, as specified in Section 01 35 40.00 20 Environmental Management, shall be responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the project. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. The Contractor is responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by federal, state, and local regulations. Also, provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan; G; (LEED)

SD-11 Closeout Submittals

Records; (LEED)

1.5 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Waste Management Plan and to develop a mutual understanding relative to the details of waste management. The requirements for this meeting may be fulfilled during the coordination and mutual understanding meeting outlined in Section 01 45 00.00 2001 45 00.00 10 QUALITY CONTROL. At a minimum, environmental and waste management goals and issues shall be discussed at the following additional meetings:

a. Pre-bid meeting.

b. [Preconstruction][Pre-demolition] meeting.

c. Regular [site][QC] meetings.

d. Work safety meetings.

1.6 WASTE MANAGEMENT PLAN

A waste management plan shall be submitted within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. The plan shall demonstrate how the project waste diversion goal shall be met and shall include the following:

a. Name of individuals on the Contractor's staff responsible for waste prevention and management.

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be held to address waste management.

d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of wastes.

e. Characterization, including estimated types and quantities, of the waste to be generated.

f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.

g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.

h. List of specific waste materials that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Recycling facilities that will be used shall be identified by name, location, and phone number, including a copy of the permit or license for each facility.

i. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Contracting Officer.

j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.

k. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each subcontractor, the Quality Control Manager, and the Contracting Officer.

1.7 RECORDS

Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. [Records shall be kept in accordance with the LEED Reference Guide and using the LEED Letter Template.] Quantities may be measured by weight or by volume, but must be consistent throughout. List each type of waste separately noting the disposal or diversion date. Identify the landfill, recycling center, waste processor, or other organization used to process or receive the solid waste. Provide explanations for any waste not recycled or reused. With each application for payment, submit updated documentation for solid waste disposal and diversion, and submit manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be [delivered to the Contracting Officer upon completion of the construction][included in the LEED Documentation Notebook].

[Demolition accomplished by other parties on this project site count toward the project's total waste diversion cumulative score for LEED. Information on the quantity and disposition of these materials will be provided by the Contracting Officer. Include this data in records, annotated to indicate that it was accomplished by another party.]

1.8 REPORTS

Provide quarterly reports and a final report to the Government. Quarterly and final reports shall include project name, information for waste generated this quarter, and cumulative totals for the project. Each report shall include supporting documentation to include manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. Include timber harvest and demolition information, if any.

1.9 COLLECTION

Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to subcontractors. Recycling and waste bin areas are to be kept neat and clean, and recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials. Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION. Separate materials by one of the following methods:

1.9.1 Source Separated Method.

Waste products and materials that are recyclable shall be separated from trash and sorted as described below into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the following category types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

a. Land clearing debris.

b. Asphalt.

c. Concrete and masonry.

d. Metal (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).

   (1) Ferrous.

   (2) Non-ferrous.

e. Wood (nails and staples allowed).

f. Debris.

g. Glass (colored glass allowed).

h. Paper.

(1) Bond.

(2) Newsprint.

(3) Cardboard and paper packaging materials.

i. Plastic.

(1) Type 1: Polyethylene Terephthalate (PET, PETE).

(2) Type 2: High Density Polyethylene (HDPE).

(3) Type 3: Vinyl (Polyvinyl Chloride or PVC).

(4) Type 4: Low Density Polyethylene (LDPE).

(5) Type 5: Polypropylene (PP).

(6) Type 6: Polystyrene (PS).

(7) Type 7: Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

j. Gypsum.

k. Non-hazardous paint and paint cans.

l. Carpet.

m. Ceiling tiles.

n. Insulation.

o. Beverage containers.

1.9.2 Co-Mingled Method.

Waste products and recyclable materials shall be placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed.

1.9.3 Other Methods.

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.10 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures. Except as otherwise specified in other sections of the specifications, disposal shall be in accordance with the following:

1.10.1 Reuse.

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. [Coordinate reuse with the Contracting Officer.][Reuse materials as indicated on the drawings.] Sale or donation of waste suitable for reuse shall be considered.

1.10.2 Recycle.

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling. All fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site shall be recycled. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

[1.10.3 Compost

Consider composting on site if a reasonable amount of compostable material will be available. Compostable materials include plant material, sawdust, and certain food scraps.

]1.10.4 Waste.

Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

1.10.5 Return

Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 26 56 00

EXTERIOR LIGHTING
07/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO LTS-5	(2009; Errata 2009; Amendment 2010) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2009) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M	(2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

IESNA HB-9	(2000; Errata 2004; Errata 2005; Errata 2006) IES Lighting Handbook

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms
IEEE C2	(2007; Errata 06-1; TIA 07-1; TIA 07-2; TIA 07-3; Errata 07-2; TIA 08-4; TIA 08-5; TIA 08-6; TIA 08-7; TIA 08-8; TIA 08-9; TIA 08-10; TIA 08-11; TIA 09-12; TIA 09-13; TIA 09-14; Errata 09-3; TIA 09-15; TIA 09-16; TIA 10-17) National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI ANSLG C78.42	(2009) For Electric Lamps: High-Pressure Sodium Lamps
ANSI C136.10	(2006) American National Standard for Roadway and Area Lighting Equipment-Locking-Type Photocontrol Devices and Mating Receptacles--Physical

	and Electrical Interchangeability and Testing
ANSI C136.13	(2004; R 2009) American National Standard for Roadway Lighting Equipment, Metal Brackets for Wood Poles
ANSI C136.21	(2004; R 2009) American National Standard for Roadway and Area Lighting Equipment - Vertical Tenons Used with Post-Top-Mounted Luminaires
ANSI C136.3	(2005; R 2009) American National Standard for Roadway and Area Lighting Equipment Luminaire Attachments
ANSI C78.1381	(1998) American National Standard for Electric Lamps - 250-Watt, 70 Watt, M85 Metal-Halide Lamps
ANSI C82.4	(2002) American National Standard for Ballasts for High-Intensity-Discharge and Low-Pressure Sodium (LPS) Lamps (Multiple-Supply Type)
ANSI/ANSLG C78.43	(2007) American National Standard for Electric Lamps - Single-Ended Metal-Halide Lamps
NEMA 250	(2008) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA ICS 2	(2000; R 2005; Errata 2008) Standard for Controllers, Contactors, and Overload Relays Rated 600 V
NEMA ICS 6	(1993; R 2006) Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2011) National Electrical Code

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Energy Star	(1992; R 2006) Energy Star Energy Efficiency Labeling System

UNDERWRITERS LABORATORIES (UL)

UL 1029	(1994; Reprint Jun 2010) High-Intensity-Discharge Lamp Ballasts
UL 1598	(2008; Reprint Jan 2010) Luminaires
UL 773	(1995; Reprint Mar 2002) Standard for Plug-In, Locking Type Photocontrols for Use with Area Lighting
UL 773A	(2006; Reprint Mar 2011) Standard for

1.2 DEFINITIONS

a. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, shall be as defined in IEEE 100.

b. Average life is the time after which 50 percent will have failed and 50 percent will have survived under normal conditions.

c. Groundline section is that portion between one foot above and 2 feet below the groundline.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Luminaire drawings; G

Poles; G

SD-03 Product Data

Energy Efficiency

Luminaires; G

Lamps; G

Ballasts; G

Lighting contactor; G

Time switch; G

Photocell switch; G

Steel poles; G

Brackets

SD-05 Design Data

Design Data for luminaires; G

SD-06 Test Reports

Operating test

Submit operating test results as stated in paragraph entitled

"Field Quality Control."

SD-08 Manufacturer's Instructions

Submit instructions prior to installation.

Fiberglass poles

Submit instructions prior to installation.

SD-10 Operation and Maintenance Data

Operational Service

Submit documentation that includes contact information, summary of procedures, and the limitations and conditions applicable to the project. Indicate manufacturer's commitment to reclaim materials for recycling and/or reuse.

1.4 QUALITY ASSURANCE

1.4.1 Drawing Requirements

1.4.1.1 Luminaire Drawings

Include dimensions, effective projected area (EPA), accessories, and installation and construction details. Photometric data, including zonal lumen data, average and minimum ratio, aiming diagram, and computerized candlepower distribution data shall accompany shop drawings.

1.4.1.2 Poles

Include dimensions, wind load determined in accordance with AASHTO LTS-5, pole deflection, pole class, and other applicable information.

1.4.2 Design Data for Luminaires

a. Distribution data according to IESNA classification type as defined in IESNA HB-9.

b. Computerized horizontal illumination levels in footcandles at ground level, taken every 10 feet. Include average maintained footcandle level and maximum and minimum ratio.

c. Amount of shielding on luminaires.

1.4.3 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.4.4 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.4.4.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.4.4.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Steel Poles

Do not store poles on ground. Support poles so they are at least one foot above ground level and growing vegetation. Do not remove factory-applied pole wrappings until just before installing pole.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a [500][_____] mile radius from the project site, if available from a minimum of three sources.

1.6.2 Energy Efficiency

Comply with National Energy Policy Act and Energy Star requirements for lighting products. Submit data indicating lumens per watt efficiency and color rendition index of light source.

1.7 WARRANTY

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

PART 2 PRODUCTS

2.1 PRODUCT COORDINATION

Products and materials not considered to be lighting equipment or lighting fixture accessories are specified in[Section 33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION,] Section 33 71 01 OVERHEAD TRANSMISSION AND DISTRIBUTION,[Section 33 70 02.00 10 ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND,][and] Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.[Lighting fixtures and accessories mounted on exterior surfaces of buildings are specified in Section 26 51 00 INTERIOR LIGHTING.]

2.2 LUMINAIRES

UL 1598. Provide luminaires as indicated. Provide luminaires complete with lamps of number, type, and wattage indicated. Details, shapes, and dimensions are indicative of the general type desired, but are not intended to restrict selection to luminaires of a particular manufacturer. Luminaires of similar designs, light distribution and brightness characteristics, and of equal finish and quality will be acceptable as approved.

2.2.1 Lamps

2.2.1.1 High-Pressure Sodium (HPS) Lamps

ANSI ANSLG C78.42. Wattage as indicated. HPS lamps shall have average rated life of 16,000 hours (minimum) for 35 watt lamps and 24,000 hours (minimum) for all higher wattage lamps. 150 watt lamps, if required, shall be 55 volt lamps. Lamps shall have Luminaire Efficiency Ratings (LER) as follows:

a. Upward efficiency of 0 percent

1. 150-399 watts: minimum 58 LER for closed fixture; minimum 68 for open fixture

2. 400-999 watts: minimum 63 LER for closed fixture; minimum 84 for open fixture

b. Upward efficiency of 1 percent - 10 percent

1. 150-399 watts: minimum 64 LER for closed fixture; minimum 63 for open fixture

2. 400-999 watts: minimum 82 LER for closed fixture; minimum 89 for open fixture

3. 1000 plus watts: minimum 109 LER for open fixture

c. Upward efficiency of 11 percent to 20 percent

1. 150-399 watts: minimum 78 LER for open fixture

2. 400-999 watts: minimum 94 for open fixture

d. Upward efficiency greater than 20 percent

150-399 watts: minimum 75 LER for closed fixture; minimum 77 for open

fixture

2.2.1.2 Metal-Halide Lamps

Provide luminaires with tempered glass lens.

a. Double-ended, 70 watt, conforming to ANSI C78.1381

b. Single-ended, wattage as indicated, conforming to ANSI/ANSLG C78.43

Lamps shall have Luminaire Efficiency Ratings (LER) as follows:

a. Upward efficiency of 0 percent

1. 150-399 watts: minimum 41 LER for closed fixture

2. 400-999 watts: minimum 53 LER for closed fixture; minimum 59 for open fixture

3. 1000 plus watts: minimum 77 LER for closed fixture

b. Upward efficiency of 1 percent - 10 percent

1. 150-399 watts: minimum 56 LER for closed fixture

2. 400-999 watts: minimum 62 LER for closed fixture; minimum 64 for open fixture

3. 1000 plus watts: minimum 88 LER for open fixture

c. Upward efficiency greater than 20 percent

1. 150-399 watts: minimum 62 LER for closed fixture; minimum 77 for open fixture

2. 400-999 watts: minimum 65 LER for closed fixture

2.2.2 Ballasts for High-Intensity-Discharge (HID) Luminaires

UL 1029 and ANSI C82.4, and shall be constant wattage autotransformer (CWA) or regulator, high power-factor type (minimum 90 percent). Provide single-lamp ballasts which shall have a minimum starting temperature of minus 30 degrees C. Ballasts shall be:

a. Designed to operate on voltage system to which they are connected.

b. Constructed so that open circuit operation will not reduce the average life.

HID ballasts shall have a solid-state igniter/starter with an average life in the pulsing mode of 10,000 hours at the intended ambient temperature. Igniter case temperature shall not exceed 90 degrees C.

2.3 LIGHTING CONTACTOR

NEMA ICS 2,[electrically][mechanically] held contactor.[Contacts shall be rated [_____] volts, [_____] amperes, and [_____] poles. Coils shall be rated [_____] volts.][Rate contactor as indicated.] Provide in NEMA[4][_____] enclosure conforming to NEMA ICS 6. Contactor shall have silver

alloy double-break contacts [and coil clearing contacts for mechanically held contactor] and shall require no arcing contacts.[Provide contactor with[hand-off-automatic][on-off] selector switch.][Contactor shall be hermetically sealed.]

2.4 TIME SWITCH

Astronomic dial type or electronic type, arranged to turn "ON" at sunset, and turn "OFF" at predetermined time between 8:30 p.m. and 2:30 a.m. or sunrise, automatically changing the settings each day in accordance with seasonal changes of sunset and sunrise. Provide switch rated [_____] volts, having automatically wound spring mechanism or capacitor, to maintain accurate time for a minimum of 7 hours following power failure. Provide time switch with a manual on-off bypass switch. Housing for the time switch shall be surface mounted, NEMA [3R][_____] enclosure conforming to NEMA ICS 6.

2.5 PHOTOCELL SWITCH

UL 773 or UL 773A, hermetically sealed cadmium-sulfide or silicon diode type cell rated [_____] volts ac, 60 Hz with[single-throw contacts][single pole double-throw (spdt) contacts for mechanically held contactors rated 1000 watts] designed to fail to the ON position. Switch shall turn on at or below 3 footcandles and off at 4 to 10 footcandles. A time delay shall prevent accidental switching from transient light sources.[Provide a directional lens in front of the cell to prevent fixed light sources from creating a turnoff condition.] Provide switch:

[a. In a high-impact-resistant, noncorroding and nonconductive molded plastic housing with a[fixture mounted,] locking-type receptacle conforming to ANSI C136.10 and rated 1800 VA, minimum.]

[b. In a cast weatherproof aluminum housing with adjustable window slide, rated 1800 VA, minimum.]

[c. In a U.V. stabilized polycarbonate housing with swivel arm and adjustable window slide, rated 1800 VA, minimum.]

[d. Integral to the luminaire, rated 1000 VA, minimum.]

2.6 POLES

Provide poles designed for wind loading of 100 miles per hour determined in accordance with AASHTO LTS-5 while supporting luminaires and all other appurtenances indicated. The effective projected areas of luminaires and appurtenances used in calculations shall be specific for the actual products provided on each pole. Poles shall be anchor-base type designed for use with underground supply conductors. Poles shall have oval-shaped handhole having a minimum clear opening of 2.5 by 5 inches. Handhole cover shall be secured by stainless steel captive screws. Metal poles shall have an internal grounding connection accessible from the handhole near the bottom of each pole. Scratched, stained, chipped, or dented poles shall not be installed.

2.6.1 Steel Poles

AASHTO LTS-5. Provide steel poles having minimum 11-gage steel with minimum yield/strength of 48,000 psi and hot-dipped galvanized in accordance with ASTM A123/A123M factory finish. Provide a pole grounding

connection designed to prevent electrolysis when used with copper ground wire. Pole shall be anchor bolt mounted type. Poles shall have tapered tubular members, either round in cross section or polygonal. Pole markings shall be approximately 3 to 4 feet above grade and shall include manufacturer, year of manufacture, top and bottom diameters, and length. Base covers for steel poles shall be structural quality hot-rolled carbon steel plate having a minimum yield of 36,000 psi.

2.7 BRACKETS AND SUPPORTS

ANSI C136.3, ANSI C136.13, and ANSI C136.21, as applicable. Pole brackets shall be not less than 1 1/4 inch galvanized steel pipe secured to pole. Slip-fitter or pipe-threaded brackets may be used, but brackets shall be coordinated to luminaires provided, and brackets for use with one type of luminaire shall be identical. Brackets for pole-mounted street lights shall correctly position luminaire no lower than mounting height indicated. Mount brackets not less than 24 feet above street. Special mountings or brackets shall be as indicated and shall be of metal which will not promote galvanic reaction with luminaire head.

2.8 POLE FOUNDATIONS

Anchor bolts shall be steel rod having a minimum yield strength of 50,000 psi; the top 12 inches of the rod shall be galvanized in accordance with ASTM A153/A153M. Concrete shall be as specified in[Section 03 30 00 CAST-IN-PLACE CONCRETE][Section 03 30 00.00 10 CAST-IN-PLACE CONCRETE].

2.9 EQUIPMENT IDENTIFICATION

2.9.1 Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

2.9.2 Labels

Provide labeled luminaires in accordance with UL 1598 requirements. Luminaires shall be clearly marked for operation of specific lamps and ballasts according to proper lamp type. The following lamp characteristics shall be noted in the format "Use Only _____":

a. Lamp diameter code (T-4, T-5, T-8, T-12), tube configuration (twin, quad, triple), base type, and nominal wattage for fluorescent and compact fluorescent luminaires.

b. Lamp type, wattage, bulb type (ED17, BD56, etc.) and coating (clear or coated) for HID luminaires.

c. Start type (preheat, rapid start, instant start) for fluorescent and compact fluorescent luminaires.

d. ANSI ballast type (M98, M57, etc.) for HID luminaires.

e. Correlated color temperature (CCT) and color rendering index (CRI) for all luminaires.

Markings related to lamp type shall be clear and located to be readily

visible to service personnel, but unseen from normal viewing angles when lamps are in place. Ballasts shall have clear markings indicating multi-level outputs and indicate proper terminals for the various outputs.

2.10 FACTORY APPLIED FINISH

Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA 250 corrosion-resistance test.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to IEEE C2, NFPA 70, and to the requirements specified herein.

3.1.1 Steel Poles

Provide pole foundations with galvanized steel anchor bolts, threaded at the top end and bent 90 degrees at the bottom end. Provide ornamental covers to match pole and galvanized nuts and washers for anchor bolts. Concrete for anchor bases, polyvinyl chloride (PVC) conduit ells, and ground rods shall be as specified in Section[33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION][33 70 02.00 10 ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND]. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath and the end of conduit ell. Adjust poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.[After installation, paint exposed surfaces of steel poles with two finish coats of[exterior oil paint of a color as indicated][aluminum paint].]

3.1.2 Pole Setting

[Depth shall be as indicated.][Poles in straight runs shall be in a straight line. Dig holes large enough to permit the proper use of tampers to the full depth of the hole. Place backfill in the hole in 6 inch maximum layers and thoroughly tamp. Place surplus earth around the pole in a conical shape and pack tightly to drain water away.]

3.1.3 Photocell Switch Aiming

Aim switch according to manufacturer's recommendations.

3.1.4 GROUNDING

Ground noncurrent-carrying parts of equipment including[metal poles,] luminaires, mounting arms, brackets, and metallic enclosures as specified in Section[33 71 02.00 20 UNDERGROUND ELECTRICAL DISTRIBUTION][33 70 02.00 10 ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND]. Where copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

3.1.5 FIELD APPLIED PAINTING

Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria. Painting shall be

as specified in Section 09 90 00 PAINTS AND COATINGS.

3.2 FIELD QUALITY CONTROL

Upon completion of installation, verify that equipment is properly installed, connected, and adjusted. Conduct an operating test to show that the equipment operates in accordance with the requirements of this section.

-- End of Section --

SECTION 31 11 00

CLEARING AND GRUBBING
08/08

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Nonsaleable Materials

Written permission to dispose of such products on private property shall be filed with the Contracting Officer.

1.2 DELIVERY, STORAGE, AND HANDLING

Deliver materials to store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

PART 2 PRODUCTS

2.1 TREE WOUND PAINT

Bituminous based paint of standard manufacture specially formulated for tree wounds.

2.2 HERBICIDE

Comply with Federal Insecticide, Fungicide, and Rodenticide Act (Title 7 U.S.C. Section 136) for requirements on Contractor's licensing, certification and record keeping. Contact the command Pest Control Coordinator prior to starting work.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.2 Trees, Shrubs, and Existing Facilities

Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

3.1.3 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor is responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, notify the Contracting Officer in ample time to minimize interruption of the service.

3.2 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Apply herbicide in accordance with the manufacturer's label to the top surface of stumps designated not to be removed.

3.3 TREE REMOVAL

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.4 PRUNING

Prune trees designated to be left standing within the cleared areas of dead branches 1 1/2 inches or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches. Paint cuts more than 1 1/4 inches in diameter with an approved tree wound paint.

3.5 GRUBBING

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.6 DISPOSAL OF MATERIALS

3.6.1 Nonsaleable Materials

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of outside the limits of Government-controlled land at the Contractor's responsibility, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed.

All timber on the project site noted for clearing and grubbing shall become the property of the Contractor, and shall be removed from the project site and disposed of off stations.

-- End of Section --

SECTION 31 23 00.00 20

EXCAVATION AND FILL
02/11

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600	(2010) Installation of Ductile-Iron Water Mains and Their Appurtenances

ASTM INTERNATIONAL (ASTM)

ASTM C 136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 33	(2008) Standard Specification for Concrete Aggregates
ASTM D 1140	(2000; R 2006) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D 1556	(2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2009) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D 2216	(2010) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 2321	(2009) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D 2487	(2010) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 3786	(2009) Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
ASTM D 4318	(2010) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4355	(2007) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus

ASTM D 4491	(1999a; R 2009) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(2004; R 2009) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(2004) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(2002; R 2007) Determining the Specification Conformance of Geosynthetics
ASTM D 4833	(2007) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D 698	(2007e1) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008; Change 1-2010; Change 3-2010; Errata 1-2010) Safety and Health Requirements Manual

1.2 DEFINITIONS

1.2.1 Capillary Water Barrier

A layer of clean, poorly graded crushed rock, stone, or natural sand or gravel having a high porosity which is placed beneath a building slab with or without a vapor barrier to cut off the capillary flow of pore water to the area immediately below a slab.

1.2.2 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, for general soil types, abbreviated as percent laboratory maximum density.

1.2.3 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.4 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shoring and Sheeting Plan

Dewatering work plan

Submit 15 days prior to starting work.

SD-06 Test Reports

Borrow Site Testing; G

Fill and backfill test

Select material test

Porous fill test for capillary water barrier

Density tests

Moisture Content Tests

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

1.5 CRITERIA FOR BIDDING

Base bids on the following criteria:

a. Surface elevations are as indicated.

b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily

represent ground water elevation at the time of construction.

d. Material character is indicated by the boring logs.

e. Suitable backfill and bedding material in the quantities required is available at the project site.

f. Blasting will not be permitted. Remove material in an approved manner.

1.6 QUALITY ASSURANCE

1.6.1 Shoring and Sheeting Plan

Submit drawings and calculations, certified by a registered professional engineer, describing the methods for shoring and sheeting of excavations. Drawings shall include material sizes and types, arrangement of members, and the sequence and method of installation and removal. Calculations shall include data and references used.

The Contractor is required to hire a Professional Geotechnical Engineer to provide inspection of excavations and soil/groundwater conditions throughout construction. The Geotechnical Engineer shall be responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Geotechnical Engineer shall update the excavation, sheeting and dewatering plans as construction progresses to reflect changing conditions and shall submit an updated plan if necessary. A written report shall be submitted, at least monthly, informing the Contractor and Contracting Officer of the status of the plan and an accounting of the Contractor's adherence to the plan addressing any present or potential problems. The Geotechnical Engineer shall be available to meet with the Contracting Officer at any time throughout the contract duration.

1.6.2 Dewatering Work Plan

Submit procedures for accomplishing dewatering work.

1.6.3 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Perform work adjacent to non-Government utilities as indicated in accordance with procedures outlined by utility company. Excavation made with power-driven equipment is not permitted within two feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Satisfactory Materials

Any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML, CH, MH free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and frozen, deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM, GP-GM, GW-GM, SW-SM, SP-SM, and SM shall be identified as cohesionless only when the fines are nonplastic (plasticity index equals zero). Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

2.1.4 Expansive Soils

Soils that have a plasticity index equal to or greater than [_____] when tested in accordance with ASTM D 4318.

2.1.5 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.6 Backfill and Fill Material

ASTM D 2487, classification GW, GP, GM, GC, SW, SP, SM, SC with a maximum ASTM D 4318 liquid limit of 35, maximum ASTM D 4318 plasticity index of 12, and a maximum of 25 percent by weight passing ASTM D 1140, No. 200 sieve.

2.1.7 Select Material

Material shall conform to MDOT.

2.1.8 Topsoil

Provide as specified in Section 32 92 19 SEEDING.

Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant

growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

2.2 UTILITY BEDDING MATERIAL

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe shall be compacted to 95 percent of ASTM D 698 maximum density. Plastic piping shall have bedding to spring line of pipe. Provide ASTM D 2321 materials as follows:

a. Class I: Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

b. Class II: Coarse sands and gravels with maximum particle size of 1.5 inches, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D 2487.

2.2.1 Sand

Clean, coarse-grained sand shall be in accordance with MDOT.

2.2.2 Gravel

Clean, coarsely graded natural gravel, crushed stone or a combination thereof shall be in accordance with MDOT.

2.3 BACKFILL FOR UNDERDRAINAGE SYSTEMS

Clean sand, crushed rock, or gravel meeting the following requirements:

a. Perforated or Slotted-Wall Pipe: Backfill meeting requirements of Type I material as specified in Table 1.

b. Blind or French Drains: Backfill consisting of Type II or Type III material as specified in Table 1.

c. Any Type Drain Used With Filter Fabric: Clean gravel or crushed stone or gravel conforming to ASTM C 33 coarse aggregate grading size 57, 67, or 7 fill consisting of Type I or Type II material as specified in Table 1.

2.4 FILTER FABRIC

Provide a pervious sheet of polyester, nylon, glass or polypropylene, ultraviolet resistant filaments woven, spun bonded, fused, or otherwise manufactured into a nonraveling fabric with uniform thickness and strength. Fabric shall have the following manufacturer certified minimum average roll properties as determined by ASTM D 4759:

	Class A	Class B	
a. Grab tensile strength (ASTM D 4632) machine and transversed direction	min. 180	80	lbs.
b. Grab elongation (ASTM D 4632) machine and transverse direction	min. 15	15	percent

	Class A	Class B
c. Puncture resistance (ASTM D 4833)	min. 80	25 lbs.
d. Mullen burst strength (ASTM D 3786)	min. 290	130 psi.
e. Trapezoidal Tear (ASTM D 4533)	min. 290	25 lbs.
f. Apparent Opening Size (ASTM D 4751)	See Criteria Below	
(1) Soil with 50 percent or less particles by weight passing US No. 200 Sieve, AOS less than (greater than #30 US Std. Sieve)		
(2) Soil with more than 50 percent particles by weight passing US No. 200 Sieve, AOS less than (greater than #50 US Std. Sieve)		
g. Permeability (ASTM D 4491)	k fabric greater than k Soil	
h. Ultraviolet Degradation (ASTM D 4355)	70 percent Strength retained at 150 hours	

2.5 MATERIAL FOR RIP-RAP

Bedding material filter fabric and rock conforming to MDOT.

2.5.1 Bedding Material

Consisting of sand, gravel, or crushed rock, well graded, with a maximum particle size of 2 inches. Material shall be composed of tough, durable particles. Fines passing the No. 200 standard sieve shall have a plasticity index less than six.

2.5.2 Rock

Rock fragments sufficiently durable to ensure permanence in the structure and the environment in which it is to be used. Rock fragments shall be free from cracks, seams, and other defects that would increase the risk of deterioration from natural causes. The size of the fragments shall be such that no individual fragment exceeds a weight of 150 pounds and that no more than 10 percent of the mixture, by weight, consists of fragments weighing 2 pounds or less each. Specific gravity of the rock shall be a minimum of 2.50. The inclusion of more than trace 1 percent quantities of dirt, sand, clay, and rock fines will not be permitted.

2.6 BURIED WARNING AND IDENTIFICATION TAPE

Metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

Warning Tape Color Codes

Yellow:	Electric
Yellow:	Gas, Oil; Dangerous Materials
Orange:	Telephone and Other Communications
Blue:	Water Systems
Green:	Sewer Systems
White:	Steam Systems
Gray:	Compressed Air

2.6.1 Warning Tape for Metallic Piping

Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

2.6.2 Detectable Warning Tape for Non-Metallic Piping

Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.7 DETECTION WIRE FOR NON-METALLIC PIPING

Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Shoring and Sheeting

Provide shoring, bracing, cribbing, trench boxes, underpinning, and sheeting where indicated. In addition to Section 25 A and B of EM 385-1-1 and other requirements set forth in this contract, include provisions in the shoring and sheeting plan that will accomplish the following:

a. Prevent undermining of pavements, foundations and slabs.

b. Prevent slippage or movement in banks or slopes adjacent to the excavation.

c. Allow for the abandonment of shoring and sheeting materials in place in critical areas as the work is completed. In these areas, backfill the excavation to within 3 feet of the finished grade and remove the remaining exposed portion of the shoring before completing the backfill.

3.1.2 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.1.2.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. The Contractor shall establish/construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils, prevent erosion and undermining of foundations. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

3.1.2.2 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 1 feet below the working level.

Operate dewatering system continuously until construction work below existing water levels is complete. Submit performance records weekly.

3.1.3 Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction.

3.1.4 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.2 SURFACE PREPARATION

3.2.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs, brush and vegetation and other items that would interfere with construction operations within the clearing limits. Remove stumps entirely. Grub out

matted roots and roots over 2 inches in diameter to at least 18 inches below existing surface. All materials shall be disposed of off government property at a disposal site approved by the USACE.

3.2.2 Stripping

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be stockpiled and used for backfilling. Locate topsoil so that the material can be used readily for the finished grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.

3.2.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with satisfactory material or select material and compact to the requirements of the geotechnical report using ASTM D 1557 maximum density. Unless specified otherwise, refill excavations cut below indicated depth with backfill and fill material or select material and compact to the requirements of the geotechnical report using ASTM D 1557 maximum density. Satisfactory material removed below the depths indicated, without specific direction of the Contracting Officer, shall be replaced with satisfactory materials to the indicated excavation grade; except as specified for spread footings. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

3.3.1 Structures With Spread Footings

Ensure that footing subgrades have been inspected and approved by the Contracting Officer prior to concrete placement. Fill over excavations with concrete during foundation placement.

3.3.2 Pipe Trenches

Excavate to the dimension indicated. Grade bottom of trenches to provide uniform support for each section of pipe after pipe bedding placement. Tamp if necessary to provide a firm pipe bed. Recesses shall be excavated to accommodate bells and joints so that pipe will be uniformly supported for the entire length. Rock, where encountered, shall be excavated to a depth of at least 6 inches below the bottom of the pipe.

3.3.3 Hard Material and Rock Excavation

Remove hard material and rock to elevations indicated in a manner that will leave foundation material in an unshattered and solid condition. Roughen level surfaces and cut sloped surfaces into benches for bond with concrete. Protect shale from conditions causing decomposition along joints or cleavage planes and other types of erosion. Removal of hard material and rock beyond lines and grades indicated will not be grounds for a claim for additional payment unless previously authorized by the Contracting Officer. Excavation of the material claimed as rock shall not be performed until the material has been cross sectioned by the Contractor and approved by the Contracting Officer. Common excavation shall consist of all excavation not classified as rock excavation.

3.3.4 Excavated Materials

Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in Paragraph "DISPOSITION OF SURPLUS MATERIAL."

3.3.5 Final Grade of Surfaces to Support Concrete

Excavation to final grade shall not be made until just before concrete is to be placed. Only excavation methods that will leave the foundation rock in a solid and unshattered condition shall be used. Approximately level surfaces shall be roughened, and sloped surfaces shall be cut as indicated into rough steps or benches to provide a satisfactory bond. Shales shall be protected from slaking and all surfaces shall be protected from erosion resulting from ponding or flow of water.

3.4 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified herein.

3.4.1 Proof Rolling

Proof rolling shall be done on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. Proof roll the existing subgrade with

six passes of a dump truck loaded with 212 cubic feet of soil. Operate the truck in a systematic manner to ensure the number of passes over all areas, and at speeds between 2 1/2 to 3 1/2 miles per hour. When proof rolling under buildings, the building subgrade shall be considered to extend 5 feet beyond the building lines, and one-half of the passes made with the roller shall be in a direction perpendicular to the other passes. Notify the Contracting Officer a minimum of 3 days prior to proof rolling. Proof rolling shall be performed in the presence of the Contracting Officer. Rutting or pumping of material shall be undercut to a depth of 12 inches and replaced with select material.

3.5 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

3.5.1 Common Fill Placement

Provide for general site. Use satisfactory materials. Place in 6 inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

3.5.2 Backfill and Fill Material Placement

Provide for paved areas and under concrete slabs, except where select material is provided. Place in 6 inch lifts. Do not place over wet or frozen areas. Place backfill material adjacent to structures as the structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against the structure.

3.5.3 Select Material Placement

Provide under structures not pile supported. Place in 6 inch lifts. Do not place over wet or frozen areas. Backfill adjacent to structures shall be placed as structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against structure.

3.5.4 Backfill and Fill Material Placement Over Pipes and at Walls

Backfilling shall not begin until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to indicated finish grade and shall include backfill for outside grease interceptors and underground fuel tanks. Where pipe is coated or wrapped for protection against corrosion, the backfill material up to an elevation 2 feet above sewer lines and 1 foot above other utility lines shall be free from stones larger than 1 inch in any dimension. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around pipes or tanks to avoid damage to coatings, wrappings, or tanks. Backfill shall not be placed against foundation walls prior to 7 days after completion of the walls. As far as

practicable, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall.

3.5.5 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Place and compact backfill under structures and paved areas in 6 inch lifts to top of trench and in 6 inch lifts to one foot over pipe outside structures and paved areas.

3.6 BORROW

Where satisfactory materials are not available in sufficient quantity from required excavations, approved borrow materials shall be obtained as specified herein.

3.7 BURIED WARNING AND IDENTIFICATION TAPE

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.8 BURIED DETECTION WIRE

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. The wire shall extend continuously and unbroken, from manhole to manhole. The ends of the wire shall terminate inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. The wire shall remain insulated over it's entire length. The wire shall enter manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, the wire shall terminate in the valve pit at the pump station end of the pipe.

3.9 COMPACTION

Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required. Density requirements specified herein are for cohesionless materials. When cohesive materials are encountered or used, density requirements may be reduced by 5 percent.

3.9.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the paved area or structure to 90 percent of ASTM D 1557.

3.9.2 Structures, Spread Footings, and Concrete Slabs

Compact top 12 inches of subgrades to 95 percent of ASTM D 1557.

3.9.3 Adjacent Area

Compact areas within 5 feet of structures to 90 percent of ASTM D 1557.

3.9.4 Paved Areas

Compact top 12 inches of subgrades to 95 percent of ASTM D 1557. Compact fill and backfill materials to 95 percent of ASTM D 1557.

3.10 SPECIAL EARTHWORK REQUIREMENTS FOR SUBSURFACE DRAINS

Excavate to dimensions indicated. Provide a bedding surface of no more than one inch of gravel, Type I subdrain backfill material, and place on compacted native soil as indicated. Backfill around and over the pipes after pipe installation has been approved. Place special granular filter material in 6 inch lifts and compact with mechanical, vibrating plate tampers or rammers until no further consolidation can be achieved. Compact backfill overlying the special granular filter material as specified for adjacent or overlying work.

3.10.1 Granular Backfill Using Filter Fabric

3.10.1.1 Perforated or Slotted Wall Pipes

Wrap one layer of filter fabric around pipe in such a manner that longitudinal overlaps are in unperforated or unslotted quadrants of the pipe. Overlap fabric a minimum of 2 inches. Secure fabric to pipe so that backfill material does not infiltrate through overlaps. Place granular material and extend it for one pipe diameter, minimum of 6 inches on each side of and 18 inches above top of pipe. Place a layer of filter fabric on top of granular filter before continuing with backfill.

3.10.1.2 Open-Joint Pipe

Wrap one layer of filter fabric around pipe joints overlapping a minimum of 2 inches in the longitudinal direction and extending at least 6 inches on both sides of the joint. Secure fabric to pipe so that backfill material does not infiltrate through overlaps. Place granular material specified and extend it for a minimum of one pipe diameter on each side of and 18 inches above top of pipe. Place a layer of filter fabric on top of granular filter before continuing with backfill.

3.10.1.3 Blind or French Drains

Install filter cloth in trenches with smoothly graded sides and bottom, free of cavities or projecting rocks. Lay the cloth flat but not stretched and secure with anchor pins. Place filter cloth so that drain water must pass through the cloth into the specified granular filter material. Overlap ends at least of 12 inches. Place backfill on filter cloth in the direction of overlaps. Where fabric is damaged, place a new piece of filter cloth over damaged area and overlap at least of 12 inches in every direction.

3.11 RIP-RAP CONSTRUCTION

Construct rip-rap on bedding material in accordance with MDOT.

3.11.1 Preparation

Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

3.11.2 Bedding Placement

Spread filter fabric bedding material uniformly to a thickness of at least 3 inches on prepared subgrade as indicated. Compaction of bedding is not required. Finish bedding to present even surface free from mounds and

windrows.

3.11.3 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above.

3.12 FINISH OPERATIONS

3.12.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. Maintain areas free of trash and debris. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

3.12.2 Topsoil and Seed

Provide as specified in Section 32 92 19 SEEDING.

3.12.3 Protection of Surfaces

Protect newly backfilled, graded, and topsoiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.13 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.

3.14 FIELD QUALITY CONTROL

3.14.1 Sampling

Take the number and size of samples required to perform the following tests.

3.14.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

3.14.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 4318 for liquid limit and for plastic limit; or ASTM D 1557 for moisture density relations, as applicable.

3.14.2.2 Select Material Testing

Test select material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No.

200 sieve; ASTM D 1557 for moisture density relations, as applicable.

3.14.2.3 Porous Fill Testing

Test porous fill in accordance with ASTM C 136 for conformance to gradation specified in ASTM C 33.

3.14.2.4 Density Tests

Test density in accordance with ASTM D 1556, or ASTM D 6938. When ASTM D 6938 density tests are used, verify density test results by performing an ASTM D 1556 density test at a location already ASTM D 6938 tested as specified herein. Perform an ASTM D 1556 density test at the start of the job, and for every 10 ASTM D 6938 density tests thereafter. Test each lift at randomly selected locations every 2000 square feet of existing grade in fills for structures and concrete slabs, and every 2500 square feet for other fill areas and every 2000 square feet of subgrade in cut. Include density test results in daily report.

Bedding and backfill in trenches: One test per 50 linear feet in each lift.

3.14.2.5 Moisture Content Tests

In the stockpile, excavation or borrow areas, a minimum of two tests per day per type of material or source of materials being placed is required during stable weather conditions. During unstable weather, tests shall be made as dictated by local conditions and approved moisture content shall be tested in accordance with ASTM D 2216. Include moisture content test results in daily report.

-- End of Section --

SECTION 31 31 16

SOIL TREATMENT FOR SUBTERRANEAN TERMITE CONTROL
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

7 USC Section 136	Federal Insecticide, Fungicide, and Rodenticide Act

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Termiticide Application Plan; G

Termiticide application plan with proposed sequence of treatment work with dates and times. Include the termiticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area/volume treated, amount applied; and the name and state license number of the state certified applicator.

Termiticides

Manufacturer's label and Material Safety Data Sheet (MSDS) for termiticides proposed for use.

Foundation Exterior

Written verification that other site work will not disturb the treatment.

Utilities and Vents

Written verification that utilities and vents have been located.

Crawl and Plenum Air Spaces

Written verification that crawl spaces and plenum air spaces have been located.

Verification of Measurement

Written verification that the volume of termiticide used meets the application rate.

Application Equipment

A listing of equipment to be used.

Warranty

Copy of Contractor's warranty.

SD-04 Samples

Termiticides

Samples of the pesticides used in this work. The Contracting Officer may draw, at any time and without prior notice, from stocks at the job site; should analysis, performed by the Government, indicate such samples to contain less than the amount of active ingredient specified on the label, work performed with such products shall be repeated, with pesticides conforming to this specification, at no additional cost to the Government.

SD-06 Test Reports

Equipment Calibration and Tank Measurement

Certification of calibration tests conducted on the equipment used in the termiticide application.

Soil Moisture

Quality Assurance

Pest Management Report and copies of daily records signed by an officer of the Contractor.

SD-07 Certificates

Qualifications

1.3 QUALITY ASSURANCE

Comply with 7 USC Section 136 for requirements on Contractor's licensing, certification, and record keeping. Maintain daily records using Pest Management Maintenance Record, DD Form 1532-1 and submit copies of records when requested by the Contracting Officer. These forms may be obtained from the main web site:

http://www.dtic.mil/whs/directives/infomgt/forms/ddforms1500-1999.htm

Upon completion of this work, submit Pest Management Report DD Form 1532 identifying target pest, type of operation, brand name and manufacturer of pesticide, formulation, concentration or rate of application used.

1.3.1 Qualifications

For the application of pesticides, use the services of a subcontractor

whose principal business is pest control. The subcontractor shall be licensed and certified in the state where the work is to be performed. Termiticide applicators shall also be certified in the U.S. Environmental Protection Agency (EPA) pesticide applicator category which includes structural pest control. Submit the qualifications and state license number of the termiticide applicator.

1.3.2 Safety Requirements

Formulate, treat, and dispose of termiticides and their containers in accordance with label directions. Draw water for formulating only from sites designated by the Contracting Officer, and fit the filling hose with a backflow preventer meeting local plumbing codes or standards. The filling operation shall be under the direct and continuous observation of a contractor's representative to prevent overflow. Secure pesticides and related materials under lock and key when unattended. Ensure that proper protective clothing and equipment are worn and used during all phases of termiticide application. Dispose of used pesticide containers off Government property.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

Deliver termiticide material to the site in the original unopened containers bearing legible labels indicating the EPA registration number and manufacturer's registered uses. All other materials, to be used on site for the purpose of termite control, shall be delivered in new or otherwise good condition as supplied by the manufacturer or formulator.

1.4.2 Inspection

Inspect termiticides upon arrival at the job site for conformity to type and quality in accordance with paragraph TERMITICIDES. Each label shall bear evidence of registration under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended or under appropriate regulations of the host county. Other materials shall be inspected for conformance with specified requirements. Remove unacceptable materials from the job site.

1.4.3 Storage

Store materials in designated areas and in accordance with manufacturer's labels. Termiticides and related materials shall be kept under lock and key when unattended.

1.4.4 Handling

Observe manufacturer's warnings and precautions. Termiticides shall be handled in accordance with manufacturer's labels, preventing contamination by dirt, water, and organic material. Protect termiticides from sunlight as recommended by the manufacturer.

1.5 SITE CONDITIONS

The following conditions will determine the time of application.

1.5.1 Soil Moisture

Soils to be treated shall be tested immediately before application. Test

soil moisture content to a minimum depth of 3 inches. The soil moisture shall be as recommended by the termiticide manufacturer. The termiticide will not be applied when soil moisture exceeds manufacturer's recommendations because termiticides do not adhere to the soil particles in saturated soils.

1.5.2 Runoff and Wind Drift

Do not apply termiticide during or immediately following heavy rains. Applications shall not be performed when conditions may cause runoff or create an environmental hazard. Applications shall not be performed when average wind speed exceeds 10 miles per hour. The termiticide shall not be allowed to enter water systems, aquifers, or endanger humans or animals.

1.5.2.1 Vapor Barriers and Waterproof Membranes

Termiticide shall be applied prior to placement of a vapor barrier or waterproof membrane.

1.5.2.2 Utilities and Vents

Prior to application, HVAC ducts and vents located in treatment area shall be turned off and blocked to protect people and animals from termiticide.

1.5.3 Placement of Concrete

Place concrete covering treated soils as soon as the termiticide has reached maximum penetration into the soil. Time for maximum penetration shall be as recommended by the manufacturer.

1.6 WARRANTY

Provide a 5-year written warranty against infestations or reinfestations by subterranean termites of the buildings or building additions constructed under this contract. Warranty shall include annual inspections of the buildings or building additions. If live subterranean termite infestation or subterranean termite damage is discovered during the warranty period, and the soil and building conditions have not been altered in the interim:

a. Retreat the soil and perform other treatment as may be necessary for elimination of subterranean termite infestation;

b. Repair damage caused by termite infestation; and

c. Reinspect the building approximately 180 days after the retreatment.

PART 2 PRODUCTS

2.1 TERMITICIDES

Provide termiticides currently registered by the EPA or approved for such use by the appropriate agency of the host county. Select non-repellant termiticide for maximum effectiveness and duration after application. The selected termiticide shall be suitable for the soil and climatic conditions at the project site.

PART 3 EXECUTION

3.1 VERIFICATION OF MEASUREMENT

Once termiticide application has been completed, measure tank contents to determine the remaining volume. The total volume measurement of used contents for the application shall equal the established application rate for the project site conditions. Provide written verification of the measurements.

3.2 TECHNICAL REPRESENTATIVE

The certified installation pest management coordinator shall be the technical representative, shall be present at all meetings concerning treatment measures for subterranean termites, and may be present during treatment application. The command Pest Control Coordinator shall be contacted prior to starting work.

3.3 SITE PREPARATION

Site preparation shall be in accordance with Sections 31 11 00 CLEARING AND GRUBBING, 31 00 00 EARTHWORK, 32 92 19 SEEDING, 32 92 23 SODDING, 32 92 26 SPRIGGING, and 32 93 00 EXTERIOR PLANTS. Work related to final grades, landscape plantings, foundations, or any other alterations to finished construction which might alter the condition of treated soils, shall be coordinated with this specification.

3.3.1 Ground Preparation

Food sources shall be eliminated by removing debris from clearing and grubbing and post construction wood scraps such as ground stakes, form boards, and scrap lumber from the site, before termiticide application begins.

3.3.2 Verification

Before work starts, verify that final grades are as indicated and smooth grading has been completed in accordance with Section 31 00 00 EARTHWORK. Soil particles shall be finely graded with particles no larger than 1 inch and compacted to eliminate soil movement to the greatest degree.

3.3.3 Foundation Exterior

Provide written verification that final grading and landscape planting operations will not disturb treatment of the soil on the exterior sides of foundation walls, grade beams, and similar structures.

3.3.4 Utilities and Vents

Provide written verification that the location and identity of HVAC ducts and vents, water and sewer lines, and plumbing have been accomplished prior to the termiticide application.

3.3.5 Crawl and Plenum Air Spaces

Provide written verification that the location and identity of crawl and plenum air spaces have been accomplished prior to the termiticide application.

3.3.6 Application Plan

Submit a Termiticide Application Plan for approval before starting the specified treatment.

3.4 TERMITICIDE TREATMENT

3.4.1 Equipment Calibration and Tank Measurement

Immediately prior to commencement of termiticide application, calibration tests shall be conducted on the application equipment to be used and the application tank shall be measured to determine the volume and contents. These tests shall confirm that the application equipment is operating within the manufacturer's specifications and will meet the specified requirements. Provide written certification of the equipment calibration test results within 1 week of testing.

3.4.2 Mixing and Application

Formulating, mixing, and application shall be performed in the presence of the Contracting Officer or the technical representative. A closed system is recommended as it prevents the termiticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Prior to each day of use, the equipment used for applying termiticides shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately.

3.4.3 Treatment Method

For areas to be treated, establish complete and unbroken vertical and/or horizontal soil poison barriers between the soil and all portions of the intended structure which may allow termite access to wood and wood related products. Application shall not be made to areas which serve as crawl spaces or for use as a plenum air space.

3.4.3.1 Surface Application

Use surface application for establishing horizontal barriers. Surface applicants shall be applied as a coarse spray and provide uniform distribution over the soil surface. Termiticide shall penetrate a minimum of 1 inch into the soil, or as recommended by the manufacturer.

3.4.3.2 Rodding and Trenching

Use rodding and trenching for establishing vertical soil barriers. Trenching shall be to the depth of the foundation footing. Width of trench shall be as recommended by the manufacturer, or as indicated. Rodding or other approved method may be implemented for saturating the base of the trench with termiticide. Immediately after termiticide has reached maximum penetration as recommended by the manufacturer, backfilling of the trench shall commence. Backfilling shall be in 6 inch rises or layers. Each rise shall be treated with termiticide.

3.4.4 Sampling

The Contracting Officer may draw from stocks at the job site, at any time and without prior notice, take samples of the termiticides used to

determine if the amount of active ingredient specified on the label is being applied.

3.5 CLEAN UP, DISPOSAL, AND PROTECTION

Once application has been completed, proceed with clean up and protection of the site without delay.

3.5.1 Clean Up

The site shall be cleaned of all material associated with the treatment measures, according to label instructions, and as indicated. Excess and waste material shall be removed and disposed off site.

3.5.2 Disposal of Termiticide

Dispose of residual termiticides and containers off Government property, and in accordance with label instructions and EPA criteria.

3.5.3 Protection of Treated Area

Immediately after the application, the area shall be protected from other use by erecting barricades and providing signage as required or directed. Signage shall be in accordance with Section 10 14 01 EXTERIOR SIGNAGE. Signage shall be placed inside the entrances to crawl spaces and shall identify the space as treated with termiticide and not safe for children and animals.

3.6 CONDITIONS FOR SATISFACTORY TREATMENT

3.6.1 Equipment Calibrations and Measurements

Where results from the equipment calibration and tank measurements tests are unsatisfactory, re-treatment will be required.

3.6.2 Testing

Should an analysis, performed by a third party, indicate that the samples of the applied termiticide contain less than the amount of active ingredient specified on the label, and/or if soils are treated to a depth less than specified or approved, re-treatment will be required.

3.6.3 Disturbance of Treated Soils

Soil and fill material disturbed after treatment shall be re-treated before placement of slabs or other covering structures.

3.6.4 Termites Found Within the Warranty Period

If live subterranean termite infestation or termite damage is discovered during the warranty period, re-treat the site.

3.7 RE-TREATMENT

Where re-treatment is required, comply with the requirements specified in paragraph WARRANTY.

-- End of Section --

SECTION 32 05 33

LANDSCAPE ESTABLISHMENT
02/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 5851	(1995; R 2006) Planning and Implementing a Water Monitoring Program

TREE CARE INDUSTRY ASSOCIATION (TCIA)

TCIA Z133.1	(2006) American National Standard for Arboricultural Operations - Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush - Safety Requirements

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	(2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)

1.2 DEFINITIONS

1.2.1 Pesticide

Any substance or mixture of substances, including biological control agents, that may prevent, destroy, repel, or mitigate pests and are specifically labeled for use by the U.S. Environmental Protection Agency (EPA). Also, any substance used as a plant regulator, defoliant, disinfectant, or biocide. Examples of pesticides include fumigants, herbicides, insecticides, fungicides, nematicides, molluscicides and rodenticides.

1.2.2 Stand of Turf

95 percent ground cover of the established species.

1.2.3 Planter Beds

A planter bed is defined as an area containing one or a combination of the following plant types: shrubs, vines, wildflowers, annuals, perennials, ground cover, and a mulch topdressing excluding turf. Trees may also be found in planter beds.

1.3 RELATED REQUIREMENTS

Section 32 92 19 SEEDING applies to this section for installation of seed requirements, with additions and modifications herein.

Section 32 93 00 EXTERIOR PLANTS applies to this section for installation of trees, shrubs, ground cover, and wildflower, with additions and modifications herein.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Integrated Pest Management Plan; G

SD-03 Product Data

Local/Regional Materials; (LEED)

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to total dollar value of products included in project.

Fertilizer; G

Hose; (LEED)
Mulches Topdressing; (LEED)

Submit documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.

Organic Mulch Materials

Submit documentation indicating type of biobased material in product and biobased content. Indicate relative dollar value of biobased content products to total dollar value of products included in project.

SD-07 Certificates

Maintenance inspection report

Plant quantities; G

SD-10 Operation and Maintenance Data

Maintenance

SD-11 Closeout Submittals

Tree, staking and guying removal

1.5 DELIVERY, STORAGE AND HANDLING

1.5.1 Delivery

Deliver fertilizer to the site in original containers bearing manufacturer's chemical analysis, name, trade name, or trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with a certificate indicating the above information.

1.5.2 Storage

1.5.2.1 Fertilizer, Lime, Mulch Storage

Material shall be stored in designated areas. Lime and fertilizer shall be stored in cool, dry locations away from contaminants.

1.5.2.2 Antidessicants Storage

Do not store with fertilizers or other landscape maintenance materials.

1.5.3 Handling

Do not drop or dump materials from vehicles.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

1.6.1 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 500 mile radius from the project site, if available from a minimum of three sources. See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Landscaping materials may be locally available.

1.7 MAINTENANCE

Submit Operation and Maintenance (O&M) Manuals for planting materials. Include instructions indicating procedures during one typical year including variations of maintenance for climatic conditions throughout the year. Provide instructions and procedures for watering; promotion of growth, including fertilizing, pruning, and mowing; and integrated pest management. O&M Manuals shall include pictures of planting materials cross referenced to botanical and common names, with a description of the normal appearance in each season.

Develop a water monitoring program for surface and ground water on the project site in accordance with ASTM D 5851 and consistent with the water management program utilized during construction operations.

PART 2 PRODUCTS

2.1 POST-PLANT FERTILIZER

Fertilizer for groundcover, wildflowers, and grasses is not permitted.

Fertilizer for trees, plants, and shrubs shall be as recommended by plant supplier, except synthetic chemical fertilizers are not permitted. Fertilizers containing petrochemical additives or that have been treated with pesticides or herbicides are not permitted.

2.1.1 Granular Fertilizer

Organic, granular controlled release fertilizer shall be as determined by laboratory soil analysis of the soils at the job site.

2.2 WATER

The contractor shall be responsible for watering all plant materials, including turf areas until final acceptance. Source of water shall be approved by the Contracting Officer, and be of suitable quality for irrigation. Use collected storm water or graywater when available.

2.3 MULCHES TOPDRESSING

Free from noxious weeds, mold, pesticides, or other deleterious materials.

2.3.1 Inert Mulch Materials

Riverbank stone ranging in size from 1 to 12 inches. Provide materials from site to the greatest extent possible.

2.3.2 Organic Mulch Materials

Wood cellulose fiber, shredded hardwood, or pine straw mulch. Biobased content shall be a minimum of 100 percent. Wood cellulose fiber shall be processed to contain no growth or germination-inhibiting factors, dyed with non-toxic, biodegradable dye to an appropriate color to facilitate visual metering of materials application. Paper-based hydraulic mulch shall contain a minimum of 100 percent post-consumer recycled content. Wood-based hydraulic mulch shall contain a minimum of 100 percent recycled material.

2.3.3 Recycled Organic Mulch

Recycled mulch may include compost, tree trimmings, or pine needles with a gradation that passes through a 2-1/2 by 2-1/2 inch screen. It shall be cleaned of all sticks a minimum 1 inch in diameter and plastic materials a minimum 3 inch length. The material shall be treated to retard the growth of mold and fungi.

2.4 PESTICIDES

Pesticides and herbicides are not permitted. Submit an Integrated Pest Management Plan, including weed and pest management strategies and proposed alternatives to herbicides and pesticides. Use biological pest controls as approved in the Plan.

PART 3 EXECUTION

3.1 EXTENT OF WORK

Provide landscape construction maintenance to include mowing, edging, overseeding, aeration, fertilizing, watering, weeding, pruning, and stake and guy adjusting for all newly installed landscape areas, unless indicated

otherwise, and at all areas inside or outside the limits of the construction that are disturbed by the Contractor's operations.

3.1.1 Policing

The Contractor shall police all landscaped areas. Policing includes removal of leaves, branches and limbs regardless of length or diameter, dead vegetation, paper, trash, cigarette butts, garbage, rocks or other debris. Policing shall extend to both sides of fencing or walls. Collected debris shall be promptly removed and disposed of at an approved disposal site.

3.1.2 Drainage System Maintenance

The Contractor shall remove all obstructions from surface and subsurface drain lines to allow water to flow unrestricted in swales, gutters, catch basins, storm drain curb inlets, and yard drains. Remove grates and clear debris in catch basins. Open drainage channels are to be maintained free of all debris and vegetation at all times. Edges of these channels shall be clear of any encroachment by vegetation.

3.2 IRRIGATION ESTABLISHMENT PERIOD (NOT USED)

3.3 GROUNDCOVER ESTABLISHMENT PERIOD

Groundcover establishment period will commence on the date that inspection by the Contracting Officer shows that the new turf furnished under this contract has been satisfactorily installed to a 95 percent stand of coverage. The establishment period shall continue for a period of 365 days.

3.3.1 Frequency of Maintenance

Begin maintenance immediately after turf has been installed. Inspect areas once a week during the installation and establishment period and perform needed maintenance promptly.

3.3.2 Promotion of Growth

Groundcover shall be maintained in a manner that promotes proper health, growth, and natural color. Turf shall have a neat uniform manicured appearance, free of bare areas, ruts, holes, weeds, pests, dead vegetation, debris, and unwanted vegetation that present an unsightly appearance. Mow, remove excess clippings, eradicate weeds, water, fertilize, overseed, aerate, topdress and perform other operations necessary to promote growth, as approved by Contracting Officer and consistent with approved Integrated Pest Management Plan. Remove noxious weeds common to the area from planting areas by mechanical means.

3.3.3 Mowing

3.3.3.1 Turf

Turf shall be mowed at a uniform finished height. Mow turfed areas to a minimum average height of 3 inches when average height of grass becomes 4-5 inches for spring/summer and fall/winter maintenance. The height of turf is measured from the soil. Mowing of turf shall be performed in a manner that prevents scalping, rutting, bruising, uneven and rough cutting. Prior to mowing, all rubbish, debris, trash, leaves, rocks, paper, and limbs or branches on a turf area shall be picked up and disposed. Adjacent paved

areas shall be swept/vacuumed clean.

3.3.3.2 Native Grasses

Mow above height of native grass seedlings (approximately 3.5 to 4 inches). Mow during spring or early summer. Do not mow after early summer during the second growing season.

3.3.3.3 Wildflowers

Mow three times per season above height of the wildflowers (approximately 12 to 15 inches).

3.3.4 Turf Edging and Trimming

Perimeter of planter bed edges, sidewalks, driveways, curbs, and other paved surfaces shall be edged. Uniformly edge these areas to prevent encroachment of vegetation onto paved surfaces and to provide a clear cut division line between planter beds, turf, and ground cover. Edging is to be accomplished in a manner that prevents scalping, rutting, bruising, uneven and rough cutting. Edging shall be performed on the same day that turf is mowed. Use of string line trimmers is permitted in "soft" areas such as an edge between turfgrass and a planter bed. Care shall be exercised to avoid damage to any plant materials, structures, and other landscape features.

Trimming around trees, fences, poles, walls, and other similar objects is to be accomplished to match the height and appearance of surrounding mowed turf growth. Trimming shall be performed on the same day the turf is mowed. Care shall be exercised to avoid "Girdling" trees located in turf areas. The use of protective tree collars on trees in turf areas may be utilized as a temporary means to avoid injury to tree trunks. At the end of the plant establishment period Contractor will be responsible for removing all protective tree collars.

3.3.5 Post-Fertilizer Application

Do not fertilize wildflowers, groundcover, and grasses. Apply turf fertilizer in a manner that promotes health, growth, vigor, color and appearance of cultivated turf areas. The method of application, fertilizer type and frequencies shall be determined by the laboratory soil analysis results the requirements of the particular turf species. Organic fertilizer shall be used. In the event that organic fertilizer is not producing the desired effect, the Contractor shall contact the Contracting Officer for approval prior to the use of a synthetic type of fertilizer. Fertilizer shall be applied by approved methods in accordance with the manufacturer's recommendations.

3.3.6 Turf Watering

The Contractor shall perform irrigation in a manner that promotes the health, growth, color and appearance of cultivated vegetation and that complies with all Federal, State, and local water agencies and authorities directives. The Contractor shall be responsible to prevent over watering, water run-off, erosion, and ponding due to excessive quantities or rate of application. The Contractor shall abide by state, local or other water conservation regulations or restrictions in force during the establishment period.

3.3.7 Turf Aeration

Upon completion of weed eradication operations and Contracting Officer's approval to proceed, aerate turf areas by approved device. Core by pulling soil plugs, to a minimum depth of 2 inches. Leave all soil plugs that are produced in the turf area. [After aeration operations are complete, topdress entire area 1/4 to 1/2 inch depth with a mixture as recommended by laboratory soil tests.

Blend all parts of topdressing mixture to a uniform consistency throughout.] Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean all soil plugs off of other paving when work is complete. This work shall commence 14 days prior final acceptance of the maintenance establishment period.

3.3.8 Turf Clearance Area

Trees located in turf areas shall be maintained with a growth free clearance of 24 inches from the tree trunk base. The use of mechanical weed whips to accomplish the turf growth free bed area is prohibited.

3.3.9 Replanting

Replant in accordance with Section 32 92 19 SEEDING and within specified planting dates areas which do not have a satisfactory stand of turf. Replant areas which do not have a satisfactory stand of other groundcover and grasses.

3.3.10 Final Inspection and Acceptance

Final inspection will be make upon written request from the Contractor at least 10 days prior to the last day of the turf establishment period. Final turf acceptance will be based upon a satisfactory stand of turf. Final acceptance of wildflower and grass areas will be based upon a stand of 95 percent groundcover of established species.

3.3.11 Unsatisfactory Work

When work is found to not meet design intent and specifications, maintenance period will be extended at no additional cost to the Government until work has been completed, inspected and accepted by Contracting Officer.

3.4 EXTERIOR PLANT ESTABLISHMENT PERIOD

The exterior plant establishment period will commence on the date that inspection by the Contracting Officer shows that the new plants furnished under this contract have been satisfactorily installed and shall continue for a period of 365 days.

3.4.1 Frequency of Maintenance

Begin maintenance immediately after plants have been installed. Inspect exterior plants at least once a week during the installation and establishment period and perform needed maintenance promptly.

3.4.2 Promotion of Plant Growth and Vigor

Water, prune, fertilize, mulch, adjust stakes, guys and turnbuckles, eradicate weeds and perform other operations necessary to promote plant growth, and vigor.

3.4.3 Planter Bed Maintenance

Planter beds shall be weeded, fertilized, irrigated, kept pest free, turf free, pruned, and mulch levels maintained. Planter beds will not be allowed to encroach into turf areas. A definite break shall be maintained between turf areas and planter beds. Fertilize exterior planting materials to promote healthy plant growth without encouraging excessive top foliar growth. Remove noxious weeds common to the area from planting areas by mechanical means.

3.4.3.1 Shrub Selective Maintenance

In addition to the above requirements, shrubs shall be selectively pruned, and shaped for health and safety when the following conditions exist: Remove growth in front of windows, over entrance ways or walks, and any growth which will obstruct vision at street intersections or of security personnel; Remove dead, damaged or diseased branches or limbs; where shrub growth obstructs pedestrian walkways; where shrub growth is found growing against or over structures; where shrub growth permits concealment of unauthorized persons. All pruning debris shall be disposed of in a proper manner.

3.4.3.2 Tree Maintenance

Tree maintenance shall include adjustment of stakes, ties, guy supports and turnbuckles, watering, fertilizing, pest control, mulching, pruning for health and safety and fall leaf cleanup. Fertilize exterior trees to promote healthy plant growth without encouraging excessive top foliar growth. Stakes, ties, guy supports and turnbuckles shall be inspected and adjusted to avoid girdling and promote natural development. All trees within the project boundaries, regardless of caliper, shall be selectively pruned for safety and health reasons. These include but are not limited to removal of dead and broken branches and correction of structural defects. Prune trees according to their natural growth characteristics leaving trees well shaped and balanced. Pruning of all trees shall be accomplished by or in the presence of a certified member of the International Society of Arboriculture and in accordance with TCIA Z133.1. All pruning debris generated shall be disposed of in a proper manner.

3.4.4 Slope Erosion Control Maintenance

The Contractor shall provide slope erosion control maintenance to prevent undermining of all slopes in newly landscaped and natural growth areas. Maintenance tasks include immediate repairs to weak spots in sloped areas, and maintaining clean, clear culverts, and graded berms, and terraces to intercept and direct water flow to prevent development of large gullies and slope erosion. Eroded areas shall be filled with amended topsoil and replanted with the same plant species. Erosion control blankets damaged due to slope erosion shall be reinstalled.

3.4.5 Removal of Dying or Dead Plants

Remove dead and dying plants and provide new plants immediately upon

commencement of the specified planting season, and replace stakes, guys, mulch and eroded earth mound water basins. No additional plant establishment period will be required for replacement plants beyond the original warranty period. A tree shall be considered dying or dead when the main leader has died back, or a minimum of 20 percent of the crown has died. A shrub or ground cover shall be considered dying or dead when a minimum of 20 percent of the plant has died. This condition shall be determined by scraping on a branch an area 1/16 inch square, maximum, to determine the cause for dying plant material and shall provide recommendations for replacement. The Contractor shall determine the cause for dying plant material and provide recommendations for replacement.

3.4.6 Tracking of Unhealthy Plants

Note plants not in healthy growing condition, as determined by the Contracting Officer, and as soon as seasonal conditions permit, remove and replace with plants of the same species and sizes as originally specified. Install replacement plantings in accordance with Section 32 93 00 EXTERIOR PLANTS.

3.4.7 Final Inspection

Final inspection will be made upon written request from the Contractor at least 10 days prior to the last day of the establishment period. Final inspection will be based upon satisfactory health and growth of plants and on the following:

3.4.7.1 Total Plants on Site

Plants have been accepted and required number of replacements have been installed.

3.4.7.2 Mulching and Weeding

Planter beds and earth mound water basins are properly mulched and free of weeds.

3.4.7.3 Tree Supports

Stakes, guys and turnbuckles are in good condition.

3.4.7.4 Remedial Work

Remedial measures directed by the Contracting Officer to ensure plant material survival and promote healthy growth have been completed.

3.4.8 Unsatisfactory Work

When work is found to not meet design intent and specifications, maintenance period will be extended at no additional cost to the Government until work has been completed, inspected and accepted by Contracting Officer.

3.5 FIELD QUALITY CONTROL

3.5.1 Maintenance Inspection Report

Provide maintenance inspection report to assure that landscape maintenance is being performed in accordance with the specifications and in the best

interest of plant growth and survivability. Site observations shall be documented at the start of the establishment period, then quarterly following the start, and at the end of establishment period. Results of site observation visits shall be submitted to the Contracting Officer within 7 calendar days of each site observation visit.

3.5.2 Plant Quantities

The Contractor shall provide Contracting Officer with the number of plant quantities. In addition, provide total exterior area of landscaping such as turf and total number of shrubs.

3.5.3 Tree Staking and Guying Removal

The Contractor shall provide a certified letter that all stakes and guys are removed from all project trees at the end of the establishment period.

-- End of Section --

SECTION 32 11 26

BITUMINOUS BASE COURSE
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 156	(1997: R 2009) Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

ASTM INTERNATIONAL (ASTM)

ASTM C 127	(2007) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C 128	(2007a) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C 131	(2006) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 183	(2008) Standard Practice for Sampling and the Amount of Testing of Hydraulic Cement
ASTM C 29	(2009) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM D 140	(2009) Standard Practice for Sampling Bituminous Materials
ASTM D 1856	(2009) Recovery of Asphalt from Solution by Abson Method
ASTM D 2172	(2005) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2216	(2010) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

ASTM D 242	(2009) Mineral Filler for Bituminous Paving Mixtures
ASTM D 4318	(2010) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 5	(2006e1) Penetration of Bituminous Materials

1.2 SYSTEM DESCRIPTION

1.2.1 Bituminous Plant

Provide a bituminous plant of such capacity, as specified herein, to produce the quantities of bituminous mixtures required for the project within the completion time of the contract. Provide hauling equipment, paving machines, rollers, miscellaneous equipment, and tools in sufficient numbers and capacity and in proper working condition to place the bituminous paving mixtures at a rate equal to the plant output. A sufficient number of adequately trained personnel shall be available during paving operations to produce a pavement meeting the requirements in this specification.

1.2.2 Mixing Plants

Provide mixing plants which are automatic or semiautomatic controlled, commercially manufactured units designed, coordinated, and operated to consistently produce a mixture within the job-mix formula (JMF). Drum mixers will be prequalified at the production rate to be used during actual mix production. The prequalification tests will include extraction in accordance with ASTM D 2172 and recovery of the asphalt cement in accordance with ASTM D 1856. The penetration of the recovered asphalt binder shall not be less than 60 percent of the original penetration in accordance with ASTM D 5.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Job-Mix Formula (JMF)

Mix design at least [_____] days before it is to be used.

Waybills and delivery tickets
Sources of Aggregates

Copies of waybills and delivery tickets during the progress of the work. Certified waybills and delivery tickets for all materials actually used. Plan for operation of a new source of aggregates well in advance of starting production.

SD-04 Samples

Sources of Aggregates

Samples of a new source of aggregates for approval.

SD-06 Test Reports

Sources of Aggregates
Bituminous Materials
Sampling and testing

Copies of field tests results within 24 hours after the tests are performed. Certified copies of tests results for approval not less than 30 days before material is required for the work.

1.4 QUALITY ASSURANCE

1.4.1 Sampling and Testing

Sampling and testing are the responsibility of the Contractor, performed by an approved commercial testing laboratory or by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved. The first inspection will be at the expense of the Government. Cost incurred for any subsequent inspection required because of failure of the facilities to pass the first inspection will be charged to the Contractor. Perform tests in sufficient numbers and at the locations and times directed to ensure that materials, mixtures and compaction meet specified requirements. Obtain samples of finished pavement, including samples that span the longitudinal joint. Sizes of samples shall be suitable to determine conformance to density, thickness, and other specified requirements. Take samples at start of paving operations and at intervals throughout paving operations as directed. Take and test samples of plant mixtures to determine conformance to specified requirements. Certified copies of the test results shall be furnished to the Contracting Officer.

1.4.2 Aggregates

Sample aggregates in accordance with ASTM D 75 and test them at the start of production and at intervals during production of the bituminous base course. Intervals and points of sampling will be as approved. Test results on these samples will be the basis for approval of specific lots of aggregates.

1.4.3 Mineral Filler

Sampling of mineral filler shall conform to ASTM C 183.

1.4.4 Bituminous Materials

Sampling of bituminous materials shall conform to ASTM D 140.

1.4.5 Field Sampling of Pavements and Mixtures

The type, size, and locations of samples will be approved. Furnish all tools, labor, and materials for cutting samples and replacing pavement to meet specified requirements.

1.5 ENVIRONMENTAL REQUIREMENTS

Do not construct bituminous courses when the underlying course contains free surface water, or when temperature of the surface of the underlying course is below 40 degrees F, unless otherwise directed.

PART 2 PRODUCTS

2.1 AGGREGATES

Provide aggregates consisting of crushed stone, crushed slag, crushed gravel screenings, sand, and mineral filler, as required. The portion of these materials retained on the No. 4 sieve will be known as coarse aggregate; the portion passing the No. 4 sieve and retained on the No. 200 sieve, as fine aggregate; and the portion passing the No. 200 sieve, as mineral filler.

2.1.1 Coarse Aggregates

Provide coarse aggregates consisting of clean, sound, durable fragments of crushed stone, crushed slag, or crushed gravel meeting the following requirements:

2.1.1.1 Aggregate Wear

The percentage of wear shall not exceed 40 after 500 revolutions, as determined in accordance with ASTM C 131.

2.1.1.2 Dry Weight of Crushed Slag

The dry weight of crushed slag shall be not less than 75 pcf as determined in accordance with ASTM C 29.

2.1.2 Fine Aggregates

Provide fine aggregates consisting of clean, durable natural sands; manufactured sands prepared by crushing stone, slag, or gravel, or any combination of natural and manufactured sands. Natural sands shall consist of grains of clean, hard, durable rock.

2.1.3 Mineral Filler

Mineral filler shall conform to ASTM D 242.

2.1.4 Liquid Limit and Plasticity Index

Measure liquid limit and plasticity index in accordance with ASTM D 4318. Requirements stated herein shall apply to any aggregate component that is blended to meet the required gradation and also to the aggregate in the completed base course. The portion of the aggregate passing the No. 40 sieve shall be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

2.1.5 Sources of Aggregates

Select sources of aggregates well in advance of the time the material will be required in the work. If a previously developed source is selected, submit test results with evidence that central plant hot-mix bituminous pavements constructed with the aggregates have had a satisfactory service

record of at least 5 years under similar climatic conditions. An inspection of the producer's operation may be made. When new sources are developed, indicate the sources and submit samples for approval and a plan for operation well in advance of starting production. Proposed sources may be inspected. Make such tests and other investigations as necessary to determine whether or not aggregates meeting the requirements specified can be produced from the proposed sources. Inspection of the source of aggregate does not relieve the Contractor of the responsibility for delivery at the jobsite of aggregates that meet requirements specified herein.

2.2 BITUMINOUS MATERIALS

Select sources where bituminous materials are obtained in advance of time when materials will be required in the work; submit test results for approval not less than 10 working days before such material is required for use in the work.

2.2.1 Asphalt Cement

Asphalt cement to be mixed with mineral aggregates shall conform to MDOT.

2.2.2 Quality Control

In addition to initial qualification testing of bituminous materials, take samples before and during construction when shipments of bituminous materials are received or when necessary to assure that some condition of handling or storage has not been detrimental to the bituminous material.

2.3 AGGREGATE GRADATION

Mineral aggregate shall be of such size that percentage composition by weight, as determined by ASTM C 136, will conform to the gradation specified in TABLE 1. The table is based on aggregates of uniform specific gravity; percentages passing various sieves may be changed by the Contracting Officer when aggregates of varying specific gravities are used.

TABLE 1. AGGREGATE GRADATION

Sieve Size	Percent Passing	Percent Passing	Percent Passing	Percent Passing
1 1/2 inch	100	---	---	---
1 inch	75-93	100	---	---
3/4 inch	67-85	74-92	100	---
1/2 inch	57-75	64-82	73-91	100
3/8 inch	50-68	55-73	63-81	74-92
No. 4	36-54	39-57	45-63	53-71
No. 8	26-44	28-46	32-50	38-56
No. 16	18-36	19-37	23-41	27-45
No. 30	11-29	12-30	15-33	19-37
No. 50	7-21	9-23	10-24	13-27
No. 100	4-14	6-16	7-17	9-19
No. 200	3-7	3-7	3-7	3-7

2.4 COMPOSITION OF MIXTURE

2.4.1 Job-Mix Formula (JMF)

Do not produce bituminous mixture until a JMF has been approved by the Contracting Officer. The formula will indicate the percentage of each sieve fraction of aggregate, the percentage of bitumen, and the temperature of the completed mixture when discharged from the mixer. The JMF will be allowed tolerances given in TABLE 2 herein. Bitumen content and aggregate gradation may be adjusted within the limits of tables specified herein to improve the paving mixtures, as directed, without adjustments in contract prices.

TABLE 2. JOB-MIX FORMULA TOLERANCES

Material	Tolerance, Plus or Minus
Aggregate passing No. 4 sieve or larger	5 percent
Aggregate passing Nos. 8, 16, 30, and 50 sieves	4 percent
Aggregate passing Nos. 100 and 200 sieves	2 percent
Bitumen	0.25 percent
Temperature of mixing	25 degrees F

2.4.2 Test Properties of Bituminous Mixtures

The finished mixture shall meet requirements described below when tested in accordance with MDOT. All samples will be compacted with 75 blows of specified hammer on each side of sample.

2.4.2.1 Stability, Flow, and Voids

a. Nonabsorptive Aggregate: When the water-absorption value of the entire blend of aggregate does not exceed 2.5 percent as determined by ASTM C 127 and ASTM C 128, aggregate is designated as nonabsorptive. Use the apparent specific gravity in computing the voids total mix and voids filled with bitumen; the mixture shall meet the requirement in TABLE 3.

TABLE 3. NONABSORPTIVE AGGREGATE MIXTURE

Test Property	Limits
Stability, minimum, pounds	1800
Flow, maximum, 1/100-inch units	16
Voids total mix, percent	4-6
Voids filled with bitumen, percent	65-75

b. Absorptive Aggregate: When the water-absorption value of the entire blend of aggregate exceeds 2.5 percent as determined in ASTM C 127 and ASTM C 128, the aggregate is designated as absorptive. Use bulk-impregnated specific gravity, in computing the percentages of the voids total mix and voids filled with bitumen; the mixture shall meet the requirements in TABLE 4.

TABLE 4. ABSORPTIVE AGGREGATE MIXTURE

Test Property	Limits
Stability, minimum, pounds	1800
Flow, maximum, 1/100-inch units	16
Voids total mix, percent	3-5
Voids filled with bitumen, percent	70-80

2.4.2.2 Reduction in Stability by Immersion

If the index of retained stability of specimens of composite mixture is less than 75 percent, reject the aggregates or treat the bitumen with an approved antistripping agent. The quantity or type of antistripping agent to add to the bitumen shall be sufficient, as approved, to produce an index of retained stability of not less than 75 percent. Payment will not be made for the addition of the antistripping agent that may be required.

PART 3 EXECUTION

3.1 CONDITIONING OF UNDERLYING COURSE

Prior to placing the bituminous base course, clean the underlying surface of foreign or objectionable matter. The condition of the underlying course will be inspected and approved.

3.2 MIXING

3.2.1 Preparation of Mineral Aggregates

Place and maintain each aggregate stockpile in such a manner to prevent segregation. Regulate rates of feed of aggregates so that the moisture content and temperature of aggregates will be within tolerances specified herein. Provide dry storage for mineral filler.

3.2.2 Preparation of Bituminous Mixtures

Convey aggregates, mineral filler, and bitumen into the mixer in proportionate quantities required to meet the JMF. Set the mixing time as required to obtain a uniform coating of the aggregate with the bituminous material. The temperature of bitumen at time of mixing shall not exceed 300 degrees F. The temperature of aggregate and mineral filler in the mixer shall not exceed 325 degrees F when bitumen is added. Overheated and carbonized mixtures or mixtures that foam will be rejected.

3.2.3 Water Content of Aggregates

Perform drying operations to reduce the water content of mixture to less than 0.75 percent. The water content test will be conducted in accordance with ASTM D 2216. If the water content is determined on hot bin samples, the water content will be a weighted average based on composition of blend.

3.2.4 Storage of Bituminous Paving Mixture

Store the mixture according to the requirements of AASHTO M 156.

3.3 TRANSPORTATION OF BITUMINOUS MIXTURE

Transport the bituminous mixture from the paving plant to the site in trucks having tight, clean, smooth beds lightly coated with an approved releasing agent to prevent adhesion of mixture to truck bodies. Excessive releasing agent will be drained prior to loading. Cover each load with canvas or other approved material of ample size to protect mixture from weather and prevent loss of heat. Loads that have crusts of cold, unworkable material or have become wet by rain will be rejected. Hauling over freshly placed material will not be permitted.

3.4 PLACING

Do not place bituminous mixtures without ample time to complete spreading and rolling during daylight hours, unless satisfactory artificial lighting is provided.

3.4.1 Spraying of Contact Surfaces of Structures

Spray contact surfaces of previously constructed pavement, curbs, manholes, and similar structures with a thin coat of bituminous material conforming to the requirements of Section 32 12 10 BITUMINOUS TACK AND PRIME COATS.

3.4.2 Offsetting Joints in Bituminous Base Course

Place the bituminous base course so that longitudinal joints will be offset from joints in the underlying course by at least 1 foot. Transverse joints shall be offset by at least 2 feet from transverse joints in the underlying course.

3.4.3 Use of Mechanical Spreader

The range of temperatures of mixtures, when dumped into the mechanical spreader, shall be as approved. Mixtures having temperatures less than 225 degrees F when dumped into the mechanical spreader will be rejected. Adjust the mechanical spreader and regulate the speed so that the surface of the course being laid will be smooth and continuous without tears and pulls, and of such depth that, when compacted, the surface will conform to the cross section, grade, and contour indicated. Placing with respect to the center line, areas with crowned sections, or the high side of areas with one-way slope shall be as directed. Place the mixture as nearly continuous as possible, and adjust the speed of placing as directed, to permit proper rolling. When segregation occurs in the mixture during placing, suspend the spreading operation until the cause is determined and corrected. Correct irregularities in alignment of the course left by the mechanical spreader by trimming directly behind machine. Immediately after trimming, the edges of the course shall be thoroughly compacted by tamping laterally with a lute. Distortion of the course during tamping will not be permitted.

3.4.4 Placing Strips Succeeding Initial Strips

In placing each succeeding strip after the initial strip has been spread and compacted as specified below, the screed of the mechanical spreader shall overlap previously placed strip 3 to 4 inches and shall be sufficiently high so that compaction will produce a smooth, dense joint. The mixture placed on the edge of the previously placed strip by the mechanical spreader shall be pushed back to the edge of the strip being placed by using a lute. Excess mixture shall be removed and wasted.

3.4.5 Handwork Behind Machine Spreading

A sufficient number of shovelers and rakers shall follow the spreading machine, adding or removing hot mixture and raking mixtures as required to obtain a course that, when completed, will conform to all requirements specified herein. Excessive handwork will not be permitted. Broadcasting or fanning of the mixture over areas being compacted will not be permitted.

3.4.6 Hand Spreading in Lieu of Machine Spreading

In areas where the use of machine spreading is impractical, spread the mixture by hand. Prevent segregation during spreading. Spread the mixture uniformly with hot rakes in a loose layer of thickness that, when compacted, will conform to the required grade and thickness.

3.5 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS

Finished surfaces of bituminous base courses, when tested as specified below, shall conform to the gradeline and elevations shown and to surface-smoothness requirements specified.

3.5.1 Plan Grade

Finished surfaces shall conform, within tolerances specified, to the lines, grades, and cross sections indicated. Finished surfaces of runways, taxiways, and aprons shall vary not more than 0.04 foot from the plan gradeline or elevation established and approved at the site of work. Finished surfaces of nonaircraft traffic areas, such as blast pads and stabilized shoulders, shall vary not more than 0.06 foot from the plan gradeline and elevation established and approved at the site. Finished surfaces at the juncture with other pavements shall coincide with finished surfaces of abutting pavements. The 0.04- and 0.06-foot deviations from the plan gradeline and elevation will not be permitted in areas of pavements where closer conformance with plan grade and elevation is required for the proper functioning of drainage and other appurtenant structures involved.

3.5.2 Surface Smoothness

Finished surfaces shall not deviate from the testing edge of a 12 foot straightedge more than 1/4 inch in any direction.

3.5.3 Equipment

Furnish and maintain at the site, in good condition, one straightedge for each bituminous paver for use in testing the finished surface. Straightedges shall be aluminum and have blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on pavement.

3.6 COMPACTION OF MIXTURE

Begin rolling as soon after placing as the mixture will bear roller without undue displacement. Delays in rolling freshly spread mixture will not be permitted. After the initial rolling, perform preliminary tests of the crown, grade, and smoothness. Correct deficiencies so that the finished course will conform to requirements for the grade and smoothness specified herein. After meeting crown, grade, and smoothness requirements, continue

rolling until a density of at least 96 percent of laboratory compacted specimens of the same mixture is obtained. Places inaccessible to rollers shall be thoroughly compacted with hot hand tampers.

3.6.1 Testing of Mixture

At the start of plant operation, a quantity of the mixture sufficient to construct a test section at least 50 feet long and two spreader widths wide shall be prepared. The mixture shall be placed, spread, and rolled with equipment to be used in the project and in accordance with requirements specified above. This test section shall be tested and evaluated and shall conform to all specified requirements. If tests indicate that the pavement does not conform to specification requirements, make necessary adjustments immediately to plant operations and rolling procedures. Additional test sections shall be constructed and sampled for conformance to specification requirements. In no case shall the Contractor start production of the bituminous base course mixture without approval.

3.6.2 Correcting Deficient Areas

Remove mixtures that become contaminated or are defective. Skin patching of an area that has been rolled will not be permitted. Cut holes the full thickness of the base course so that the sides are perpendicular and parallel to the direction of traffic and the edges are vertical. Spray bulges with bituminous materials conforming to requirements of Section 32 12 10 BITUMINOUS TACK AND PRIME COATS. Place fresh paving mixture in the holes in sufficient quantity so that the finished surface will conform to grade, smoothness, and density requirements.

3.7 JOINTS

3.7.1 General

Joints between old and new pavements or between successive day's work, or joints that have become cold because of delay, shall be made carefully to insure continuous bond between old and new sections of course. All joints shall have the same texture, density, and smoothness as other sections of the course. Contact surfaces of previously constructed pavements that have become coated with dust, sand, or other objectionable material shall be cleaned by brushing or cut back with approved power saw, as directed. Spray the surface against which new material is placed with a thin, uniform coat of bituminous material conforming to requirements of Section 32 12 10 BITUMINOUS TACK AND PRIME COATS. Apply the material far enough in advance of placement of the fresh mixture to insure adequate curing. Take care to prevent damage or contamination of sprayed surface.

3.7.2 Transverse Joints

Pass the roller over the unprotected end of freshly placed mixture only when placing of the course is discontinued or when delivery of the mixture is interrupted to the extent that the unrolled material may become cold. In all cases, cut back the edge of the previously placed course to expose an even, vertical surface for the full thickness of the course. In continuing placement of the strip, position the mechanical spreader on the transverse joint so that sufficient hot mixture will be spread to obtain a joint after rolling that conforms to the required density and smoothness specified herein.

3.7.3 Longitudinal Joints

Edges of a previously placed strip that have cooled or are irregular, honeycombed, poorly compacted, damaged, or otherwise defective, and unsatisfactory sections of the joint shall be cut back to expose a clean, sound surface for the full thickness of the course as directed.

3.8 EDGES OF PAVEMENT

Bulges adjacent to shoulders shall be trimmed neatly to the line.

3.9 PROTECTION OF PAVEMENT

After final rolling of the pavement, no vehicular traffic of any kind shall be permitted until the pavement has cooled to ambient temperature.

-- End of Section --

SECTION 32 12 10

BITUMINOUS TACK AND PRIME COATS
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 81	(1992; R 2008) Standard Specification for Cutback Asphalt (Rapid-Curing Type)
AASHTO M 82	(1975; R 2008) Standard Specification for Cutback Asphalt (Medium-Curing Type)
AASHTO T 40	(2002; R 2006) Sampling Bituminous Materials

ASTM INTERNATIONAL (ASTM)

ASTM D 2397	(2005) Standard Specification for Cationic Emulsified Asphalt
ASTM D 2995	(1999; R 2009) Determining Application Rate of Bituminous Distributors
ASTM D 977	(2005) Emulsified Asphalt

1.2 SYSTEM DESCRIPTION

1.2.1 General Requirements

Plant, equipment, machines and tools used in the work are subject to approval and shall be maintained in a satisfactory working condition at all times. Calibrated equipment such as asphalt distributors, scales, batching equipment, spreaders and similar equipment, should have been recalibrated by a calibration laboratory within 12 months prior to commencing work.

1.2.2 Bituminous Distributor

Provide a distributor with pneumatic tires of such size and number that the load produced on the base surface does not exceed 650 psi of tire width to prevent rutting, shoving or otherwise damaging the base surface or other layers in the pavement structure. Design and equip the distributor to spray the bituminous material in a uniform coverage at the specified temperature, at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard, with a pressure range of 25 to 75 psi and with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars,

tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying bituminous material manually to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the bituminous material during the heating process.

1.2.3 Heating Equipment for Storage Tanks

The equipment for heating the bituminous material shall be steam, electric, or hot oil heaters. Provide steam heaters consisting of steam coils and equipment for producing steam, so designed that the steam cannot get into the material. Fix an armored thermometer to the tank with a temperature range from 40 to 400 degrees F so that the temperature of the bituminous material may be determined at all times.

1.2.4 Power Brooms and Power Blowers

Use power brooms and power blowers suitable for cleaning the surfaces to which the bituminous coat is to be applied.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Waybills and Delivery Tickets

Waybills and delivery tickets, during progress of the work.

SD-06 Test Reports

Sampling and Testing

Copies of all test results for emulsified asphalt, and bituminous materials, within 24 hours of completion of tests. Certified copies of the manufacturer's test reports indicating temperature viscosity relationship for cutback asphalt, compliance with applicable specified requirements, not less than 30 days before the material is required in the work.

1.4 QUALITY ASSURANCE

[Use Local/Regional Materials or products extracted, harvested, or recovered, as well as manufactured, within a [500][_____] mile radius from the project site, if available from a minimum of three sources.][See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Tack and prime coat materials may be locally available.]

1.5 DELIVERY, STORAGE, AND HANDLING

Inspect the materials delivered to the site for contamination and damage. Unload and store the materials with a minimum of handling.

1.6 ENVIRONMENTAL REQUIREMENTS

Apply bituminous coat only when the surface to receive the bituminous coat is dry. Apply bituminous coat only when the atmospheric temperature in the shade is 50 degrees F or above and when the temperature has not been below 35 degrees F for the 12 hours prior to application, unless otherwise directed.

PART 2 PRODUCTS

2.1 PRIME COAT

Provide asphalt conforming to [AASHTO M 81] [AASHTO M 82], and specified in the following two subparagraphs.

2.1.1 Emulsified Asphalt

Provide emulsified asphalt conforming to ASTM D 977, Type SS-1 ASTM D 2397, Type CSS-1.

2.2 TACK COAT

Provide asphalt conforming to MDOT.

2.2.1 Emulsified Asphalt

Provide emulsified asphalt conforming to MDOT.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

Immediately before applying the bituminous coat, remove all loose material, dirt, clay, or other objectionable material from the surface to be treated by means of a power broom or blower supplemented with hand brooms. The surface shall be dry and clean at the time of treatment.

3.2 APPLICATION RATE

The exact quantities within the range specified, which may be varied to suit field conditions, will be determined by the Contracting Officer.

3.2.1 Tack Coat

Apply bituminous material for the tack coat in quantities of not less than 0.05 gallon nor more than 0.15 gallon per square yard of pavement surface.

3.2.2 Prime Coat

Apply bituminous material for the prime coat in quantities of not less than 0.18 gallon nor more than 0.35 gallon per square yard of pavement surface.

3.3 APPLICATION TEMPERATURE

3.3.1 Viscosity Relationship

Asphalt application temperature shall provide an application viscosity between 10 and 60 seconds, Saybolt Furol, or between 20 and 120 centistokes, kinematic. Furnish the temperature viscosity relation to the Contracting

Officer.

3.3.2 Temperature Ranges

The viscosity requirements determine the application temperature to be used. The following is a normal range of application temperatures:

Liquid Asphalts	
RC-70	120-200 degrees F*
Paving Grade Asphalts	
Penetration Grades	
200-300	plus 265 degrees F
Viscosity Grades	
AR 1000	plus 275 degrees F
Emulsions	
SS-1	70-160 degrees F

These temperature ranges exceed the flash point of the material and care should be taken in their heating.

3.4 APPLICATION

3.4.1 General

Following preparation and subsequent inspection of the surface, apply the bituminous prime or tack coat with the Bituminous Distributor at the specified rate with uniform distribution over the surface to be treated. Properly treat all areas and spots missed by the distributor with the hand spray. Until the succeeding layer of pavement is placed, maintain the surface by protecting the surface against damage and by repairing deficient areas at no additional cost to the Government. If required, spread clean dry sand to effectively blot up any excess bituminous material. No smoking, fires, or flames other than those from the heaters that are a part of the equipment are permitted within 25 feet of heating, distributing, and transferring operations of bituminous material other than bituminous emulsions. Prevent all traffic, except for paving equipment used in constructing the surfacing, from using the underlying material, whether primed or not, until the surfacing is completed. The bituminous coat shall conform to all requirements as described herein.

3.4.2 Prime Coat

Apply a prime coat at locations shown on the Drawings. The prime coat is required if it will be at least 7 days before the surfacing (Asphalt cement hot mix concrete) layer is constructed on the underlying (base course, etc.) compacted material. The type of liquid asphalt and application rate will be as specified herein. Protect the underlying from any damage

(water, traffic, etc.) until the surfacing is placed. If the Contractor places the surfacing within seven days, the choice of protection measures or actions to be taken is at the Contractor's option. Repair (recompact or replace) damage to the underlying material caused by lack of, or inadequate, protection by approved methods at no additional cost to the Government. If the Contractor opts to use the prime coat, apply as soon as possible after consolidation of the underlying material. Apply the bituminous material uniformly over the surface to be treated at a pressure range of 25 to 75 psi; the rate shall be as specified above in paragraph APPLICATION RATE. To obtain uniform application of the prime coat on the surface treated at the junction of previous and subsequent applications, spread building paper on the surface for a sufficient distance back from the ends of each application to start and stop the prime coat on the paper and to ensure that all sprayers will operate at full force on the surface to be treated. Immediately after application remove and destroy the building paper.

3.4.3 Tack Coat

Apply tack coat at the locations shown on the drawings. Apply the tack coat when the surface to be treated is dry. Immediately following the preparation of the surface for treatment, apply the bituminous material by means of the bituminous distributor, within the limits of temperature specified herein and at a rate as specified above in paragraph APPLICATION RATE. Apply the bituminous material so that uniform distribution is obtained over the entire surface to be treated. Treat lightly coated areas and spots missed by the distributor with the bituminous material. Following the application of bituminous material, allow the surface to cure without being disturbed for period of time necessary to permit setting of the tack coat. Apply the bituminous tack coat only as far in advance of the placing of the overlying layer as required for that day's operation. Maintain and protect the treated surface from damage until the succeeding course of pavement is placed.

3.5 CURING PERIOD

Following application of the bituminous material and prior to application of the succeeding layer of pavement, allow the bituminous coat to cure and to obtain evaporation of any volatiles or moisture. Maintain the coated surface until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas. Allow the prime coat to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course. Furnish and spread enough sand to effectively blot up and cure excess bituminous material.

3.6 FIELD QUALITY CONTROL

Samples of the bituminous material shall be tested for compliance with the applicable specified requirements. A sample shall be obtained and tested by the Contractor for every 1000 gallons of bituminous material used shall be obtained by the Contractor as directed, under the supervision of the Contracting Officer. The sample may be retained and tested by the Government at no cost to the Contractor.

3.7 SAMPLING AND TESTING

Perform sampling and testing by an approved commercial testing laboratory or by facilities furnished by the Contractor. No work requiring testing

will be permitted until the facilities have been inspected and approved.

3.7.1 Sampling

The samples of bituminous material, unless otherwise specified, shall be in accordance with ASTM D 140 or AASHTO T 40. Sources from which bituminous materials are to be obtained shall be selected and notification furnished the Contracting Officer within 15 days after the award of the contract.

3.7.2 Calibration Test

Furnish all equipment, materials, and labor necessary to calibrate the bituminous distributor. Calibration shall be made with the approved job material and prior to applying the bituminous coat material to the prepared surface. Calibrate the bituminous distributor in accordance with ASTM D 2995.

3.7.3 Trial Applications

Before providing the complete bituminous coat, apply three lengths of at least 100 feet for the full width of the distributor bar to evaluate the amount of bituminous material that can be satisfactorily applied.

3.7.3.1 Tack Coat Trial Application Rate

Unless otherwise authorized, apply the trial application rate of bituminous tack coat materials in the amount of 0.05 gallons per square yard. Other trial applications shall be made using various amounts of material as may be deemed necessary.

3.7.3.2 Prime Coat Trial Application Rate

Unless otherwise authorized, apply the trial application rate of bituminous materials in the amount of 0.25 gallon per square yard. Other trial applications shall be made using various amounts of material as may be deemed necessary.

3.7.4 Sampling and Testing During Construction

Perform quality control sampling and testing as required in paragraph FIELD QUALITY CONTROL.

3.8 TRAFFIC CONTROLS

Keep traffic off surfaces freshly treated with bituminous material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

-- End of Section --

SECTION 32 12 17

HOT MIX BITUMINOUS PAVEMENT
04/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASPHALT INSTITUTE (AI)

AI MS-02	(1997 6th Ed) Mix Design Methods

ASTM INTERNATIONAL (ASTM)

ASTM C 117	(2004) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 127	(2007) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C 128	(2007a) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C 131	(2006) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 188	(2009) Standard Test Method for Density of Hydraulic Cement
ASTM C 29	(2009) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C 88	(2005) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM D 1073	(2007) Fine Aggregate for Bituminous Paving Mixtures
ASTM D 1188	(2007e1) Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
ASTM D 1559	(1989) Resistance to Plastic Flow of

	Bituminous Mixtures Using Marshall Apparatus
ASTM D 2041	(2003a) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D 2172	(2005) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 242	(2009) Mineral Filler for Bituminous Paving Mixtures
ASTM D 2726	(2010) Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D 4867	(2009) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D 546	(2005) Sieve Analysis of Mineral Filler for Bituminous Paving Mixtures
ASTM D 692	(2009) Coarse Aggregate for Bituminous Paving Mixtures
ASTM D 70	(2009e1) Specific Gravity and Density of Semi-Solid Bituminous Materials (Pycnometer Method)
ASTM D 75	(2009) Standard Practice for Sampling Aggregates
ASTM D 854	(2010) Specific Gravity of Soil Solids by Water Pycnometer
ASTM D 979	(2001; R 2006e1) Sampling Bituminous Paving Mixtures
ASTM D 995	(1995b; R 2002) Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-04 Samples

Bituminous pavement

SD-05 Design Data

Job-mix formula

Submit a job-mix formula, prepared specifically for this project

within one year of submittal for roads, for approval by the Government prior to preparing and placing the bituminous mixture. Design mix using procedures contained in Chapter V, Marshall Method of Mix Design, of AI MS-02. Formulas shall indicate physical properties of the mixes as shown by tests made by a commercial laboratory approved by the Contracting Officer, using materials identical to those to be provided on this project. Submit formulas with material samples. Job-mix formula for each mixture shall be in effect until modified in writing by the Contractor and approved by the Contracting Officer. Provide a new job-mix formula for each source change. Submittal shall include all tests indicated in MIX DESIGN section of this specification.

ASPHALT CEMENT BINDER

MIX DESIGN

SD-06 Test Reports

Specific gravity test of asphalt

Coarse aggregate tests

Weight of slag test

Percent of crushed pieces in gravel

Fine aggregate tests

Specific gravity of mineral filler

Bituminous mixture tests

Aggregates tests

Bituminous mix tests

Pavement courses

Submit in accordance with paragraph entitled "Mock-Up Test Section."

1.3 QUALITY ASSURANCE

1.3.1 Safety Requirements

Provide adequate and safe stairways with handrails to the mixer platform, and safe and protected ladders or other means for accessibility to plant operations. Guard equipment and exposed steam or other high temperature lines or cover with a suitable type of insulation.

1.3.2 Required Data

Job-mix formula shall show the following:

a. Source and proportions, percent by weight, of each ingredient of the mixture;

b. Correct gradation, the percentages passing each size sieve listed

in the specifications for the mixture to be used, for the aggregate and mineral filler from each separate source and from each different size to be used in the mixture and for the composite mixture;

c. Amount of material passing the No. 200 sieve determined by dry sieving;

d. Number of blows of hammer compaction per side of molded specimen;

e. Temperature viscosity relationship of the asphalt cement;

f. Stability, flow, percent voids in mineral aggregate, percent air voids, unit weight;

g. Asphalt absorption by the aggregate;

h. Effective asphalt content as percent by weight of total mix;

i. Temperature of the mixture immediately upon completion of mixing;

j. Asphalt performance grade viscosity grade penetration range; and

k. Curves for the leveling, binder, and wearing courses.

1.3.3 Charts

Plot and submit, on a grain size chart, the specified aggregate gradation band, the job-mix gradation and the job-mix tolerance band.

1.3.4 Selection of Optimum Asphalt Content

Base selection on percent of total mix and the average of values at the following points on the curves for each mix:

a. Stability: Peak

b. Unit Weight: Peak

c. Percent Air Voids: Median

1.4 DELIVERY, STORAGE, AND HANDLING

Inspect materials delivered to the site for damage and store with a minimum of handling. Store aggregates in such a manner as to prevent segregation, contamination, or intermixing of the different aggregate sizes.

1.5 ENVIRONMENTAL CONDITIONS

Place bituminous mixture only during dry weather and on dry surfaces. Place courses only when the surface temperature of the underlying course is greater than 45 degrees F for course thicknesses greater than one inch and 55 degrees F for course thicknesses one inch or less.

1.6 CONSTRUCTION EQUIPMENT

Calibrated equipment, such as scales, batching equipment, spreaders and similar equipment, shall have been recalibrated by a calibration laboratory approved by the Contracting Officer within 12 months of commencing work.

1.6.1 Mixing Plant

Design, coordinate, and operate the mixing plant to produce a mixture within the job-mix formula tolerances and to meet the requirements of ASTM D 995, including additional plant requirements specified herein. The plant shall be a batch type, continuous mix type or drum-dryer mixer type, and shall have sufficient capacity to handle the new bituminous construction. Minimum plant capacity shall be 100 tons per hour. The mixing plant and equipment shall remain accessible at all times for inspecting operation, verifying weights, proportions and character of materials, and checking mixture temperatures. The plant and plant site shall meet the requirements of Section 01 57 19.00 20 TEMPORARY ENVIRONMENTAL CONTROLS.

1.6.1.1 Cold Aggregate Feeder

Provide plant with a feeder or feeders capable of delivering the maximum number of aggregate sizes required in their proper proportion. Provide adjustment for total and proportional feed and feeders capable of being locked in any position. When more than one cold elevator is used, feed each elevator as a separate unit and install individual controls integrated with a master control.

1.6.1.2 Dryer

Provide rotary drum-dryer which continuously agitates the mineral aggregate during the heating and drying process. When one dryer does not dry the aggregate to specified moisture requirements, provide additional dryers.

1.6.1.3 Plant Screens and Bins for Batch and Continuous Mix Plants

Use screen to obtain accurate gradation and allow no bin to contain more than 10 percent oversize or undersize. Inspect screens each day prior to commencing work for plugged, worn, or broken screens. Clean plugged screens and replace worn or broken screens with new screens prior to beginning operations. Divide hot aggregate bins into at least three compartments arranged to ensure separate and adequate storage of appropriate fractions of the aggregate.

1.6.1.4 Testing Laboratory

Provide a testing laboratory for control and acceptance testing functions during periods of mix production, sampling and testing, and whenever materials subject to the provisions of these specifications are being supplied or tested. The laboratory shall provide adequate equipment, space, and utilities as required for the performance of the specified tests.

1.6.1.5 Surge and Storage Bins

Use for temporary storage of hot bituminous mixtures will be permitted under the following conditions:

a. When stored in surge bins for a period of time not to exceed 3 hours.

b. When stored in insulated and heated storage bins for a period of time not to exceed 12 hours. If it is determined by the Contracting Officer that there is an excessive amount of heat

loss, segregation and oxidation of the mixture due to temporary storage, discontinue use of surge bins or storage bins.

1.6.1.6 Drum-Dryer Mixer

Do not use drum-dryer mixer if specified requirements of the bituminous mixture or of the completed bituminous pavement course cannot be met. If drum-dryer mixer is prohibited, use either batch or continuous mix plants meeting the specifications and producing a satisfactory mix.

1.6.2 Paving Equipment

1.6.2.1 Spreading Equipment

Self-propelled electronically controlled type, unless other equipment is authorized by the Contracting Officer. Equip spreading equipment of the self-propelled electronically controlled type with hoppers, tamping or vibrating devices, distributing screws, electronically adjustable screeds, and equalizing devices. Capable of spreading hot bituminous mixtures without tearing, shoving, or gouging and to produce a finished surface of specified grade and smoothness. Operate spreaders, when laying mixture, at variable speeds between 5 and 45 feet per minute. Design spreader with a quick and efficient steering device; a forward and reverse traveling speed; and automatic devices to adjust to grade and confine the edges of the mixture to true lines. The use of a spreader that leaves indented areas or other objectionable irregularities in the fresh laid mix during operations is prohibited.

1.6.2.2 Rolling Equipment

Self-propelled pneumatic-tired rollers supplemented by three-wheel and tandem type steel wheel rollers. The number, type and weight of rollers shall be sufficient to compact the mixture to the required density without detrimentally affecting the compacted material. Rollers shall be suitable for rolling hot-mix bituminous pavements and capable of reversing without backlash. Pneumatic-tired rollers shall be capable of being operated both forward and backward without turning on the mat, and without loosening the surface being rolled. Equip rollers with suitable devices and apparatus to keep the rolling surfaces wet and prevent adherence of bituminous mixture. Vibratory rollers especially designed for bituminous concrete compaction may be used provided rollers do not impair stability of pavement structure and underlying layers. Repair depressions in pavement surfaces resulting from use of vibratory rollers. Rollers shall be self-propelled, single or dual vibrating drums, and steel drive wheels, as applicable; equipped with variable amplitude and separate controls for energy and propulsion.

1.6.2.3 Hand Tampers

Minimum weight of 25 pounds with a tamping face of not more than 50 square inches.

1.6.2.4 Mechanical Hand Tampers

Commercial type, operated by pneumatic pressure or by internal combustion.

PART 2 PRODUCTS

2.1 AGGREGATES

Grade and proportion aggregates and filler so that combined mineral aggregate conforms to specified grading.

2.1.1 Coarse Aggregates

ASTM D 692, except as modified herein. At least 75 percent by weight of aggregate retained on the No. 4 sieve shall have two or more fractured faces. Percentage of wear, Los Angeles test, except for slag, shall not exceed 40 in accordance with ASTM C 131. Weight of slag shall not be less than 70 pounds per cubic foot. Soundness test is required in accordance with ASTM C 88; after 5 cycles, loss shall not be more than 12 percent when tested with sodium sulfate or 18 percent when tested with magnesium sulfate.

2.1.2 Fine Aggregate

ASTM D 1073, except as modified herein. Fine aggregate shall be produced by crushing stone, slag or gravel that meets requirements for wear and soundness specified for coarse aggregate. Where necessary to obtain the gradation of aggregate blend or workability, natural sand may be used. Quantity of natural sand to be added shall be approved by the Contracting Officer and shall not exceed 15 percent of weight of coarse and fine aggregate and material passing the No. 200 sieve.

2.1.3 Mineral Filler

Nonplastic material meeting the requirements of ASTM D 242.

2.1.4 Aggregate Gradation

The combined aggregate gradation shall conform to gradations specified in Table I, when tested in accordance with ASTM C 136 and ASTM C 117, and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grade uniformly from coarse to fine.

Table I. Aggregate Gradations

	Gradation 1	Gradation 2	Gradation 3
Sieve Size, inch	Percent Passing by Mass	Percent Passing by Mass	Percent Passing by Mass
1	100	---	---
3/4	76-96	100	---
1/2	68-88	76-96	100
3/8	60-82	69-89	76-96
No. 4	45-67	53-73	58-78
No. 8	32-54	38-60	40-60
No. 16	22-44	26-48	28-48
No. 30	15-35	18-38	18-38
No. 50	9-25	11-27	11-27
No. 100	6-18	6-18	6-18
No. 200	3-6	3-6	3-6

2.2 ASPHALT CEMENT BINDER

Asphalt cement binder shall conform to MDOT.

2.3 MIX DESIGN

The Contractor shall develop the mix design. The asphalt mix shall be composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF). No hot-mix asphalt for payment shall be produced until a JMF has been approved. The hot-mix asphalt shall be designed using procedures contained in AI MS-02 and the criteria shown in Table II. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D 4867 is less than 75, the aggregates shall be rejected or the asphalt mixture treated with an approved anti-stripping agent. The amount of anti-stripping agent added shall be sufficient to produce a TSR of not less than 75. If an antistrip agent is required, it shall be provided by the Contractor at no additional cost.

2.3.1 JMF Requirements

The job mix formula shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of the test section and shall include as a minimum:

a. Percent passing each sieve size.

b. Percent of asphalt cement.

c. Percent of each aggregate and mineral filler to be used.

d. Asphalt viscosity grade, penetration grade, or performance grade.

e. Number of blows of hammer per side of molded specimen.

f. Laboratory mixing temperature.

g. Lab compaction temperature.

h. Temperature-viscosity relationship of the asphalt cement.

i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.

j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-02.

k. Specific gravity and absorption of each aggregate.

l. Percent natural sand.

m. Percent particles with two or more fractured faces (in coarse aggregate).

n. Fine aggregate angularity.

o. Percent flat or elongated particles (in coarse aggregate).

p. Tensile Strength Ratio.

q. Antistrip agent (if required) and amount.

r. List of all modifiers and amount.

s. Percentage and properties (asphalt content, binder properties, and aggregate properties) of RAP in accordance with paragraph RECYCLED HOT-MIX ASPHALT, if RAP is used.

Table II. Marshall Design Criteria

Test Property	75 Blow Mix	50 Blow Mix
Stability, pounds minimum	*2150	*1350
Flow, 0.01 inch	8-16	8-18
Air voids, percent	3-5	3-5
Percent Voids in mineral aggregate (minimum)	See Table III	See Table III
TSR, minimum percent	75	75

* This is a minimum requirement. The average during construction shall be significantly higher than this number to ensure compliance with the specifications.

Table III. Minimum Percent Voids in Mineral Aggregate (VMA)**

Aggregate (See Table 2)	Minimum VMA, percent
Gradation 1	13.0
Gradation 2	14.0
Gradation 3	15.0

** Calculate VMA in accordance with AI MS-02, based on ASTM D 2726 bulk specific gravity for the aggregate.

2.3.2 Adjustments to JMF

The JMF for each mixture shall be in effect until a new formula is approved in writing by the Contracting Officer. Should a change in sources of any materials be made, a new mix design shall be performed and a new JMF approved before the new material is used. The Contractor will be allowed to adjust the JMF within the limits specified below to optimize mix volumetric properties. Adjustments to the JMF shall be limited to plus or minus 3 percent on the 1/2 inch, No. 4, and No. 8 sieves; plus or minus 1.0 percent on the No. 200 sieve; and plus or minus 0.40 percent binder content. If adjustments are needed that exceed these limits, a new mix design shall be developed. Tolerances given above may permit the aggregate grading to be outside the limits shown in Table I; this is acceptable.

2.4 SOURCE QUALITY CONTROL

Employ a commercial laboratory approved by the Contracting Officer to perform testing. The laboratory used to develop the JMF and the laboratory used to perform all sampling and testing shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements or clearly listing all deficiencies shall be submitted to the Contracting Officer prior to the start of construction. The certification shall contain as a minimum:

a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.

b. A listing of equipment to be used in developing the job mix.

c. A copy of the laboratory's quality control system.

d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program.

2.4.1 Tests

Perform testing in accordance with the following:

a. Specific Gravity Test of Asphalt: ASTM D 70

b. Coarse Aggregate Tests:

(1) Bulk Specific Gravity: ASTM C 127

(2) Abrasion Loss: ASTM C 131

(3) Soundness Loss: ASTM C 88

c. Weight of Slag Test: ASTM C 29

d. Percent of Crushed Pieces in Gravel: Count by observation and weight

e. Fine Aggregate Tests:

(1) Bulk Specific Gravity: ASTM C 128

(2) Soundness Loss: ASTM C 88

f. Specific Gravity of Mineral Filler: ASTM C 188 or ASTM D 854

g. Bituminous Mixture Tests:

(1) Bulk Specific Gravity: ASTM D 1188 or ASTM D 2726

(2) Theoretical Maximum Specific Gravity: ASTM D 2041

(3) Tensile Strength Ratio: ASTM D 4867

2.4.2 Specimens

ASTM D 1559 for the making and testing of bituminous specimens with the

following exceptions:

a. Compaction: Apply 75 blows of the hammer to each flat face of the specimen.

b. Curves: Plot curves for the leveling, binder, and wearing courses to show the effect on the test properties of at least four different percentages of asphalt on the unit weight, stability, flow, air voids, and voids in mineral aggregate; each point on the curves shall represent the average of at least four specimens.

c. Cooling of Specimen: After compaction is completed, allow the specimen to cool in air to the same temperature approximately as that of the water, 77 degrees F, to be used in the specific gravity determination.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Preparation of Asphalt Binder Material

The asphalt cement material shall be heated avoiding local overheating and providing a continuous supply of the asphalt material to the mixer at a uniform temperature. The temperature of unmodified asphalts shall be no more than 325 degrees F when added to the aggregates. Modified asphalts shall be no more than 350 degrees F when added to the aggregate.

3.1.2 Preparation of Mineral Aggregates

Store different size aggregate in separate stockpiles so that different sizes will not mix. Stockpile different-sized aggregates in uniform layers by use of a clam shell or other approved method so as to prevent segregation. The use of bulldozers in stockpiling of aggregate or in feeding aggregate to the dryer is prohibited. Feed aggregates into the cold elevator by means of separate mechanical feeders so that aggregates are graded within requirements of the job-mix formulas and tolerances specified. Regulate rates of feed of the aggregates so that moisture content and temperature of aggregates are within tolerances specified herein. Dry and heat aggregates to the temperature necessary to achieve the mixture determined by the job mix formula within the job tolerance specified. Provide adequate dry storage for mineral filler.

3.1.3 Preparation of Bituminous Mixture

Accurately weigh aggregates and dry mineral filler and convey into the mixer in the proportionate amounts of each aggregate size required to meet the job-mix formula. In batch mixing, after aggregates and mineral filler have been introduced into the mixer and mixed for not less than 15 seconds, add asphalt by spraying or other approved methods and continue mixing for a period of not less than 20 seconds, or as long as required to obtain a homogeneous mixture. The time required to add or spray asphalt into the mixer will not be added to the total wet-mixing time provided the operation does not exceed 10 seconds and a homogeneous mixture is obtained. When a continuous mixer is employed, mixing time shall be more than 35 seconds to obtain a homogeneous mixture. Additional mixing time, when required, will be as directed by the Contracting Officer. When mixture is prepared in a twin-pugmill mixer, volume of the aggregates, mineral filler, and asphalt

shall not extend above tips of mixer blades when blades are in a vertical position. Overheated and carbonized mixtures, or mixtures that foam or show indication of free moisture, will be rejected. When free moisture is detected in batch or continuous mix plant produced mixtures, waste the mix and withdraw the aggregates in the hot bins immediately and return to the respective stockpiles; for drum-dryer mixer plants, waste the mix, including that in surge or storage bins that is affected by free moisture.

3.1.4 Transportation of Bituminous Mixtures

Transport bituminous material from the mixing plant to the paving site in trucks having tight, clean, smooth beds that have been coated with a minimum amount of concentrated solution of hydrated lime and water or other approved coating to prevent adhesion of the mixture to the truck. Petroleum products will not be permitted for coating truck. If air temperature is less than 60 degrees F or if haul time is greater than 30 minutes, cover each load with canvas or other approved material of ample size to protect the mixture from the loss of heat. Make deliveries so that the spreading and rolling of all the mixture prepared for one day's run can be completed during daylight, unless adequate approved artificial lighting is provided. Deliver mixture to area to be paved so that the temperature at the time of dumping into the spreader is within the range specified herein. Reject loads that are below minimum temperature, that have crusts of cold unworkable material, or that have been wet excessively by rain. Hauling over freshly laid material is prohibited.

3.1.5 Surface Preparation of Underlying Course

Prior to the laying of the asphalt concrete, clean underlying course of foreign or objectionable matter with power blowers or power brooms, supplemented by hand brooms and other cleaning methods where necessary. During the placement of multiple lifts of bituminous concrete, each succeeding lift of bituminous concrete shall have its underlying lift cleaned and provided with a bituminous tack coat if the time period between the placement of each lift of bituminous concrete exceeds 14 days, or the underlying bituminous concrete has become dirty. Remove grass and other vegetative growth from existing cracks and surfaces.

3.1.6 Spraying of Contact Surfaces

Spray contact surfaces of previously constructed pavement with a thin coat of bituminous materials to act as an anti-stripping agent, conforming to Section 32 12 21 BITUMINOUS ROAD-MIX SURFACE COURSE. Paint contact surfaces of structures with a thin coat of emulsion or other approved bituminous material prior to placing the bituminous mixture. Tack coat the previously placed primed coats on base courses when surface has become excessively dirty and cannot be cleaned or when primed surface has cured to the extent that it has lost all bonding effect.

3.2 PLACEMENT

3.2.1 Machine Spreading

The range of temperatures of the mixtures at the time of spreading shall be between 250 degrees F and 300 degrees F. Bituminous concrete having temperatures less than minimum spreading temperature when dumped into the spreader will be rejected. Adjust spreader and regulate speed so that the surface of the course is smooth and continuous without tears and pulling, and of such depth that, when compacted, the surface conforms with the cross

section, grade, and contour indicated. Unless otherwise directed, begin the placing along the centerline of areas to be paved on a crowned section or on the high side of areas with a one-way slope. Place mixture in consecutive adjacent strips having a minimum width of 10 feet, except where the edge lanes require strips less than 10 feet to complete the area. Construct longitudinal joints and edges to true line markings. Establish lines parallel to the centerline of the area to be paved, and place string lines coinciding with the established lines for the spreading machine to follow. Provide the number and location of the lines needed to accomplish proper grade control. When specified grade and smoothness requirements can be met for initial lane construction by use of an approved long ski-type device of not less than 30 feet in length and for subsequent lane construction by use of a short ski or shoe, in-place string lines for grade control may be omitted. Place mixture as nearly continuous as possible and adjust the speed of placing as needed to permit proper rolling.

3.2.2 Shoveling, Raking, and Tamping After Machine-Spreading

Shovelers and rakers shall follow the spreading machine. Add or remove hot mixture and rake the mixture as required to obtain a course that when completed will conform to requirements specified herein. Broadcasting or fanning of mixture over areas being compacted is prohibited. When segregation occurs in the mixture during placing, suspend spreading operation until the cause is determined and corrected. Correct irregularities in alignment left by the spreader by trimming directly behind the machine. Immediately after trimming, compact edges of the course by tamping laterally with a metal lute or by other approved methods. Distortion of the course during tamping is prohibited.

3.2.3 Hand-Spreading in Lieu of Machine-Spreading

In areas where the use of machine spreading is impractical, spread mixture by hand. The range of temperatures of the mixtures when dumped onto the area to be paved shall be between 250 and 300 degrees F. Mixtures having temperatures less than minimum spreading temperature when dumped onto the area to be paved will be rejected. Spread hot mixture with rakes in a uniformly loose layer of a thickness that, when compacted, will conform to the required grade, thickness, and smoothness. During hand spreading, place each shovelful of mixture by turning the shovel over in a manner that will prevent segregation. Do not place mixture by throwing or broadcasting from a shovel. Do not dump loads any faster than can be properly handled by the shovelers and rakers.

3.3 COMPACTION OF MIXTURE

Compact mixture by rolling. Begin rolling as soon as placement of mixture will bear rollers. Delays in rolling freshly spread mixture shall not be permitted. Start rolling longitudinally at the extreme sides of the lanes and proceed toward center of pavement, or toward high side of pavement with a one-way slope. Operate rollers so that each trip overlaps the previous adjacent strip by at least one foot. Alternate trips of the roller shall be of slightly different lengths. Conduct tests for conformity with the specified crown, grade and smoothness immediately after initial rolling. Before continuing rolling, correct variations by removing or adding materials as necessary. If required, subject course to diagonal rolling with the steel wheeled roller crossing the lines of the previous rolling while mixture is hot and in a compactible condition. Speed of the rollers shall be slow enough to avoid displacement of hot mixture. Correct displacement of mixture immediately by use of rakes and fresh mixture, or

remove and replace mixture as directed. Continue rolling until roller marks are eliminated and course has a density per MDOT requirements but not more than 100 percent of that attained in a laboratory specimen of the same mixture prepared in accordance with ASTM D 1559. During rolling, moisten wheels of the rollers enough to prevent adhesion of mixture to wheels, but excessive water is prohibited. Operation of rollers shall be by competent and experienced operators. Provide sufficient rollers for each spreading machine in operation on the job and to handle plant output. In places not accessible to the rollers, compact mixture thoroughly with hot hand tampers. Skin patching of an area after compaction is prohibited. Remove mixture that becomes mixed with foreign materials or is defective and replace with fresh mixture compacted to the density specified herein. Roller shall pass over unprotected edge of the course only when laying of course is to be discontinued for such length of time as to permit mixture to become cold.

3.4 JOINTS

Joints shall present the same texture and smoothness as other portions of the course, except permissible density at the joint may be up to 2 percent less than the specified course density. Carefully make joints between old and new pavement or within new pavements in a manner to ensure a thorough and continuous bond between old and new sections of the course. Vertical contact surfaces of previously constructed sections that are coated with dust, sand, or other objectionable material shall be painted with a thin uniform coat of emulsion or other approved bituminous material just before placing fresh mixture.

3.4.1 Transverse

Roller shall pass over unprotected end of freshly laid mixture only when laying of course is to be discontinued. Except when an approved bulkhead is used, cut back the edge of previously laid course to expose an even, vertical surface for the full thickness of the course. When required, rake fresh mixture against joints, thoroughly tamp with hot tampers, smooth with hot smoothers, and roll. Transverse joints in adjacent lanes shall be offset a minimum of 2 feet.

3.4.2 Longitudinal Joints

Space 6 inches apart. Do not allow joints to coincide with joints of existing pavement or previously placed courses. Spreader screed shall overlap previously placed lanes 2 to 3 inches and be of such height to permit compaction to produce a smooth dense joint. With a lute, push back mixture placed on the surface of previous lanes to the joint edge. Do not scatter mix. Remove and waste excess material. When edges of longitudinal joints are irregular, honeycombed, or poorly compacted, cut back unsatisfactory sections of joint and expose an even vertical surface for the full thickness of the course. When required, rake fresh mixture against joint, thoroughly tamp with hot tampers, smooth with hot smoothers, and roll while hot.

3.5 FIELD QUALITY CONTROL

3.5.1 Sampling

3.5.1.1 Aggregates At Source

Prior to production and delivery of aggregates, take at least one initial

sample in accordance with ASTM D 75 at the source from each stockpile. Collect each sample by taking three incremental samples at random from the source material to make a composite sample of not less than 50 pounds. Repeat the sampling when the material source changes or when testing reveals unacceptable deficiencies or variations from the specified grading of materials.

3.5.1.2 Cold Feed Aggregate Sampling

Take two samples daily from the belt conveying materials from the cold feed. Collect materials in three increments at random to make a representative composite sample of not less than 50 pounds. Take samples in accordance with ASTM D 75.

3.5.1.3 Coarse and Fine Aggregates

Take a 50 pound sample from the cold feed at least once daily for sieve analyses and specific gravity tests. Additional samples may be required to perform more frequent tests when analyses show deficiencies, or unacceptable variances or deviations. The method of sampling is as specified herein for aggregates.

3.5.1.4 Mineral Filler

ASTM D 546. Take samples large enough to provide ample material for testing.

3.5.1.5 Pavement and Mixture

Take plant samples for the determination of mix properties and field samples for thickness and density of the completed pavements. Furnish tools, labor and material for samples, and satisfactory replacement of pavement. Take samples and tests at not less than frequency specified hereinafter and at the beginning of plant operations; for each day's work as a minimum; each change in the mix or equipment; and as often as directed. Accomplish sampling in accordance with ASTM D 979.

3.5.2 Testing

3.5.2.1 Aggregates Tests

a. Gradation: ASTM C 136.

b. Mineral Filler Content: ASTM D 546.

c. Abrasion: ASTM C 131 for wear (Los Angeles test). Perform one test initially prior to incorporation into the work and each time the source is changed.

3.5.2.2 Bituminous Mix Tests

Test one sample for each 500 tons, or fraction thereof, of the uncompacted mix for extraction in accordance with ASTM D 2172; perform a sieve analysis on each extraction sample in accordance with ASTM C 136 and ASTM C 117. Test one sample for each 500 tons or fraction thereof for stability and flow in accordance with ASTM D 1559. Test one sample for each material blend for Tensile Strength Ratio in accordance with ASTM D 4867.

3.5.2.3 Pavement Courses

Perform the following tests:

a. Density: For each 1000 tons of bituminous mixture placed, determine the representative laboratory density by averaging the density of four laboratory specimens prepared in accordance with ASTM D 1559. Samples for laboratory specimens shall be taken from trucks delivering mixture to the site; record in a manner approved by the Contracting Officer the project areas represented by the laboratory densities. From each representative area recorded, determine field density of pavement by averaging densities of 4 inch diameter cores obtained from leveling, binder, and wearing courses; take one core for each 2000 square yards or fraction thereof of course placed. Determine density of laboratory prepared specimens and cored samples in accordance with ASTM D 1188 or ASTM D 2726, as applicable. Separate pavement layers by sawing or other approved means. Maximum allowable deficiency at any point, excluding joints, shall not be more than 2 percent less than the specified density for any course. The average density of each course, excluding joints, shall be not less than the specified density. Joint densities shall not be more than 2 percent less than specified course densities and are not included when calculating average course densities. When the deficiency exceeds the specified tolerances, correct each such representative area or areas by removing the deficient pavement and replacing with new pavement.

b. Thickness: Determine thickness of binder and wearing courses from samples taken for the field density test. The maximum allowable deficiency at any point shall not be more than 1/4 inch less than the thickness for the indicated course. Average thickness of course or of combined courses shall be not less than the indicated thickness. Where a deficiency exceeds the specified tolerances, correct each such representative area or areas by removing the deficient pavement and replacing with new pavement.

c. Smoothness: Straightedge test the compacted surface of leveling, binder, and wearing courses as work progresses. Apply straightedge parallel with and at right angles to the centerline after final rolling. Unevenness of leveling and binder courses shall not vary more than 1/4 inch in 10 feet; variations in the wearing course shall not vary more than 1/8 inch in 10 feet. Correct each portion of the pavement showing irregularities greater than that specified.

d. Finished Grades: Finish grades of each course placed shall not vary from the finish elevations, profiles, and cross sections indicated by more than 1/2 inch. Finished surface of the final wearing course will be tested by the Contracting Officer by running lines of levels at intervals of 25 feet longitudinally and transversely to determine elevations of completed pavement. Within 45 days after completion of final placement, perform a level survey at the specified grid spacing and plot the results on a plan drawn to the same scale as the drawings. Elevations not in conformance with the specified tolerance shall be noted on the plan in an approved manner. The survey shall be performed by a registered land surveyor. The Contracting Officer will inform the Contractor in writing of paved areas that fail to meet the final

grades indicated within the specified tolerances. Correct deficient paved areas by removing existing work and replacing with new materials that meet the specifications. Skin patching for correcting low areas is prohibited.

e. Finish Surface Texture of Wearing Course: Visually check final surface texture for uniformity and reasonable compactness and tightness. Final wearing course with a surface texture having undesirable irregularities such as segregation, cavities, pulls or tears, checking, excessive exposure of coarse aggregates, sand streaks, indentations, ripples, or lack of uniformity shall be removed and replaced with new materials.

3.6 PROTECTION

Do not permit vehicular traffic, including heavy equipment, on pavement until surface temperature has cooled to at least 120 degrees F. Measure surface temperature by approved surface thermometers or other satisfactory methods.

-- End of Section --

SECTION 32 16 13

CONCRETE SIDEWALKS AND CURBS AND GUTTERS
04/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 182	(2005; R 2009) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

ASTM INTERNATIONAL (ASTM)

ASTM A 185	(2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A 615	(2009b) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM C 143	(2010) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C 171	(2007) Standard Specification for Sheet Materials for Curing Concrete
ASTM C 173	(2010b) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 309	(2007) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 31	(2010) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 920	(2010) Standard Specification for Elastomeric Joint Sealants
ASTM D 1751	(2004; R 2008) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	(2004a; R 2008) Standard Specification for

	Preformed Sponge Rubber Cork and Recycled PVC Expansion
ASTM D 5893	(2010) Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

1.2 SYSTEM DESCRIPTION

1.2.1 General Requirements

Provide plant, equipment, machines, and tools used in the work subject to approval and maintained in a satisfactory working condition at all times. The equipment shall have the capability of producing the required product, meeting grade controls, thickness control and smoothness requirements as specified. Use of the equipment shall be discontinued if it produces unsatisfactory results. The Contracting Officer shall have access at all times to the plant and equipment to ensure proper operation and compliance with specifications.

1.2.2 Slip Form Equipment

Slip form paver or curb forming machine, will be approved based on trial use on the job and shall be self-propelled, automatically controlled, crawler mounted, and capable of spreading, consolidating, and shaping the plastic concrete to the desired cross section in 1 pass.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Concrete

Copies of certified delivery tickets for all concrete used in the construction.

SD-06 Test Reports

Field Quality Control

Copies of all test reports within 24 hours of completion of the test.

1.4 ENVIRONMENTAL REQUIREMENTS

1.4.1 Placing During Cold Weather

Do not place concrete when the air temperature reaches 40 degrees F and is falling, or is already below that point. Placement may begin when the air temperature reaches 35 degrees F and is rising, or is already above 40 degrees F. Make provisions to protect the concrete from freezing during the specified curing period. If necessary to place concrete when the temperature of the air, aggregates, or water is below 35 degrees F, placement and protection shall be approved in writing. Approval will be

contingent upon full conformance with the following provisions. The underlying material shall be prepared and protected so that it is entirely free of frost when the concrete is deposited. Mixing water and aggregates shall be heated as necessary to result in the temperature of the in-place concrete being between 50 and 85 degrees F. Methods and equipment for heating shall be approved. The aggregates shall be free of ice, snow, and frozen lumps before entering the mixer. Covering and other means shall be provided for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.

1.4.2 Placing During Warm Weather

The temperature of the concrete as placed shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. The placing temperature shall not exceed 95 degrees F at any time.

PART 2 PRODUCTS

2.1 CONCRETE

Provide concrete conforming to the applicable requirements of Section 03 30 00.00 10 CAST-IN-PLACE CONCRETE except as otherwise specified. Concrete shall have a minimum compressive strength of 3500 psi at 28 days. Maximum size of aggregate shall be 1-1/2 inches.

2.1.1 Air Content

Mixtures shall have air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

2.1.2 Slump

The concrete slump shall be 2 inches plus or minus 1 inch where determined in accordance with ASTM C 143.

2.1.3 Reinforcement Steel

Reinforcement bars shall conform to ASTM A 615. Wire mesh reinforcement shall conform to ASTM A 185.

2.2 CONCRETE CURING MATERIALS

2.2.1 Impervious Sheet Materials

Impervious sheet materials shall conform to ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.

2.2.2 Burlap

Burlap shall conform to AASHTO M 182.

2.2.3 White Pigmented Membrane-Forming Curing Compound

White pigmented membrane-forming curing compound shall conform to ASTM C 309, Type 2.

2.3 CONCRETE PROTECTION MATERIALS

Concrete protection materials shall be a linseed oil mixture of equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the Contractor, commercially prepared linseed oil mixtures, formulated specifically for application to concrete to provide protection against the action of deicing chemicals may be used, except that emulsified mixtures are not acceptable.

2.4 JOINT FILLER STRIPS

2.4.1 Contraction Joint Filler for Curb and Gutter

Contraction joint filler for curb and gutter shall consist of hard-pressed fiberboard.

2.4.2 Expansion Joint Filler, Premolded

Expansion joint filler, premolded, shall conform to ASTM D 1751 or ASTM D 1752, 1/2 inch thick, unless otherwise indicated.

2.5 JOINT SEALANTS

Joint sealant, cold-applied shall conform to ASTM C 920 or ASTM D 5893.

2.6 FORM WORK

Design and construct form work to ensure that the finished concrete will conform accurately to the indicated dimensions, lines, and elevations, and within the tolerances specified. Forms shall be of wood or steel, straight, of sufficient strength to resist springing during depositing and consolidating concrete. Wood forms shall be surfaced plank, 2 inches nominal thickness, straight and free from warp, twist, loose knots, splits or other defects. Wood forms shall have a nominal length of 10 feet. Radius bends may be formed with 3/4 inch boards, laminated to the required thickness. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Ends of steel forms shall be interlocking and self-aligning. Steel forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers. Steel forms shall have a nominal length of 10 feet with a minimum of 3 welded stake pockets per form. Stake pins shall be solid steel rods with chamfered heads and pointed tips designed for use with steel forms.

2.6.1 Sidewalk Forms

Sidewalk forms shall be of a height equal to the full depth of the finished sidewalk.

2.6.2 Curb and Gutter Forms

Curb and gutter outside forms shall have a height equal to the full depth of the curb or gutter. The inside form of curb shall have batter as indicated and shall be securely fastened to and supported by the outside form. Rigid forms shall be provided for curb returns, except that benders or thin plank forms may be used for curb or curb returns with a radius of 10 feet or more, where grade changes occur in the return, or where the central angle is such that a rigid form with a central angle of 90 degrees cannot be used. Back forms for curb returns may be made of 1-1/2 inch

benders, for the full height of the curb, cleated together. In lieu of inside forms for curbs, a curb "mule" may be used for forming and finishing this surface, provided the results are approved.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

The subgrade shall be constructed to the specified grade and cross section prior to concrete placement. Subgrade shall be placed and compacted as directed.

3.1.1 Sidewalk Subgrade

The subgrade shall be tested for grade and cross section with a template extending the full width of the sidewalk and supported between side forms.

3.1.2 Curb and Gutter Subgrade

The subgrade shall be tested for grade and cross section by means of a template extending the full width of the curb and gutter. The subgrade shall be of materials equal in bearing quality to the subgrade under the adjacent pavement.

3.1.3 Maintenance of Subgrade

The subgrade shall be maintained in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected to produce a subgrade free from frost when the concrete is deposited.

3.2 FORM SETTING

Set forms to the indicated alignment, grade and dimensions. Hold forms rigidly in place by a minimum of 3 stakes per form placed at intervals not to exceed 4 feet. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Clamps, spreaders, and braces shall be used where required to ensure rigidity in the forms. Forms shall be removed without injuring the concrete. Bars or heavy tools shall not be used against the concrete in removing the forms. Any concrete found defective after form removal shall be promptly and satisfactorily repaired. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

3.2.1 Sidewalks

Set forms for sidewalks with the upper edge true to line and grade with an allowable tolerance of 1/8 inch in any 10 foot long section. After forms are set, grade and alignment shall be checked with a 10 foot straightedge. Forms shall have a transverse slope of 1/4 inch per foot with the low side adjacent to the roadway. Side forms shall not be removed for 12 hours after finishing has been completed.

3.2.2 Curbs and Gutters

The forms of the front of the curb shall be removed not less than 2 hours

nor more than 6 hours after the concrete has been placed. Forms back of curb shall remain in place until the face and top of the curb have been finished, as specified for concrete finishing. Gutter forms shall not be removed while the concrete is sufficiently plastic to slump in any direction.

3.3 SIDEWALK CONCRETE PLACEMENT AND FINISHING

3.3.1 Formed Sidewalks

Place concrete in the forms in one layer. When consolidated and finished, the sidewalks shall be of the thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be consolidated by tamping and spading or with an approved vibrator, and the surface shall be finished to grade with a strike off.

3.3.2 Concrete Finishing

After straightedging, when most of the water sheen has disappeared, and just before the concrete hardens, finish the surface with a wood or magnesium float or darby to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. A scored surface shall be produced by brooming with a fiber-bristle brush in a direction transverse to that of the traffic, followed by edging.

3.3.3 Edge and Joint Finishing

All slab edges, including those at formed joints, shall be finished with an edger having a radius of 1/8 inch. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with a properly proportioned mortar mixture and then finished.

3.3.4 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 5/16 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.4 CURB AND GUTTER CONCRETE PLACEMENT AND FINISHING

3.4.1 Formed Curb and Gutter

Concrete shall be placed to the section required in a single lift. Consolidation shall be achieved by using approved mechanical vibrators. Curve shaped gutters shall be finished with a standard curb "mule".

3.4.2 Curb and Gutter Finishing

Approved slipformed curb and gutter machines may be used in lieu of hand placement.

3.4.3 Concrete Finishing

Exposed surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. Floated surfaces

shall then be brushed with a fine-hair brush with longitudinal strokes. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. The front curb surface, while still wet, shall be brushed in the same manner as the gutter and curb top. The top surface of gutter and entrance shall be finished to grade with a wood float.

3.4.4 Joint Finishing

Curb edges at formed joints shall be finished as indicated.

3.4.5 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.5 SIDEWALK JOINTS

Sidewalk joints shall be constructed to divide the surface into rectangular areas. Transverse contraction joints shall be spaced at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and shall be continuous across the slab. Longitudinal contraction joints shall be constructed along the centerline of all sidewalks 10 feet or more in width. Transverse expansion joints shall be installed at sidewalk returns and opposite expansion joints in adjoining curbs. Where the sidewalk is not in contact with the curb, transverse expansion joints shall be installed as indicated. Expansion joints shall be formed about structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated. Expansion joints are not required between sidewalks and curb that abut the sidewalk longitudinally.

3.5.1 Sidewalk Contraction Joints

The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-fourth of the sidewalk slab thickness, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8 inch blade to the depth indicated. An ample supply of saw blades shall be available on the job before concrete placement is started, and at least one standby sawing unit in good working order shall be available at the jobsite at all times during the sawing operations.

3.5.2 Sidewalk Expansion Joints

Expansion joints shall be formed with 1/2 inch joint filler strips. Joint filler in expansion joints surrounding structures and features within the sidewalk may consist of preformed filler material conforming to ASTM D 1752 or building paper. Joint filler shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch, and concrete over the joint filler shall be removed. At the end of the curing period, expansion joints shall be cleaned and filled with cold-applied

joint sealant. Joint sealant shall be gray or stone in color. Joints shall be sealed as specified in Section 32 01 19 FIELD MOLDED SEALANTS FOR SEALING JOINTS IN RIGID PAVEMENTS.

3.5.3 Reinforcement Steel Placement

Reinforcement steel shall be accurately and securely fastened in place with suitable supports and ties before the concrete is placed.

3.6 CURB AND GUTTER JOINTS

Curb and gutter joints shall be constructed at right angles to the line of curb and gutter.

3.6.1 Contraction Joints

Contraction joints shall be constructed directly opposite contraction joints in abutting portland cement concrete pavements and spaced so that monolithic sections between curb returns will not be less than 5 feet nor greater than 15 feet in length.

a. Contraction joints (except for slip forming) shall be constructed by means of 1/8 inch thick separators and of a section conforming to the cross section of the curb and gutter. Separators shall be removed as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint and prior to finishing.

b. When slip forming is used, the contraction joints shall be cut in the top portion of the gutter/curb hardened concrete in a continuous cut across the curb and gutter, using a power-driven saw. The depth of cut shall be at least one-fourth of the gutter/curb depth and 1/8 inch in width.

3.6.2 Expansion Joints

Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter. Expansion joints shall be provided in curb and gutter directly opposite expansion joints of abutting portland cement concrete pavement, and shall be of the same type and thickness as joints in the pavement. Where curb and gutter do not abut portland cement concrete pavement, expansion joints at least 1/2 inch in width shall be provided at intervals not less than 30 feet nor greater than 120 feet. Expansion joints shall be provided in nonreinforced concrete gutter at locations indicated. Expansion joints shall be sealed immediately following curing of the concrete or as soon thereafter as weather conditions permit. Joints shall be sealed as specified in Section 32 01 19 FIELD MOLDED SEALANTS FOR SEALING JOINTS IN RIGID PAVEMENTS.

3.7 CURING AND PROTECTION

3.7.1 General Requirements

Protect concrete against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready for use before actual concrete placement begins. Protection shall be provided as necessary to prevent cracking of the pavement due to

temperature changes during the curing period.

3.7.1.1 Mat Method

The entire exposed surface shall be covered with 2 or more layers of burlap. Mats shall overlap each other at least 6 inches. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

3.7.1.2 Impervious Sheeting Method

The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. The curing medium shall not be less than 18-inches wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

3.7.1.3 Membrane Curing Method

A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Formed surfaces shall be coated immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Concrete shall not be allowed to dry before the application of the membrane. If any drying has occurred, the surface of the concrete shall be moistened with a fine spray of water and the curing compound applied as soon as the free water disappears. Curing compound shall be applied in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet/gallon for the total of both coats. The second coat shall be applied in a direction approximately at right angles to the direction of application of the first coat. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, an additional coat shall be applied to the affected areas within 30 minutes. Concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied shall be resprayed by the method and at the coverage specified above. Areas where the curing compound is damaged by subsequent construction operations within the curing period shall be resprayed. Necessary precautions shall be taken to insure that the concrete is properly cured at sawed joints, and that no curing compound enters the joints. The top of the joint opening and the joint groove at exposed edges shall be tightly sealed before the concrete in the region of the joint is resprayed with curing compound. The method used for sealing the joint groove shall prevent loss of moisture from the joint during the entire specified curing period. Approved standby facilities for curing concrete pavement shall be provided at a location accessible to the jobsite for use in the event of mechanical failure of the spraying equipment or other conditions that might prevent correct application of the membrane-curing compound at the proper time. Concrete surfaces to which membrane-curing compounds have been applied shall be adequately protected during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and

surface tests, and from any other possible damage to the continuity of the membrane.

3.7.2 Backfilling

After curing, debris shall be removed and the area adjoining the concrete shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.

3.7.3 Protection

Completed concrete shall be protected from damage until accepted. Repair damaged concrete and clean concrete discolored during construction. Concrete that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Removed damaged portions shall be disposed of as directed.

3.7.4 Protective Coating

Protective coating, of linseed oil mixture, shall be applied to the exposed-to-view concrete surface after the curing period, if concrete will be exposed to de-icing chemicals within 6 weeks after placement. Concrete to receive a protective coating shall be moist cured.

3.7.4.1 Application

Curing and backfilling operation shall be completed prior to applying two coats of protective coating. Concrete shall be surface dry and clean before each application. Coverage shall be by spray application at not more than 50 square yards/gallon for first application and not more than 70 square yards/gallon for second application, except that the number of applications and coverage for each application for commercially prepared mixture shall be in accordance with the manufacturer's instructions. Coated surfaces shall be protected from vehicular and pedestrian traffic until dry.

3.7.4.2 Precautions

Protective coating shall not be heated by direct application of flame or electrical heaters and shall be protected from exposure to open flame, sparks, and fire adjacent to open containers or applicators. Material shall not be applied at ambient or material temperatures lower than 50 degrees F.

3.8 FIELD QUALITY CONTROL

3.8.1 General Requirements

Perform the inspection and tests described and meet the specified requirements for inspection details and frequency of testing. Based upon the results of these inspections and tests, take the action and submit reports as required below, and any additional tests to insure that the requirements of these specifications are met.

3.8.2 Concrete Testing

3.8.2.1 Strength Testing

Provide molded concrete specimens for strength tests. Samples of concrete placed each day shall be taken not less than once a day nor less than once for every 250 cubic yards of concrete. The samples for strength tests shall be taken in accordance with ASTM C 172. Cylinders for acceptance shall be molded in conformance with ASTM C 31 by an approved testing laboratory. Each strength test result shall be the average of 2 test cylinders from the same concrete sample tested at 28 days, unless otherwise specified or approved. Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test result falls below the specified strength by more than 500 psi.

3.8.2.2 Air Content

Determine air content in accordance with ASTM C 173 or ASTM C 231. ASTM C 231 shall be used with concretes and mortars made with relatively dense natural aggregates. Two tests for air content shall be made on randomly selected batches of each class of concrete placed during each shift. Additional tests shall be made when excessive variation in concrete workability is reported by the placing foreman or the Government inspector. If results are out of tolerance, the placing foreman shall be notified and he shall take appropriate action to have the air content corrected at the plant. Additional tests for air content will be performed on each truckload of material until such time as the air content is within the tolerance specified.

3.8.2.3 Slump Test

Two slump tests shall be made on randomly selected batches of each class of concrete for every 250 cubic yards, or fraction thereof, of concrete placed during each shift. Additional tests shall be performed when excessive variation in the workability of the concrete is noted or when excessive crumbling or slumping is noted along the edges of slip-formed concrete.

3.8.3 Thickness Evaluation

The anticipated thickness of the concrete shall be determined prior to placement by passing a template through the formed section or by measuring the depth of opening of the extrusion template of the curb forming machine. If a slip form paver is used for sidewalk placement, the subgrade shall be true to grade prior to concrete placement and the thickness will be determined by measuring each edge of the completed slab.

3.8.4 Surface Evaluation

The finished surface of each category of the completed work shall be uniform in color and free of blemishes and form or tool marks.

3.9 SURFACE DEFICIENCIES AND CORRECTIONS

3.9.1 Thickness Deficiency

When measurements indicate that the completed concrete section is deficient in thickness by more than 1/4 inch the deficient section will be removed,

between regularly scheduled joints, and replaced.

3.9.2 High Areas

In areas not meeting surface smoothness and plan grade requirements, high areas shall be reduced either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. The area corrected by grinding the surface of the hardened concrete shall not exceed 5 percent of the area of any integral slab, and the depth of grinding shall not exceed 1/4 inch. Pavement areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replaced.

3.9.3 Appearance

Exposed surfaces of the finished work will be inspected by the Government and any deficiencies in appearance will be identified. Areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work shall be removed and replaced.

-- End of Section --

SECTION 32 92 00.98

TURF AND GRASSES
04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

STATE OF MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT)

MDOT 816 (2003) Turf Establishment; and Subparts as Specified

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00.98 SUBMITTAL PROCEDURES:

SD-03 Product Data

Laboratory Analysis of Grass Seed for percent pure, percent germination, and percent weed seed, along with laboratory analysis of Proposed Top Soil shall be submitted.

1.3 SAMPLING AND TESTING

Sampling and testing of grass seed and topsoil shall be by an approved testing service and show compliance with all specified requirements.

1.4 DELIVERY AND STORAGE

1.4.1 Seed and Fertilizer

Grass seed and fertilizer shall be delivered in sealed containers or bags, each labeled in accordance with the applicable federal and state regulations and bearing the name, trade name or trademark, and certification of the producer.

Packaged materials shall be stored off the ground, under watertight cover, and away from damp surfaces.

1.5 WEATHER LIMITATIONS

Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry or in a condition detrimental to grass seed planting or finish grading.

Seeding shall be done between August 15 and October 1, or between April 1 and May 30 unless otherwise permitted by the COTR.

PART 2 PRODUCTS

2.1 TOPSOIL

Topsoil shall be imported. Topsoil shall be free from subsoil, litter, and other objectionable material.

Topsoil shall be fertile, friable, natural surface soil obtained from well-drained areas and possessing characteristics of representative soils in the project vicinity that produce heavy growths of crops, grass, or other vegetation. Topsoil shall be free of material that might be harmful to plant growth or hindrances to planting or maintenance operations.

Chemical and physical properties of topsoil proposed for use in the work shall be as follows:

Organic matter shall be at least 6 percent, but not more than 20 percent, as determined by loss on ignition of moisture-free samples of topsoil.

The pH range shall be from 5.0 to 7.0.

The physical analysis of the topsoil shall be within the following limits:

SIEVE SIZE	PERCENT PASSING
	97 to 100
No. 100	40 to 60
No. 200	20 to 40

2.2 GRASS SEED

Grass seed for lawn areas shall be as follows:

KIND OF GRASS SEED	GRASS SEED IN MIXTURE BY WEIGHT PERCENTAGE	GRASS SEED PURITY MINIMUM PERCENTAGE	GRASS SEED GERMINATION MINIMUM PERCENTAGE
Kentucky Bluegrass	40	98	90
Creeping Red Fescue	40	98	90
Perennial Ryegrass	20	98	90

Grass seed which has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable.

2.3 LIME

Lime shall conform to MDOT 816.03.

2.4 FERTILIZER

Fertilizer shall conform to MDOT 816.03

2.5 MULCH

Mulch shall be fresh, shredded straw of wheat, rye, oats, or barley and shall be clean and free of seeds.

Mulch that is fresh and excessively brittle or that is in such an advanced stage of decomposition as to smother or retard the growth of grass will not be acceptable.

PART 3 EXECUTION

3.1 TOPSOIL PREPARATION

3.1.1 Subgrade

Before topsoil is placed, the subgrade surface shall be cleared of all materials that might hinder the performance of the work or subsequent maintenance operations.

3.1.2 Grading

Grades on areas that have been previously established shall be maintained in a true and even condition.

Where grades have not been established and where improperly graded, areas shall be uniformly graded. Finished surfaces shall be smooth within a tolerance of 30.5 mm above or below the indicated subgrade elevations, with uniform levels or slopes between the points where elevations are indicated or between such points and existing grades and free from irregular surface changes to prevent the formation of depressions where water will accumulate.

3.1.3 Tillage

Immediately prior to placing the topsoil, the subgrade, wherever excessively compacted by traffic or other cause, shall be loosened to a depth of at least by plowing, disking, harrowing, or other approved means.

3.1.4 Placing Topsoil

Suitable topsoil shall be placed in the top 4 inches of all grassed areas stripped under this project. All areas to receive topsoil, including cut and fill areas, shall be shaped to provide a minimum of 4 inches topsoil. Prior to placement of the topsoil, the subgrade shall be scarified to a minimum depth of 4 inches. The topsoil shall be uniformly distributed and evenly spread to an average thickness of 4 inches. The spreading shall be performed in such a manner that planting can proceed with little additional soil preparation or tillage, and the area shall be left smooth and suitable for lawns. Irregularities in the surface from topsoiling or other operations shall be corrected so as to prevent the formation of depressions where water will stand. Topsoil shall not be hauled and placed when wet or when the subgrade is frozen, excessively wet, extremely dry or in a condition otherwise detrimental to the proposed planting or to proper grading. Topsoil shall be spread uniformly but shall not be compacted. Where any portion of the surface becomes gullied or otherwise damaged, the affected area shall be repaired to establish the condition and grade prior

to topsoiling, and then shall be re-topsoiled.

3.1.5 Application of Lime

The application of lime shall conform to MDOT 816.

Lime shall be uniformly distributed over the topsoil surface at a rate as indicated by laboratory soil testing and incorporated into the topsoil to a depth of at least 4 inches by disking, harrowing, or other approved means.

3.1.6 Application of Fertilizer

The application of fertilizer shall conform to MDOT 816.03.

Fertilizer shall be uniformly distributed over the topsoil surface at a rate as indicated by laboratory soil testing, and incorporated into the topsoil to a depth of at least 4 inches by disking, harrowing, or other approved means.

Fertilizer may be applied mixed with seed and water as specified in paragraph entitled, "Seeding."

3.1.7 Smooth Grading

Undulations or irregularities in the topsoil surface resulting from operations shall be leveled.

The topsoil surface shall be made smooth and uniform.

3.1.8 Cleanup

After smooth grading, the topsoil surface shall be cleared of stones or other objects that might be a hindrance to planting or maintenance operations.

Topsoil or other material that has been brought upon the surfacing of paved areas by operations shall be removed daily.

3.2 HYDROSEEDING

3.2.1 Preparation of Seedbed

Preparation of seedbed shall conform to MDOT 816.03.

Seedbed shall be loose and porous at the time of seeding. The seedbed shall be loosened to a depth of at least 4 inches by harrowing or other suitable means and the surface smooth-graded and cleared of objectionable material as specified.

3.2.2 Mixture Preparation

Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.

Mix slurry with nonasphaltic tackifier.

Type A fertilizer (5:10:10) shall be mixed in the slurry to be broadcast at the rate of 20 kilograms per 100 square meter.

3.2.3 Planting

Apply slurry uniformly to all areas to be seeded in a one-step process. apply mulch at the minimum rate of 16.5 kilograms per 100 square meter (1,500 pounds per acre) dry weight, but not less than the rate required to obtain 17.1 kilograms per 100 square meter seed-sowing rate.

Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at the minimum rate of 5.5 kilograms per 100 square meter (500 pounds per acre) dry weight, but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 11 kilograms per 100 square meter (1,000 pounds per acre).

All structures, buildings, walks, roads, and plant materials shall be brushed or swept to remove any mulch impinged thereon.

3.3 MULCHING

3.3.1 Placing Mulch

Placement, repair and maintenance of mulch shall conform to MDOT 816.03.

Hydro-mulch shall be applied at recommended rates, when hydraulic methods are employed for grass seed application.

Where grass seed is applied, areas shall be covered immediately with a uniform blanket of straw mulch not exceeding a loose depth of .

Straw mulch shall be applied by hand or approved equipment.

3.3.2 Anchoring of Mulch

Where straw mulch is employed, straw mulch shall be anchored with tacking agents noted in MDOT 816.03, or approved fiber mesh netting.

3.4 GRASS ESTABLISHMENT

3.4.1 General

The period of grass establishment shall begin immediately after the completion of mulching in an area and shall continue for a period of 2-months after the completion of seeding on the entire project unless the desired grass cover is established in a shorter period of time and shortening of the grass-establishment period is authorized.

3.4.2 Watering

Immediately after the completion of mulching in an area, the area shall be moistened to a depth of 4 inches or more.

After the initial watering, the seeded areas shall be watered as required to maintain the soil in a moist condition for the entire grass-establishment period.

Watering shall conform to MDOT 816.03.

The Contractor shall provide and maintain temporary piping and

lawn-watering equipment required to convey water from the water source to uniformly water the seeded areas. Water shall be free from substances detrimental to the growth of vegetation. Water sources located on Government property will be subject to approval prior to use. Temporary watering equipment shall be removed after grass area acceptance.

Watering schedules shall be arranged and lawn-watering equipment laid out in a manner to avoid the necessity of walking over muddy and newly seeded areas.

Watering shall be done in a manner to prevent the displacement of seed and mulch and to prevent puddling and water erosion.

3.4.3 Weeding

Weeds or other undesirable vegetation that threaten to smother the grass shall be uprooted and removed from the area.

3.4.4 Reseeding

After the first mowing, bare areas shall be reseeded.

Reseeding shall be with the grass seed specified for each seeded area and shall be sown at the rate specified and in a manner that will cause a minimum of disturbance to the existing stand of grass and mulch.

3.4.5 Remulching

In areas where mulch has been disturbed sufficiently to nullify its purpose, new mulch shall be added and anchored as specified.

3.4.6 Refertilizing

After the first mowing and during a period when the grass is dry, fertilizer shall be uniformly distributed over the seeded area at a rate of of actual nitrogen per 93 square meter. Fertilizer shall be as specified.

3.5 ACCEPTANCE PROVISIONS

3.5.1 Acceptance Requirements

Completed grass areas shall have been recently mowed and be covered with a uniform stand of the specified grass, be free of rank growths of weeds or other undesirable vegetation, and be free of irregular surface changes and other depressions where water will accumulate.

Scattered bare spots not larger than 152.4 mm in any dimension will be allowed, up to a maximum of 3 percent of any grass area.

The condition of grass areas at the time of inspection will be noted and a determination, made whether the grass-establishment period shall be extended for any area.

3.5.2 Repairs

If, before completion and acceptance of the entire work, portions of the surface become gullied or otherwise damaged following seeding or the grass seedings have been destroyed, the affected area shall be repaired to re-establish the condition and grade of the soil prior to seeding and then

re-seeded, remulched, and the grass established as specified.

3.6 PROTECTION

Seeded areas shall be protected against traffic or other use by erecting barricades around each area immediately after seeding is completed and by placing warning signs of an approved type on each seeded area.

-- End of Section --

SECTION 32 92 19

SEEDING
10/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 602	(2007) Agricultural Liming Materials
ASTM D 4972	(2001; R 2007) pH of Soils

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act
DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.2 DEFINITIONS

1.2.1 Stand of Turf

95 percent ground cover of the established species.

1.3 RELATED REQUIREMENTS

Section 31 00 00 EARTHWORK, Section 32 93 00 EXTERIOR PLANTS, and Section 32 05 33 LANDSCAPE ESTABLISHMENT applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Wood cellulose fiber mulch

Fertilizer

Include physical characteristics, and recommendations.

SD-06 Test Reports

Topsoil composition tests (reports and recommendations).

SD-07 Certificates

State certification and approval for seed

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.1 Seed Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.5.1.2 Fertilizer Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.

1.5.2 Storage

1.5.2.1 Seed, Fertilizer Storage

Store in cool, dry locations away from contaminants.

1.5.2.2 Topsoil

Topsoil shall be imported.

Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil as indicated by laboratory soil testing.

1.5.2.3 Handling

Do not drop or dump materials from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.6.1 Restrictions

Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 TIME LIMITATIONS

1.7.1 Seed

Apply seed within twenty four hours after seed bed preparation. Seeding shall conform to MDOT 816.03.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Classification

Provide State-approved seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected. Field mixes will be acceptable when field mix is performed on site in the presence of the Contracting Officer.

2.1.2 Planting Dates

Planting Season	Planting Dates
Season 1	May 1st - October 1st
Temporary Seeding	See Season 1

2.1.3 Seed Mixture by Weight

Planting Season	Variety	Percent (by Weight)
Season 1	Turf Seed Mixture	100
Temporary Seeding	Turf Seed Mixture	100

Proportion seed mixtures by weight. Temporary seeding must later be replaced by Season 1 or Season 2 plantings for a permanent stand of grass. The same requirements of turf establishment for Season 1 or Season 2 apply for temporary seeding.

2.2 TOPSOIL

2.2.1 On-Site Topsoil

On-site topsoil shall not be used.

2.2.2 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor.

2.2.3 Composition

Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D 4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials. Other components shall conform to the following limits:

Silt	7 to 17 percent
Clay	4 to 12 percent
Sand	70 to 82 percent

pH	5.5 to 7.0
Soluble Salts	600 ppm maximum

2.3 SOIL CONDITIONERS

Add conditioners to topsoil as required to bring into compliance with "composition" standard for topsoil as specified herein.

2.3.1 Lime

Commercial grade hydrate limestone containing a calcium carbonate equivalent (C.C.E.) as specified in ASTM C 602 of not less than 80 percent.

2.3.2 Sand

Clean and free of materials harmful to plants.

2.3.3 Composted Derivatives

Ground bark, nitrolized sawdust, humus or other green wood waste material free of stones, sticks, and soil stabilized with nitrogen and having the following properties:

2.3.3.1 Particle Size

Minimum percent by weight passing:

No. 4 mesh screen	95
No. 8 mesh screen	80

2.3.3.2 Nitrogen Content

Minimum percent based on dry weight:

Fir Sawdust	0.7
Fir or Pine Bark	1.0

2.4 FERTILIZER

2.4.1 Granular Fertilizer

Organic synthetic, granular controlled release fertilizer containing the minimum percentages, by weight, of plant food nutrients as recommended by laboratory soil test.

2.4.2 Hydroseeding Fertilizer

Controlled release fertilizer, to use with hydroseeding and composed of pills coated with plastic resin to provide a continuous release of nutrients for at least 6 months and containing the minimum percentages, by weight, of plant food nutrients as recommended by laboratory soil tests.

2.5 MULCH

Mulch shall be free from noxious weeds, mold, and other deleterious materials.

2.5.1 Straw

Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed.

2.5.2 Hay

Air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Hay shall be sterile, containing no fertile seed.

2.5.3 Wood Cellulose Fiber Mulch

Use recovered materials of either paper-based (100 percent) or wood-based (100 percent) hydraulic mulch. Processed to contain no growth or germination-inhibiting factors and dyed an appropriate color to facilitate visual metering of materials application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 5.5 to 8.2. Use with hydraulic application of grass seed and fertilizer.

2.6 WATER

Source of water shall be approved by Contracting Officer and of suitable quality for irrigation, containing no elements toxic to plant life.

2.7 EROSION CONTROL MATERIALS

Erosion control material shall conform to the following:

2.7.1 Erosion Control Blanket

100 percent agricultural straw stitched with degradable nettings, designed to degrade within 12 months.

2.7.2 Erosion Control Fabric

Fabric shall be knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.

2.7.3 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 EXTENT OF WORK

Provide soil preparation (including soil conditioners as required), fertilizing, seeding, and surface topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.1.1 Topsoil

Provide 4 inches of off-site topsoil, to meet indicated finish grade.

After areas have been brought to indicated finish grade, incorporate fertilizer into soil a minimum depth of 4 inches by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.1.1.2 Soil Conditioner Application Rates

Apply soil conditioners at rates as determined by laboratory soil analysis of the soils imported to the job site. For bidding purposes only apply at rates for the following:

Lime 2 pounds per 1000 square feet.

3.1.1.3 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils imported to the job site. For bidding purposes only apply at rates for the following:

Synthetic Fertilizer 4 pounds per 1000 square feet.

Hydroseeding Fertilizer 4 pounds per 1000 square feet.

3.2 SEEDING

3.2.1 Seed Application Seasons and Conditions

Immediately before seeding, restore soil to proper grade. Do not seed when ground is muddy frozen, snow covered, or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Contracting Officer stating the special conditions and proposed variance. Apply seed within twenty four hours after seedbed preparation. Sow seed by approved sowing equipment. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing.

3.2.2 Seed Application Method

Seeding method shall be broadcasted and drop seeding or hydroseeding.

3.2.2.1 Broadcast and Drop Seeding

Seed shall be uniformly broadcast at the rate of 1 pound per 1000 square feet. Use broadcast or drop seeders. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing. Cover seed uniformly to a maximum depth of 1/4 inch in clay soils and 1/2 inch in sandy soils by means of spike-tooth harrow, cultipacker, raking or other approved devices.

3.2.2.2 Hydroseeding

First, mix water and fiber. Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. Fiber shall be added at 1,000 pounds, dry weight, per acre. Then add and mix seed and fertilizer to produce a homogeneous slurry. Seed shall be mixed to ensure broadcasting at the rate of 3 pounds per 1000 square feet. When

hydraulically sprayed on the ground, material shall form a blotter like cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch.

3.2.3 Mulching

3.2.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.2.4 Rolling

Immediately after seeding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90 pounds for each foot of roller width. If seeding is performed with cultipacker-type seeder or by hydroseeding, rolling may be eliminated.

3.2.5 Erosion Control Material

Install in accordance with manufacturer's instructions, where indicated or as directed by the Contracting Officer.

3.2.6 Watering

Start watering areas seeded as required by temperature and wind conditions. Apply water at a rate sufficient to insure thorough wetting of soil to a depth of 2 inches without run off. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 RENOVATION OF EXISTING TURF AREA

3.4.1 Aeration

Upon completion of weed eradication operations and Contracting Officer's approval to proceed, aerate turf areas indicated, by approved device. Core, by pulling soil plugs, to a minimum depth of 2 inches.

Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean all soil plugs off of other paving when work is complete.

3.4.2 Vertical Mowing

Upon completion of aerating operation and Contracting Officer's approval to proceed, vertical mow turf areas indicated, by approved device, to a depth of 1/2 inch above existing soil level, to reduce thatch build-up, grain, and surface compaction. Keep clean at all times at least one paved

pedestrian access route and one paved vehicular access route to each building. Clean other paving when work is complete. Remove all debris generated during this operation off site.

3.4.3 Dethatching

Upon completion of aerating operation and Contracting Officer's approval to proceed, dethatch turf areas indicated, by approved device, to a depth of 1/2 inch below existing soil level, to reduce thatch build-up, grain, and surface compaction. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work is complete. Remove all debris generated during this operation off site.

3.4.4 Overseeding

Apply seed in accordance with applicable portions of paragraph entitled "Seed Application Method" at rates in accordance with paragraph entitled "Seed Composition."

3.5 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations at the Contractor's expense. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --

SECTION 32 93 00

EXTERIOR PLANTS
02/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z60.1	(1996; R 2004) Nursery Stock

ASTM INTERNATIONAL (ASTM)

ASTM A 580/A 580M	(2008) Standard Specification for Stainless Steel Wire
ASTM C 602	(2007) Agricultural Liming Materials
ASTM D 1972	(1997; R 2005) Standard Practice for Generic Marking of Plastic Products
ASTM D 4427	(2007) Peat Samples by Laboratory Testing
ASTM D 4972	(2001; R 2007) pH of Soils
ASTM D 5203	(2007) Polyethylene Plastics Molding and Extrusion Materials from Recycled Post-Consumer (HDPE) Sources
ASTM D 5268	(2007) Topsoil Used for Landscaping Purposes
ASTM D 5539	(1994; R 2008) Seed Starter Mix
ASTM D 5852	(2000; R 2007) Standard Test Method for Erodibility Determination of Soil in the Field or in the Laboratory by the Jet Index Method
ASTM D 6629	(2001; R 2007) Selection of Methods for Estimating Soil Loss by Erosion

FOREST STEWARDSHIP COUNCIL (FSC)

FSC STD 01 001	(2000) Principles and Criteria for Forest Stewardship

L.H. BAILEY HORTORIUM (LHBH)

LHBH	(1976) Hortus Third

TREE CARE INDUSTRY ASSOCIATION (TCIA)

TCIA A300P1	(2008) ANSI A300 Part1: Tree Care Operations - Trees, Shrubs and Other Woody Plant Maintenance Standard Practices - Pruning
TCIA Z133.1	(2006) American National Standard for Arboricultural Operations - Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush - Safety Requirements

U.S. DEPARTMENT OF AGRICULTURE (USDA)

DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED	(2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)

1.2 RELATED REQUIREMENTS

Section 31 00 00 EARTHWORK, Section 32 92 19 SEEDING, and Section 32 05 33 LANDSCAPE ESTABLISHMENT applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

State Landscape Contractor's License

Time Restrictions and Planting Conditions

Indicate anticipated dates and locations for each type of planting.

SD-03 Product Data

Local/Regional Materials; (LEED)

Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site. Indicate relative dollar value of local/regional materials to total dollar value of products included in project.

Peat
Composted Derivatives
Rotted Manure
Organic Mulch Materials

Submit documentation indicating type of biobased material in product and biobased content. Indicate relative dollar value of biobased content products to total dollar value of products included in project.

Gypsum; (LEED)
Drainage Pipe; (LEED)
Mulch; G
Ground Stakes

Submit documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.

Fertilizer

Weed control fabric; G

Staking Material
Ground Stakes

Metal anchors

Antidesiccants

Erosion control materials

Photographs; G

SD-04 Samples

Mulch; G

Submit one pint of mulch.

SD-06 Test Reports

Topsoil composition tests; Soil Test of proposed area; Soil Test location map

Percolation Test; Percolation Test of proposed area

SD-07 Certificates

Forest Stewardship Council (FSC) Certification; (LEED)

Nursery certifications

Indicate names of plants in accordance with the LHBH, including type, quality, and size.

SD-10 Operation and Maintenance Data

Plastic Identification

When not labeled, identify types in Operation and Maintenance Manual.

1.4 QUALITY ASSURANCE

1.4.1 Topsoil Composition Tests

Commercial test from an independent testing laboratory including basic soil groups (moisture and saturation percentages, Nitrogen-Phosphorus-Potassium (N-P-K) ratio, pH (ASTM D 4972), soil salinity), secondary nutrient groups (calcium, magnesium, sodium, Sodium Absorption Ratio (SAR)), micronutrients (zinc, manganese, iron, copper), toxic soil elements (boron, chloride, sulfate), cation exchange and base saturation percentages, and soil amendment and fertilizer recommendations with quantities for plant material being transplanted. Soil required for each test shall include a maximum depth of 18 inches of approximately 1 quart volume for each test. Areas sampled should not be larger than 1 acre and should contain at least 6-8 cores for each sample area and be thoroughly mixed. Problem areas should be sampled separately and compared with samples taken from adjacent non-problem areas. The location of the sample areas should be noted and marked on a parcel or planting map for future reference.

1.4.2 Nursery Certifications

a. Indicate on nursery letterhead the name of plants in accordance with the LHBH, including botanical common names, quality, and size.

b. Inspection certificate.

c. Mycorrhizal fungi inoculum for plant material treated

1.4.3 State Landscape Contractor's License

Construction company shall hold a landscape contractors license in the state where the work is performed and have a minimum of five years landscape construction experience. Submit copy of license and three references for similar work completed in the last five years.

1.4.4 Plant Material Photographs

Contractor shall submit nursery photographs, for government approval prior to ordering, for each tree larger than 24-inch box/ 2-inch caliper size.

1.4.5 Percolation Test

Immediately following rough grading operation, identify a typical location for one of the largest trees and or shrubs and excavate a pit per the project details. Fill the pit with water to a depth of 12 inches. The length of time required for the water to percolate into the soil, leaving the pit empty, shall be measured by the project Landscape Architect and verified by the Contracting Officer. Within six hours of the time the water has drained from the pit, the Contractor, with the Contracting Officer and project Landscape Architect present, shall again fill the pit with water to a depth of 12 inches. If the water does not completely percolate into the soil within 9 hours, a determination shall be made whether a drainage system or a soil penetrant will be required for each

tree and or shrub being transplanted.

1.4.6 Erosion Assessment

Assess potential effects of soil management practices on soil loss in accordance with ASTM D 6629. Assess erodibility of soil with dominant soil structure less than 2.8 to 3.1 inches in accordance with ASTM D 5852.

1.4.7 Pre-Installation Meeting

Convene a pre-installation meeting a minimum of one week prior to commencing work of this section. Require attendance of parties directly affecting work of this section. Review conditions of operations, procedures and coordination with related work. Agenda shall include the following:

a. Tour, inspect, and discuss conditions of planting materials.

b. Review planting schedule and maintenance.

c. Review required inspections.

d. Review environmental procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.1 Branched Plant Delivery

Deliver with branches tied and exposed branches covered with material which allows air circulation. Prevent damage to branches, trunks, root systems, and root balls and desiccation of leaves.

1.5.1.2 Soil Amendment Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, or trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer, gypsum, sulfur, iron, and lime may be furnished in bulk with a certificate indicating the above information. Store in dry locations away from contaminates.

1.5.1.3 Plant Labels

Deliver plants with durable waterproof labels in weather-resistant ink. Provide labels stating the correct botanical and common plant name and variety as applicable and size as specified in the list of required plants. Attach to plants, bundles, and containers of plants. Groups of plants may be labeled by tagging one plant. Labels shall be legible for a minimum of 60 days after delivery to the planting site.

1.5.2 Storage

1.5.2.1 Plant Storage and Protection

Store and protect plants not planted on the day of arrival at the site as follows:

a. Shade and protect plants in outside storage areas from the wind and direct sunlight until planted.

b. Heel-in bare root plants.

c. Protect balled and burlapped plants from freezing or drying out by covering the balls or roots with moist burlap, sawdust, wood chips, shredded bark, peat moss, or other approved material. Provide covering which allows air circulation.

d. Keep plants in a moist condition until planted by watering with a fine mist spray.

e. Do not store plant material directly on concrete or bituminous surfaces.

1.5.2.2 Fertilizer, Gypsum, pH Adjusters and Mulch Storage

Store in dry locations away from contaminants.

1.5.2.3 Topsoil

Topsoil shall be provided from an off-site source.

1.5.2.4 Weed Control Fabric

Store materials on site in enclosures or under protective covering in dry location. Store under cover out of direct sunlight. Do not store materials directly on ground.

1.5.3 Handling

Do not drop or dump plants from vehicles. Avoid damaging plants being moved from nursery or storage area to planting site. Handle balled and burlapped and container plants carefully to avoid damaging or breaking the earth ball or root structure. Do not handle plants by the trunk or stem. Remove damaged plants from the site.

1.5.4 TIME LIMITATION

Except for container-grown plant material, the time limitation from digging to installing plant material shall be a maximum of 90 days. The time limitation between installing the plant material and placing the mulch shall be a maximum of 24 hours.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

Coordinate installation of planting materials during optimal planting seasons for each type of plant material required.

1.6.1 Planting Dates

1.6.1.1 Deciduous Material

Deciduous material from March 1st to May 15th for spring planting and from October 1st until prepared soil is frozen for fall/winter planting.

1.6.1.2 Evergreen Material

Evergreen material from March 1st to June 1st for spring/summer planting.

1.6.2 Restrictions

Do not plant when ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 GUARANTEE

All plants shall be guaranteed for one year beginning on the date of inspection by the Contracting Officer to commence the plant establishment period, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by the Government or by weather conditions unusual for the warranty period.

Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season. At end of warranty period, replace planting materials that die or have 25 percent or more of their branches that die during the construction operations or the guarantee period.

1.8 SUSTAINABLE DESIGN REQUIREMENTS

1.8.1 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 500 mile radius from the project site, if available from a minimum of three sources. See Section 01 33 29 LEED(tm) DOCUMENTATION for cumulative total local material requirements. Landscaping materials may be locally available.

1.8.2 Plastic Identification

Verify that plastic products to be incorporated into the project are labeled in accordance with ASTM D 1972. Where products are not labeled, provide product data indicating polymeric information in Operation and Maintenance Manual.

Type 1: Polyethylene Terephthalate (PET, PETE).
Type 2: High Density Polyethylene (HDPE).
Type 3: Vinyl (Polyvinyl Chloride or PVC).
Type 4: Low Density Polyethylene (LDPE).
Type 5: Polypropylene (PP).
Type 6: Polystyrene (PS).
Type 7: Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

1.8.3 Forest Stewardship Council (FSC) Certification

Use FSC-certified wood where specified. Provide letter of certification signed by lumber supplier. Indicate compliance with FSC STD 01 001 and identify certifying organization. Submit FSC certification numbers; identify each certified product on a line-item basis. Submit copies of invoices bearing the FSC certification numbers.

PART 2 PRODUCTS

2.1 PLANTS

2.1.1 Regulations and Varieties

Existing trees and shrubs to remain shall be protected and a planting plan be arranged around them. Furnish nursery stock in accordance with ANSI Z60.1, except as otherwise specified or indicated. Each plant or group of planting shall have a "key" number indicated on the nursery certifications of the plant schedule. Furnish plants, including turf grass, grown under climatic conditions similar to those in the locality of the project. Plants specified shall be indigenous, low maintenance varieties, tolerant of site's existing soils and climate without supplemental irrigation or fertilization once established. Spray plants budding into leaf or having soft growth with an antidesiccant before digging. Plants of the same specified size shall be of uniform size and character of growth. Plants shall be chosen with their mature size and growth habit in mind to avoid over-planting and conflict with other plants, structures or underground utility lines. All plants shall comply with all Federal and State Laws requiring inspection for plant diseases and infestation.

2.1.2 Shape and Condition

Well-branched, well-formed, sound, vigorous, healthy planting stock free from disease, sunscald, windburn, abrasion, and harmful insects or insect eggs and having a healthy, normal, and undamaged root system.

2.1.2.1 Deciduous Trees and Shrubs

Symmetrically developed and of uniform habit of growth, with straight boles or stems, and free from objectionable disfigurements.

2.1.2.2 Evergreen Trees and Shrubs

Well developed symmetrical tops with typical spread of branches for each particular species or variety.

2.1.2.3 Ground Covers and Vines

Number and length of runners and clump sizes indicated, and of the proper age for the grade of plants indicated, furnished in removable containers, integral containers, or formed homogeneous soil section.

2.1.3 Plant Size

Minimum sizes measured after pruning and with branches in normal position, shall conform to measurements indicated, based on the average width or height of the plant for the species as specified in ANSI Z60.1. Plants larger in size than specified may be provided with approval of the Contracting Officer. When larger plants are provided, increase the ball of earth or spread of roots in accordance with ANSI Z60.1.

2.1.4 Root Ball Size

All box-grown, field potted, field boxed, collected, plantation grown, bare root, balled and burlapped, container grown, processed-balled, and in-ground fabric bag-grown root balls shall conform to ANSI Z60.1. All wrappings and ties shall be biodegradable. Root growth in container grown

plants shall be sufficient to hold earth intact when removed from containers. Root bound plants will not be accepted.

2.1.4.1 Mycorrhizal fungi inoculum

Before shipment, root systems shall contain mycorrhizal fungi inoculum.

2.1.5 Growth of Trunk and Crown

2.1.5.1 Deciduous Trees

A height to caliper relationship shall be provided in accordance with ANSI Z60.1. Height of branching shall bear a relationship to the size and species of tree specified and with the crown in good balance with the trunk. The trees shall not be "poled" or the leader removed.

a. Single stem: The trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.

b. Multi-stem: All countable stems, in aggregate, shall average the size specified. To be considered a stem, there shall be no division of the trunk which branches more than 6 inches from ground level.

2.1.5.2 Palms (NOT USED)

2.1.5.3 Deciduous Shrubs

Deciduous shrubs shall have the height and number of primary stems recommended by ANSI Z60.1. Acceptable plant material shall be well shaped, with sufficient well-spaced side branches, and recognized by the trade as typical for the species grown in the region of the project.

2.1.5.4 Coniferous Evergreen Plant Material

Coniferous Evergreen plant material shall have the height-to-spread ratio recommended by ANSI Z60.1. The coniferous evergreen trees shall not be "poled" or the leader removed. Acceptable plant material shall be exceptionally heavy, well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be as indicated.

2.1.5.5 Broadleaf Evergreen Plant Material

Broadleaf evergreen plant material shall have the height-to-spread ratio recommended by ANSI Z60.1. Acceptable plant material shall be well shaped and recognized by the trade as typical for the variety grown in the region of the project.

2.1.5.6 Ground Cover and Vine Plant Material

Ground cover and vine plant material shall have the minimum number of runners and length of runner recommended by ANSI Z60.1. Plant material shall have heavy, well developed and balanced crown with vigorous, well developed root system and shall be furnished in containers.

2.2 TOPSOIL

2.2.1 Existing Soil

Existing soil shall not be used.

2.2.2 On-Site Topsoil

On-site topsoil shall not be used.

2.2.3 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor.

2.2.4 Composition

Evaluate soil for use as topsoil in accordance with ASTM D 5268. From 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D 4972. Topsoil shall be free of sticks, stones, roots, plants, and other debris and objectionable materials.

2.3 SOIL CONDITIONERS

Provide singly or in combination as required to meet specified requirements for topsoil. Soil conditioners shall be nontoxic to plants.

2.3.1 Lime

Commercial grade hydrated or burnt limestone containing a calcium carbonate equivalent (C.C.E.) as specified in ASTM C 602 of not less than 80 percent.

2.3.2 Aluminum Sulfate

Commercial grade.

2.3.3 Sulfur

100 percent elemental

2.3.4 Iron

100 percent elemental

2.3.5 Peat

Natural product of [peat moss] derived from a freshwater site and conforming to ASTM D 4427 and ASTM D 5539 as modified herein. Shred and granulate peat to pass a 1/2 inch mesh screen and condition in storage pile for minimum 6 months after excavation. Biobased content shall be a minimum of 100 percent. Peat shall not contain invasive species, including seeds.

2.3.6 Sand

Clean and free of materials harmful to plants.

2.3.7 Perlite

Horticultural grade.

2.3.8 Composted Derivatives

Ground bark, nitrolized sawdust, humus or other green wood waste material free of stones, sticks, invasive species, including seeds, and soil stabilized with nitrogen and having the following properties:

2.3.8.1 Particle Size

Minimum percent by weight passing:

No. 4 mesh screen	95
No. 8 mesh screen	80

2.3.8.2 Nitrogen Content

Minimum percent based on dry weight:

Fir Sawdust	0.7
Fir or Pine Bark	1.0

2.3.8.3 Biobased Content

Minimum 100 percent.

2.3.9 Gypsum

Coarsely ground gypsum from recycled scrap gypsum board comprised of calcium sulfate dihydrate 91 percent, calcium 22 percent, sulfur 17 percent; minimum 96 percent passing through 20 mesh screen, 100 percent passing thru 16 mesh screen.

2.3.10 Vermiculite

Horticultural grade for planters.

2.3.11 Rotted Manure

Well rotted horse or cattle manure containing maximum 25 percent by volume of straw, sawdust, or other bedding materials; free of seeds, stones, sticks, soil, and other invasive species.

2.4 PLANTING SOIL MIXTURES

3 parts topsoil, 1 part peat moss, and 1 part fertilizer. Thoroughly mix all parts of planting soil mixture to a uniform blend throughout.

2.5 FERTILIZER

Fertilizer for groundcover, wildflowers, grasses, trees, plants, and shrubs shall be as recommended by laboratory soil analysis and plant supplier, except synthetic chemical fertilizers are not permitted. Fertilizers containing petrochemical additives or that have been treated with pesticides or herbicides are not permitted.

2.5.1 Granular Fertilizer

Organic, granular controlled release fertilizer containing the minimum percentages recommended by the laboratory soil analysis.

2.6 WEED CONTROL FABRIC

2.6.1 Roll Type Polypropylene or Polyester Mats

Fabric shall be woven, needle punched or non-woven and treated for protection against deterioration due to ultraviolet radiation. Fabric shall be minimum 99 percent opaque to prevent photosynthesis and seed germination from occurring, yet allowing air, water and nutrients to pass thru to the roots. Minimum weight shall be 5 ounces per square yard with a minimum thickness of 20 mils with a 20 year (minimum) guarantee.

2.7 DRAINAGE PIPE FOR PLANT PITS AND BEDS

Plastic HDPE pipe, size as indicated on the drawings, perforated conforming to ASTM D 5203. Minimum 100 percent post-consumer recycled content.

2.8 MULCH

Free from noxious weeds, mold, pesticides, or other deleterious materials.

2.8.1 Inert Mulch Materials

Riverbank stone ranging in size from 1 to 12 inches. Provide materials from site to the greatest extent possible.

2.8.2 Organic Mulch Materials

Wood cellulose fiber, shredded hardwood, or pine straw mulch. Biobased content shall be a minimum of 100 percent. Wood cellulose fiber shall be processed to contain no growth or germination-inhibiting factors, dyed with non-toxic, biodegradable dye to an appropriate color to facilitate visual metering of materials application. Paper-based hydraulic mulch shall contain a minimum of 100 percent post-consumer recycled content. Wood-based hydraulic mulch shall contain a minimum of 100 percent recycled material.

2.8.3 Recycled Organic Mulch

Recycled mulch may include compost, tree trimmings, or pine needles with a gradation that passes through a 2-1/2 by 2-1/2 inchscreen. It shall be cleaned of all sticks a minimum 1 inch in diameter and plastic materials a minimum 3 inches length. The material shall be treated to retard the growth of mold and fungi.

2.9 STAKING AND GUYING MATERIAL

2.9.1 Staking Material

2.9.1.1 Tree Support Stakes

Rough sawn FSC-certified or salvaged hard wood free of knots, rot, cross grain, bark, long slivers, or other defects that impair strength. Stakes shall be minimum 2 inches square or 2 1/2 inch diameter by 8 feet long, pointed at one end.

2.9.1.2 Ground Stakes

FSC-certified or salvaged wood, 2 inches square are by 3 feet long, pointed at one end.

2.9.2 Guying Material

2.9.2.1 Guying Wire

12 gauge annealed galvanized steel, ASTM A 580/A 580M.

2.9.2.2 Guying Cable

Minimum five-strand, 3/16 inch diameter galvanized steel cable plastic coated.

2.9.3 Hose Chafing Guards

New or used 2 ply 3/4 inch diameter reinforced rubber or plastic hose, black or dark green, all of same color.

2.9.4 Flags

White surveyor's plastic tape, 6 inches long, fastened to guying wires or cables.

2.9.5 Turnbuckles

Galvanized or cadmium-plated steel with minimum 3 inch long openings fitted with screw eyes. Eye bolts shall be galvanized or cadmium-plated steel with one inch diameter eyes and screw length 1 1/2 inches, minimum.

2.9.6 Deadmen

4 by 8 inch rectangular or 8 inch diameter by 36 inch long, pine wood material.

2.9.7 Metal Anchors

2.9.7.1 Driven Anchors

Malleable iron, arrow shaped, galvanized, sized as follows:

Tree Caliper	Anchor Size
2 inches and under	3 inches
3 to 6 inches	4 inches
6 to 8 inches	6 inches
8 to 10 inches	8 inches
10 to 12 inches	10 inches

2.9.7.2 Screw Anchors

Steel, screw type with welded-on 3 inch round helical steel plate, minimum 3/8 inch diameter, 15 inches long.

2.10 EDGING MATERIAL (NOT USED)

2.11 ANTIDESICCANTS

Sprayable, water insoluble vinyl-vinledine complex which produce a moisture retarding barrier not removable by rain or snow. Film shall form at temperatures commonly encountered out of doors during planting season and

have a moisture vapor transmission rate (MVT) of the resultant film of maximum 10 grams per 24 hours at 70 percent humidity.

2.12 EROSION CONTROL MATERIALS

Erosion control material shall conform to Section 31 00 00 EARTHWORK.

2.13 ROOT CONTROL BARRIER (NOT USED)

2.14 WATER

Source of water to be approved by Contracting Officer and suitable quality for irrigation and shall not contain elements toxic to plant life, including acids, alkalis, salts, chemical pollutants, and organic matter. Use collected storm water or graywater when available.

2.15 MYCORRHIZAL FUNGI INOCULUM

Mycorrhizal fungi inoculum shall be composed of multiple-fungus inoculum as recommended by the manufacturer for the plant material specified.

2.16 SOURCE QUALITY CONTROL

The Contracting Officer will inspect plant materials at the project site and approve them. Tag plant materials for size and quality.

PART 3 EXECUTION

3.1 EXTENT OF WORK

Provide soil preparation, fertilizing, tree, shrub, groundcover, and planting, staking and guying, weed control fabric, and erosion control material installation and a mulch topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.2 ALTERNATIVE HERBICIDE TREATMENT (SOLARIZING SOIL)

Within 48 hours of subsoil preparation, saturate soil with water to a depth of 3 feet. Immediately stake polyethylene sheeting over area to be planted. Stake tightly to surface of soil. Maintain sheeting in place for a minimum of 6 weeks. Immediately after removing sheeting, cover area to be planted with topsoil. Do not till soil prior to applying topsoil.

3.3 PREPARATION

3.3.1 Protection

Protect existing and proposed landscape features, elements, and sites from damage or contamination. Protect trees, vegetation, and other designated features by erecting high-visibility, reusable construction fencing. Locate fence no closer to trees than the drip line. Plan equipment and vehicle access to minimize and confine soil disturbance and compaction to areas indicated on Drawings.

3.3.2 Layout

Stake out approved plant material locations and planter bed outlines on the

project site before digging plant pits or beds. The Contracting Officer reserves the right to adjust plant material locations to meet field conditions. Do not plant closer than 36 inches to a building wall, pavement edge, fence or wall edge and other similar structures. Provide on-site locations for excavated rock, soil, and vegetation.

3.3.3 Erosion Control

Provide erosion control and seeding with native plant species to protect slopes.

3.3.4 Soil Preparation

3.3.4.1 pH Adjuster Application Rates

Apply pH adjuster at rates as determined by laboratory soil analysis of the soils imported to the job site.

3.3.4.2 Soil Conditioner Application Rates

Apply soil conditioners at rates as determined by laboratory soil analysis of the soils imported to the job site.

3.3.4.3 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils imported to the job site.

3.3.5 Root Control Barrier (NOT USED)

3.3.6 Subsoil Drainage for Plant Pits and Beds

Provide as indicated. Lay perforated drain pipe with perforations down. Backfill trenches as specified in Section 31 00 00 EARTHWORK and 31 23 00.00 20 EXCAVATION AND FILL.

3.4 PLANT BED PREPARATION

Verify location of underground utilities prior to excavation. Protect existing adjacent turf before excavations are made. Do not disturb topsoil and vegetation in areas outside those indicated on Drawings. Where planting beds occur in existing turf areas, remove turf to a depth that will ensure removal of entire root system. Measure depth of plant pits from finished grade. Depth of plant pit excavation shall be as indicated and provide proper relation between top of root ball and finished grade. Install plant material as specified in paragraph entitled "Plant Installation." Do not install trees within 10 feet of any utility lines or building walls.

3.5 PLANT INSTALLATION

3.5.1 Individual Plant Pit Excavation

Excavate pits at least twice as large in diameter as the size of ball or container to depth shown.

3.5.2 Plant Beds with Multiple Plants

Excavate plant beds continuously throughout entire bed as outlined to depth

shown.

3.5.3 Handling and Setting

Move plant materials only by supporting the root ball or container. Set plants on hand compacted layer of prepared backfill soil mixture 6 inches thick and hold plumb in the center of the pit until soil has been tamped firmly around root ball. Set plant materials, in relation to surrounding finish grade, one to 2 inches above depth at which they were grown in the nursery, collecting field or container. Replace plant material whose root balls are cracked or damaged either before or during the planting process.

Plant material shall be set in plant beds according to the drawings. Backfill soil mixture shall be placed on previously scarified subsoil to completely surround the root balls, and shall be brought to a smooth and even surface, blending to existing areas.

3.5.3.1 Balled and Burlapped Stock

Backfill with prepared soil mixture to approximately half the depth of ball and then tamp and water. Carefully remove or fold back excess burlap and tying materials from the top a minimum 1/3 depth from the top of the rootball. Tamp and complete backfill, place mulch topdressing, and water. Remove wires and non-biodegradable materials from plant pit prior to backfill operations.

3.5.3.2 Bare-Root Stock

Plant so roots are arranged in a natural position. Place roots in water a minimum of 30 minutes prior to planting. Carefully work prepared soil mixture among roots. Tamp remainder of backfill, place mulch topdressing and water.

3.5.3.3 Container Grown Stock

Remove from container and prevent damage to plant or root system.

3.5.3.4 Ground Covers and Vines

Plant after placing mulch topdressing. Do not remove plant materials from flats or containers until immediately before planting. Space at intervals indicated. Plant at a depth to sufficiently cover all roots. Start watering areas planted as required by temperature and wind conditions. Apply water at a rate sufficient to ensure thorough wetting of soil to a depth of 6 inches without run off or puddling. Smooth planting areas after planting to provide even, smooth finish. Mulch as indicated.

Smooth planting areas before planting to provide even, smooth finish. Plant after placing weed control fabric and mulch topdressing. Do not remove plant material from flats or containers until immediately before planting. Space at the intervals indicated. Plant at a depth to sufficiently cover all roots. Start watering areas planted as required by temperature and wind conditions. Apply water at a rate sufficient to ensure thorough wetting of soil to a depth of 6 inches without run off or puddling. Add mulch topdressing as needed.

3.5.4 Earth Mounded Watering Basin for Individual Plant Pits

Form with topsoil around each plant by replacing a mound of topsoil around

the edge of each plant pit. Watering basins shall be 6 inches deep for trees and 4 inches deep for shrubs. Eliminate basins around plants in plant beds containing multiple plants.

3.5.5 Weed Control Fabric Installation

Remove grass and weed vegetation, including roots, from within the area enclosed by edging. Completely cover areas enclosed by edging with specified weed control fabric prior to placing mulch layer. Overlap cut edges 6 inches.

3.5.6 Erosion Control Material

Install in accordance with manufacturer's instructions.

3.5.7 Placement of Mulch Topdressing

Place specified mulch topdressing on top of weed control fabric covering total area enclosed by edging. Place mulch topdressing to a minimum depth of 3 inches.

3.5.8 Mulch Topdressing

Provide mulch topdressing over entire planter bed surfaces and individual plant surfaces including earth mound watering basin around plants to a minimum depth of 3 inches after completion of plant installation and before watering. Keep mulch out of the crowns of shrubs. Place mulch a minimum 2 to 3 inches away from trunk of shrub or tree. Place on top of any weed control fabric.

3.5.9 Fertilization

3.5.9.1 Granular Fertilizer

Apply granular fertilizer as a top coat prior to placing mulch layer and water thoroughly.

3.5.10 Watering

Start watering areas planted as required by temperature and wind conditions. Slow deep watering shall be used. Apply water at a rate sufficient to ensure thorough wetting of soil to a depth of 12 inches without run off or puddling. Watering of other plant material or adjacent areas shall be prevented.

3.5.11 Staking and Guying

3.5.11.1 Staking

Stake plants with the number of stakes indicated complete with double strand of 12 gage guy wire as detailed. Attach guy wire half the tree height but not more than 5 feet high. Drive stakes to a depth of 2 1/2 to 3 feet into the ground outside the plant pit. Do not injure the root ball. Use hose chafer guards where guy wire comes in contact with tree trunk.

3.5.11.2 Guying

Guy plants as indicated. Attach two strands of guying wire around the tree trunk at an angle of 45 degrees at approximately 1/2 of the trunk height.

Protect tree trunks with chafing guards where guying wire contacts the tree trunk. Anchor guys to wood ground stakes. Fasten flags to each guying wire approximately 2/3 of the distance up from ground level. Provide turnbuckles as indicated.

3.5.11.3 Chafing Guards

Use hose chafing guards, as specified where guy wire will contact the plant.

3.5.11.4 Wood Ground Stakes

Drive wood ground stakes into firm ground outside of plant pit with top of stake flush with ground. Place equal distance from tree trunk and around the plant pit.

3.5.11.5 Flags

Securely fasten flags on each guy wire approximately two-thirds of the distance up from ground level.

3.5.12 Pruning

Prune in accordance with safety requirement of TCIA Z133.1.

3.5.12.1 Trees and Shrubs

Remove dead and broken branches. Prune to correct structural defects only. Retain typical growth shape of individual plants with as much height and spread as practical. Do not cut central leader on trees. Make cuts with sharp instruments. Do not flush cut with trunk or adjacent branches. Collars shall remain in place. Pruning shall be accomplished by trained and experienced personnel and shall be accordance with TCIA A300P1.

3.5.12.2 Wound Dressing

Do not apply tree wound dressing to cuts.

3.6 RESTORATION AND CLEAN UP

3.6.1 Restoration

Turf areas, pavements and facilities that have been damaged from the planting operation shall be restored to original condition at the Contractor's expense.

3.6.2 Clean Up

Excess and waste material shall be removed from the installed area and shall be disposed offsite at an approved landfill, recycling center, or composting center. Separate and recycle or reuse the following landscape waste materials: nylon straps, wire, ball wrap, burlap, and wood stakes. Adjacent paved areas shall be cleared.

-- End of Section --

SECTION 33 11 00

WATER DISTRIBUTION
02/11

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO HB-17	(2002; Errata 2003; Errata 2005, 17th Edition) Standard Specifications for Highway Bridges

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA B300	(2010) Hypochlorites
AWWA B301	(2010) Liquid Chlorine
AWWA C104/A21.4	(2008; Errata 2010) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C110/A21.10	(2008) Ductile-Iron and Gray-Iron Fittings for Water
AWWA C111/A21.11	(2007) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115/A21.15	(2005) Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C151/A21.51	(2009) Ductile-Iron Pipe, Centrifugally Cast, for Water
AWWA C153/A21.53	(2006) Ductile-Iron Compact Fittings for Water Service
AWWA C500	(2009) Metal-Seated Gate Valves for Water Supply Service
AWWA C504	(2006; R 2010) Standard for Rubber-Seated Butterfly Valves
AWWA C508	(2009) Swing-Check Valves for Waterworks Service, 2 In. (50 mm) Through 24 In. (600 mm) NPS
AWWA C509	(2009) Resilient-Seated Gate Valves for Water Supply Service

AWWA C600	(2010) Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C605	(2005) Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C651	(2005; Errata 2005) Standard for Disinfecting Water Mains
AWWA C800	(2005) Underground Service Line Valves and Fittings
AWWA C900	(2007; Errata 2008) Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Distribution
AWWA M11	(2004; 4th Ed) Manual: Steel Water Pipe: A Guide for Design and Installation
AWWA M23	(2002; 2nd Ed) Manual: PVC Pipe - Design and Installation
AWWA M9	(20083rd Ed) Manual: Concrete Pressure Pipe

ASME INTERNATIONAL (ASME)

ASME B16.15	(2006) Cast Bronze Alloy Threaded Fittings Classes 125 and 250
ASME B16.18	(2001; R 2005) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.22	(2001; R 2010) Standard for Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.26	(2006) Standard for Cast Copper Alloy Fittings for Flared Copper Tubes

ASTM INTERNATIONAL (ASTM)

ASTM B 42	(2010) Standard Specification for Seamless Copper Pipe, Standard Sizes
ASTM B 61	(2008) Standard Specification for Steam or Valve Bronze Castings
ASTM B 62	(2009) Standard Specification for Composition Bronze or Ounce Metal Castings
ASTM B 88	(2009) Standard Specification for Seamless Copper Water Tube
ASTM C 94/C 94M	(2010) Standard Specification for Ready-Mixed Concrete

ASTM D 1785	(2006) Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe, Schedules 40, 80, and 120
ASTM D 2774	(2008) Underground Installation of Thermoplastic Pressure Piping
ASTM D 2855	(1996; R 2010) Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM D 3139	(1998; R 2005) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM F 402	(2005) Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
ASTM F 477	(2010) Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-80	(2008) Bronze Gate, Globe, Angle and Check Valves

UNDERWRITERS LABORATORIES (UL)

UL 262	(2004; Reprint Jun 2008) Gate Valves for Fire-Protection Service
UL 312	(2010) Check Valves for Fire-Protection Service

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)

UBPPA UNI-B-3	(1992) Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Pressure Pipe (Nominal Diameters 4-36 Inch)

1.2 DESIGN REQUIREMENTS

1.2.1 Water Service Lines

Provide water service lines indicated as [_____] inch lines from water distribution main to building service at a point approximately 5 feet from building the points indicated. Water service lines shall be copper tubing or polyvinyl chloride (PVC) plastic pipe. Provide water service line appurtenances as specified and where indicated. Submit design calculations of water piping.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section

01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Piping Materials

Water service line piping, fittings, joints, valves, and coupling

Hydrants

Indicator posts

Corporation stops

Valve boxes

Submit manufacturer's standard drawings or catalog cuts, except submit both drawings and cuts for push-on and rubber-gasketed bell-and-spigot joints. Include information concerning gaskets with submittal for joints and couplings.

SD-06 Test Reports

Bacteriological Disinfection.

Test results from commercial laboratory verifying disinfection

SD-07 Certificates

Water distribution main piping, fittings, joints, valves, and coupling

Water service line piping, fittings, joints, valves, and coupling

Fire hydrants

Certificates shall attest that tests set forth in each applicable referenced publication have been performed, whether specified in that publication to be mandatory or otherwise and that production control tests have been performed at the intervals or frequency specified in the publication. Other tests shall have been performed within 3 years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

SD-08 Manufacturer's Instructions

Delivery, storage, and handling

Installation procedures for water piping

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery and Storage

Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials

directly on the ground. Keep inside of pipes, fittings, valves and hydrants free of dirt and debris.

1.4.2 Handling

Handle pipe, fittings, valves, hydrants, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make repairs if coatings or linings are damaged. Do not place any other material or pipe inside a pipe or fitting after the coating has been applied. Carry, do not drag pipe to the trench. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Government. Store rubber gaskets that are not to be installed immediately, under cover out of direct sunlight.

PART 2 PRODUCTS

2.1 WATER DISTRIBUTION MAIN MATERIALS

2.1.1 Piping Materials

2.1.1.1 Ductile-Iron Piping

a. Pipe and Fittings: Pipe, except flanged pipe, AWWA C151/A21.51. Flanged pipe, AWWA C115/A21.15. Fittings, AWWA C110/A21.10 or AWWA C153/A21.53; fittings with push-on joint ends conforming to the same requirements as fittings with mechanical-joint ends, except that the bell design shall be modified, as approved, for push-on joint. Fittings shall have pressure rating at least equivalent to that of the pipe. Ends of pipe and fittings shall be suitable for the specified joints. Pipe and fittings shall have cement-mortar lining, AWWA C104/A21.4, twice the standard thickness.

b. Joints and Jointing Material:

(1) Joints: Joints for pipe and fittings shall be push-on joints or mechanical joints. Joints made with sleeve-type mechanical coupling may be used in lieu of push-on joint, subject to the limitations specified in paragraph entitled "Sleeve-Type Mechanical Couplings."

(2) Push-On Joints: Shape of pipe ends and fitting ends, gaskets, and lubricant for joint assembly, AWWA C111/A21.11.

(3) Mechanical Joints: Dimensional and material requirements for pipe ends, glands, bolts and nuts, and gaskets, AWWA C111/A21.11.

2.1.1.2 Polyvinyl Chloride (PVC) Plastic Piping

a. Pipe and Fittings: Pipe, AWWA C900, shall be plain end or gasket bell end, Pressure Class 150 (DR 18) with cast-iron-pipe-equivalent OD.

b. Fittings for PVC pipe: Fittings shall be gray iron or ductile iron,

AWWA C110/A21.10 or AWWA C153/A21.53, and have cement-mortar lining, AWWA C104/A21.4, standard thickness. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends, except that bell design shall be modified, as approved, for push-on joint suitable for use with PVC plastic pipe specified in this paragraph. Iron fittings and specials shall be cement-mortar lined in accordance with AWWA C104/A21.4. Fittings and specials may be of the same material as the pipe with elastomeric gaskets, all in conformance with AWWA C605 and AWWA C900.

c. Joints and Jointing Material: Joints for pipe shall be push-on joints, ASTM D 3139. Joints between pipe and metal fittings, valves, and other accessories shall be push-on joints ASTM D 3139, or compression-type joints/mechanical joints, ASTM D 3139 and AWWA C111/A21.11. Provide each joint connection with an elastomeric gasket suitable for the bell or coupling with which it is to be used. Gaskets for push-on joints for pipe, ASTM F 477. Gaskets for push-on joints and compression-type joints/mechanical joints for joint connections between pipe and metal fittings, valves, and other accessories, AWWA C111/A21.11, respectively, for push-on joints and mechanical joints. Mechanically coupled joints using a sleeve-type mechanical coupling, as specified in paragraph entitled "Sleeve-Type Mechanical Couplings," may be used as an optional jointing method in lieu of push-on joints on plain-end PVC plastic pipe, subject to the limitations specified for mechanically coupled joints using a sleeve-type mechanical coupling and to the use of internal stiffeners as specified for compression-type joints in ASTM D 3139.

2.1.2 Valves, Hydrants, and Other Water Main Accessories

2.1.2.1 Gate Valves on Buried Piping

AWWA C500, AWWA C509, or UL 262. Unless otherwise specified, valves conforming to: (1) AWWA C500 shall be nonrising stem type with double-disc gates and mechanical-joint ends or push-on joint ends as appropriate for the adjoining pipe, (2) AWWA C509 shall be nonrising stem type with mechanical-joint ends or resilient-seated gate valves 3 to 12 inches in size, and (3) UL 262 shall be inside-screw type with operating nut, double-disc or split-wedge type gate, designed for a hydraulic working pressure, and shall have mechanical-joint ends or push-on joint ends as appropriate for the pipe to which it is joined. Materials for UL 262 valves shall conform to the reference standards specified in AWWA C500. Valves shall open by counterclockwise rotation of the valve stem. Stuffing boxes shall have 0-ring stem seals. Stuffing boxes shall be bolted and constructed so as to permit easy removal of parts for repair. In lieu of mechanical-joint ends and push-on joint ends, valves may have special ends for connection to cement piping or to sleeve-type mechanical coupling. Valve ends and gaskets for connection to sleeve-type mechanical coupling shall conform to the applicable requirements specified for the joint or coupling. Where a post indicator is shown, the valve shall have an indicator post flange; indicator post flange for AWWA C500 valve shall conform to the applicable requirements of UL 262. Provide valves with gearing and indicators, AWWA C500. Provide valves with bypasses, AWWA C500. Valves shall be of one manufacturer.

2.1.2.2 Gate Valves [in Valve Pit(s)] [and] [Aboveground Location]

AWWA C500, AWWA C509, or UL 262. Unless otherwise specified, valves conforming to: (1) AWWA C500 shall be nonrising stem type with double-disc

gates and flanged ends, (2) AWWA C509 shall be nonrising stem type with flanged ends, and (3) UL 262 shall be inside-screw type, shall have double-disc or split-wedge type gate and flanged ends, and shall be designed for a hydraulic working pressure. Materials for UL 262 valves shall conform to the reference standards specified in AWWA C500. Provide valves with handwheels that open by counterclockwise rotation of the valve stem. Stuffing boxes shall be bolted and constructed so as to permit easy removal of parts for repair. In lieu of flanged ends, valves may have grooved ends suitable for grooved type joints, as specified in paragraph entitled "Ductile-Iron Piping." Valves shall be of one manufacturer.

2.1.2.3 Check Valves

Swing-check type, AWWA C508 or UL 312. Valves conforming to: (1) AWWA C508 shall have iron or steel body and cover and flanged ends, and (2) UL 312 shall have cast iron or steel body and cover, flanged ends, and designed for a working pressure. Materials for UL 312 valves shall conform to the reference standards specified in AWWA C508. Valves shall have clear port opening. Flanges shall be Class 125 conforming to ASME B16.1. In lieu of flanged ends, valves may have grooved ends suitable for grooved type joints, as specified in paragraph entitled "Ductile-Iron Piping." Valves shall be of one manufacturer.

2.1.2.4 Rubber-Seated Butterfly Valves

Rubber-seated butterfly valves shall conform to the performance requirements of AWWA C504. Wafer type valves conforming to the performance requirements of AWWA C504 in all respects, but not meeting laying length requirements will be acceptable if supplied and installed with a spacer providing the specified laying length. All tests required by AWWA C504 shall be met. Flanged-end valves shall be installed in an approved pit and provided with a union or sleeve-type coupling in the pit to permit removal. Mechanical-end valves 3 through 10 inches in diameter may be direct burial if provided with a suitable valve box, means for manual operation, and an adjacent pipe joint to facilitate valve removal. Valve operators shall restrict closing to a rate requiring approximately 60 seconds, from fully open to fully closed.

2.1.2.5 Vacuum and Air Relief Valves

Vacuum and air relief valves shall be of the size shown and shall be of a type that will release air and prevent the formation of a vacuum. The valves shall automatically release air when the lines are being filled with water and shall admit air into the line when water is being withdrawn in excess of the inflow. Valves shall be iron body with bronze trim and stainless steel float.

2.1.2.6 Valve Boxes

Provide a valve box for each gate valve on buried piping. Valve boxes shall be of cast iron or precast concrete of a size suitable for the valve on which it is to be used and shall be adjustable. Cast-iron boxes shall have a minimum cover and wall thickness of 3/16 inch. Precast concrete boxes installed in locations subjected to vehicular traffic shall be designed to withstand the following HS-20 AASHTO load designation as outline in AASHTO HB-17. Precast concrete boxes shall be manufactured in accordance with Section 03 40 00.00 10 PLANT-PRECAST CONCRETE PRODUCTS FOR BELOW GRADE CONSTRUCTION. Provide a round head. Cast the word "WATER" on the lid. The least diameter of the shaft of the box shall be 5 1/4 inches.

Cast-iron box shall have a heavy coat of bituminous paint.

2.1.2.7 Valve Pits

Valve pits shall be constructed at locations indicated or as required above and in accordance with the details shown.

2.2 WATER SERVICE LINE MATERIALS

2.2.1 Piping Materials

2.2.1.1 Copper Pipe and Associated Fittings

Pipe, ASTM B 42, regular, threaded ends. Fittings shall be brass or bronze, ASME B16.15, 125 pound.

2.2.1.2 Copper Tubing and Associated Fittings

Tubing, ASTM B 88, Type K. Fittings for solder-type joint, ASME B16.18 or ASME B16.22; fittings for compression-type joint, ASME B16.26, flared tube type.

2.2.1.3 Plastic Piping

Plastic pipe and fittings shall bear the seal of the National Sanitation Foundation (NSF) for potable water service. Plastic pipe and fittings shall be supplied from the same manufacturer.

a. Polyvinyl Chloride (PVC) Plastic Piping with Elastomeric-Gasket Joints:

Pipe shall conform to dimensional requirements of ASTM D 1785 Schedule 40, with joints meeting the requirements of 150 psi working pressure, 200 psi hydrostatic test pressure, unless otherwise shown or specified.

2.2.1.4 Ductile-Iron Piping

Comply with "Ductile-Iron Piping" subparagraph under paragraph "Water Distribution Main Materials."

2.2.1.5 Insulating Joints

Joints between pipe of dissimilar metals shall have a rubber-gasketed or other suitable approved type of insulating joint or dielectric coupling which will effectively prevent metal-to-metal contact between adjacent sections of piping.

2.2.2 Water Service Line Appurtenances

2.2.2.1 Corporation Stops

Ground key type; bronze, ASTM B 61 or ASTM B 62; and suitable for the working pressure of the system. Ends shall be suitable for solder-joint, or flared tube compression type joint. Threaded ends for inlet and outlet of corporation stops, AWWA C800; coupling nut for connection to flared copper tubing, ASME B16.26.

2.2.2.2 Curb or Service Stops

Ground key, round way, inverted key type; made of bronze, ASTM B 61 or ASTM B 62; and suitable for the working pressure of the system. Ends shall be as appropriate for connection to the service piping. Arrow shall be cast into body of the curb or service stop indicating direction of flow.

2.2.2.3 Service Clamps

Service clamps used for repairing damaged cast-iron, steel, PVC or asbestos-cement pipe shall have a pressure rating not less than that of the pipe to be connected and shall be either the single or double flattened strap type. Clamps shall have a galvanized malleable-iron body with cadmium plated straps and nuts. Clamps shall have a rubber gasket cemented to the body.

2.2.2.4 Goosenecks

Type K copper tubing. Joint ends for goosenecks shall be appropriate for connecting to corporation stop and service line. Where multiple gooseneck connections are required for an individual service, goosenecks shall be connected to the service line through a suitable approved brass or bronze branch connection; the total clear area of the branches shall be at least equal to the clear area of the service line. Length of goosenecks shall be in accordance with standard practice.

2.2.2.5 Dielectric Fittings

Dielectric fittings shall be installed between threaded ferrous and nonferrous metallic pipe, fittings and valves, except where corporation stops join mains. Dielectric fittings shall prevent metal-to-metal contact of dissimilar metallic piping elements and shall be suitable for the required working pressure.

2.2.2.6 Check Valves

Check valves shall be designed for a minimum working pressure of 150 psi or as indicated. Valves shall have a clear waterway equal to the full nominal diameter of the valve. Valves shall open to permit flow when inlet pressure is greater than the discharge pressure, and shall close tightly to prevent return flow when discharge pressure exceeds inlet pressure. The size of the valve, working pressure, manufacturer's name, initials, or trademark shall be cast on the body of each valve. Valves 2 inches and larger shall be outside lever and spring type.

Valves 2 inches and smaller shall be all bronze designed for screwed fittings, and shall conform to MSS SP-80, Class 150, Types 3 and 4 as suitable for the application.

2.2.2.7 Gate Valves 3 Inch Size and Larger on Buried Piping

Gate valves 3 inch size and larger on buried piping AWWA C500 or UL 262 and of one manufacturer. Valves, AWWA C500, nonrising stem type with double-disc gates. Valves, UL 262, inside-screw type with operating nut, split wedge or double disc type gate, and designed for a hydraulic working pressure of 175 psi. Materials for UL 262 valves conforming to the reference standards specified in AWWA C500. Valves shall open by counterclockwise rotation of the valve stem. Stuffing boxes shall have 0-ring stem seals and shall be bolted and constructed so as to permit easy

removal of parts for repair. Valves shall have ends suitable for joining to the pipe used; push-on joint ends or mechanical-joint ends for joining to ductile-iron pipe.

2.2.2.8 Gate Valves Smaller than 3 Inch in Size on Buried Piping

Gate valves smaller than 3 inch size on Buried Piping MSS SP-80, Class 150, solid wedge, nonrising stem. Valves shall have flanged or threaded end connections, with a union on one side of the valve. Provide handwheel operators.

2.2.2.9 Curb Boxes

Provide a curb box for each curb or service stop. Curb boxes shall be of cast iron of a size suitable for the stop on which it is to be used. Provide a round head. Cast the word "WATER" on the lid. Each box shall have a heavy coat of bituminous paint.

2.2.2.10 Valve Boxes

Provide a valve box for each gate valve on buried piping. Valve boxes shall be of cast iron or precast concrete of a size suitable for the valve on which it is to be used and shall be adjustable. Precast concrete boxes installed in locations subjected to vehicular traffic shall be designed to withstand the following HS-20 AASHTO load designation as outline in AASHTO HB-17. Precast concrete boxes shall be manufactured in accordance with Section 03 40 00.00 10 PLANT-PRECAST CONCRETE PRODUCTS FOR BELOW GRADE CONSTRUCTION. Provide a round head. Cast the word "WATER" on the lid. The least diameter of the shaft of the box shall be 5 1/4 inches.

2.2.2.11 Tapping Sleeves

Tapping sleeves of the sizes indicated for connection to existing main shall be the cast gray, ductile, or malleable iron, split-sleeve type with flanged or grooved outlet, and with bolts, follower rings and gaskets on each end of the sleeve. Construction shall be suitable for a maximum working pressure of 150 psi. Bolts shall have square heads and hexagonal nuts. Longitudinal gaskets and mechanical joints with gaskets shall be as recommended by the manufacturer of the sleeve. When using grooved mechanical tee, it shall consist of an upper housing with full locating collar for rigid positioning which engages a machine-cut hole in pipe, encasing an elastomeric gasket which conforms to the pipe outside diameter around the hole and a lower housing with positioning lugs, secured together during assembly by nuts and bolts as specified, pretorqued to 50 foot-pound.

2.2.2.12 Disinfection

Chlorinating materials shall conform to the following:

Chlorine, Liquid: AWWA B301.

Hypochlorite, Calcium and Sodium: AWWA B300.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPELINES

3.1.1 General Requirements for Installation of Pipelines

These requirements shall apply to all pipeline installation except where specific exception is made in the "Special Requirements..." paragraphs.

3.1.1.1 Location of Water Lines

Terminate the work covered by this section at a point approximately 5 feet from the building. Where the location of the water line is not clearly defined by dimensions on the drawings, do not lay water line closer horizontally than 10 feet from any sewer line. Where water lines cross under gravity sewer lines, encase sewer line fully in concrete for a distance of at least 10 feet on each side of the crossing, unless sewer line is made of pressure pipe with rubber-gasketed joints and no joint is located within 3 feet horizontally of the crossing. Lay water lines which cross sewer force mains and inverted siphons at least 2 feet above these sewer lines; when joints in the sewer line are closer than 3 feet horizontally from the water line, encase these joints in concrete. Do not lay water lines in the same trench with gas lines, fuel lines, or electric wiring. Copper tubing shall not be installed in the same trench with ferrous piping materials.

Where water piping is required to be installed within 3 feet of existing structures, the water pipe shall be sleeved as required in Paragraph "Casting Pipe". The Contractor shall install the water pipe and sleeve ensuring that there will be no damage to the structures and no settlement or movement of foundations or footings.

3.1.1.2 Earthwork

Perform earthwork operations in accordance with Section 31 23 00.00 20.

3.1.1.3 Pipe Laying and Jointing

Remove fins and burrs from pipe and fittings. Before placing in position, clean pipe, fittings, valves, and accessories, and maintain in a clean condition. Provide proper facilities for lowering sections of pipe into trenches. Do not under any circumstances drop or dump pipe, fittings, valves, or any other water line material into trenches. Cut pipe in a neat workmanlike manner accurately to length established at the site and work into place without springing or forcing. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material. Blocking or wedging between bells and spigots will not be permitted. Lay bell-and-spigot pipe with the bell end pointing in the direction of laying. Grade the pipeline in straight lines; avoid the formation of dips and low points. Support pipe at proper elevation and grade. Secure firm, uniform support. Wood support blocking will not be permitted. Lay pipe so that the full length of each section of pipe and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings. Provide anchors and supports where indicated and where necessary for fastening work into place. Make proper provision for expansion and contraction of pipelines. Keep trenches free of water until joints have been properly made. At the end of each work day, close open ends of pipe temporarily with wood blocks or bulkheads. Do not lay pipe when conditions of trench or weather prevent

installation. Depth of cover over top of pipe shall not be less than 2 1/2 feet.

3.1.1.4 Installation of Tracer Wire

Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.

3.1.1.5 Connections to Existing Water Lines

Make connections to existing water lines after approval is obtained and with a minimum interruption of service on the existing line. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped, except as otherwise specified, tap concrete pipe in accordance with AWWA M9 for tapping concrete pressure pipe.

3.1.1.6 Penetrations

Pipe passing through walls of valve pits and structures shall be provided with ductile-iron or Schedule 40 steel wall sleeves. Annular space between walls and sleeves shall be filled with rich cement mortar. Annular space between pipe and sleeves shall be filled with mastic.

3.1.1.7 Flanged Pipe

Flanged pipe shall only be installed above ground or with the flanges in valve pits.

3.1.2 Special Requirements for Installation of Water Mains

3.1.2.1 Installation of Ductile-Iron Piping

Unless otherwise specified, install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" and with the requirements of AWWA C600 for pipe installation, joint assembly, valve-and-fitting installation, and thrust restraint.

a. Jointing: Make push-on joints with the gaskets and lubricant specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly. Make mechanical joints with the gaskets, glands, bolts, and nuts specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly and the recommendations of Appendix A to AWWA C111/A21.11. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer. Make grooved type joints with the couplings previously specified for this type joint connecting pipe with the grooved ends specified for this type joint; assemble in accordance with the recommendations of the coupling manufacturer. Groove pipe in the field only with approved groove cutting equipment designed especially for the purpose and produced by a manufacturer of grooved joint couplings; secure approval for field-cut grooves before assembling the joint. Make insulating joints with the gaskets, sleeves, washers, bolts, and nuts previously specified for this type joint. Assemble insulating joints as specified for flanged joints, except that bolts with insulating sleeves shall be full size for the bolt holes. Ensure that there is no metal-to-metal contact between dissimilar metals after the

joint has been assembled.

b. Allowable Deflection: The maximum allowable deflection shall be as given in AWWA C600. If the alignment requires deflection in excess of the above limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth.

c. Pipe Anchorage: Provide concrete thrust blocks (reaction backing) for pipe anchorage. Thrust blocks shall be in accordance with the requirements of AWWA C600 for thrust restraint, except that size and positioning of thrust blocks shall be as indicated. Use concrete, ASTM C 94/C 94M, having a minimum compressive strength of 2,500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2 1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.

3.1.2.2 Installation of Steel Piping

a. Jointing: Make rubber-gasketed bell-and-spigot joints with the gaskets previously specified for this type joint, using an approved lubricant recommended by the pipe manufacturer; assemble in accordance with the recommendations of the pipe manufacturer. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer. Make flanged joints with the gaskets, bolts, and nuts specified for this type joint. Make flanged joints up tight; avoid undue strain on flanges, fittings, valves, and other equipment and accessories. Align bolt holes for each flanged joint. Use full-size bolts for the bolt holes; use of undersized bolts to make up for misalignment of bolt holes or for any other purpose will not be permitted. Do not allow adjoining flange faces to be out of parallel to such degree that the flanged joint cannot be made watertight without straining the flange. When flanged pipe or fitting has dimensions that do not allow the making of a proper flanged joint as specified, replace it by one of proper dimensions. Make grooved type joints with the couplings specified for this type joint connecting pipe with roll-grooved ends or pipe with welded-on cut-grooved adapters, each with dimensions as previously specified for this type joint. Groove pipe ends in the field only with approved groove rolling equipment and groove adapters in the field only with approved groove cutting equipment; groove rolling and groove cutting equipment shall be designed especially for the purpose and produced by a manufacturer of grooved joint couplings. Obtain approval for field-cut grooves before assembling the joint. Assemble grooved and shouldered type joints in accordance with the recommendations of the coupling manufacturer. Make insulating joints with the gaskets, sleeves, washers, bolts, and nuts specified for this type joint. Assemble insulating joints as specified for flanged joints, except that bolts with insulating sleeves shall be full size for the bolt holes. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled.

b. Allowable Offsets: For pipe with bell-and-spigot rubber-gasket joints, maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets shall be 5 degrees unless a lesser amount is recommended by the manufacturer. Short-radius curves and closures shall be formed by short lengths of pipe or fabricated specials specified.

c. Pipe Anchorage: Provide concrete thrust blocks (reaction backing) for

pipe anchorage. Thrust blocks shall be in accordance with the recommendations for thrust restraint in AWWA M11, Chapter 13, "Supplementary Design Data and Details," except that size and positioning of thrust blocks shall be as indicated. Use concrete, ASTM C 94/C 94M, having a minimum compressive strength of 2500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2 1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.

3.1.2.3 Installation of Valves and Hydrants

a. Installation of Valves: Install gate valves, AWWA C500 and UL 262, in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix ("Installation, Operation, and Maintenance of Gate Valves") to AWWA C500. Install gate valves, AWWA C509, in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix ("Installation, Operation, and Maintenance of Gate Valves") to AWWA C509. Install gate valves on PVC water mains in accordance with the recommendations for appurtenance installation in AWWA M23, Chapter 7, "Installation." Install check valves in accordance with the applicable requirements of AWWA C600 for valve-and-fitting installation. Make and assemble joints to gate valves and check valves as specified for making and assembling the same type joints between pipe and fittings.

3.1.3 Installation of Water Service Piping

3.1.3.1 Location

Connect water service piping to the building service where the building service has been installed. Where building service has not been installed, terminate water service lines approximately 5 feet from the building line at a point directed by the Contracting Officer; such water service lines shall be closed with plugs or caps.

3.1.3.2 Service Line Connections to Water Mains

Connect service lines to the main with a rigid connection and install a gate valve on service line below the frostline.

3.1.4 Special Requirements for Installation of Water Service Piping

3.1.4.1 Installation of Metallic Piping

Install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" and with the applicable requirements of AWWA C600 for pipe installation, unless otherwise specified.

3.1.4.2 Installation of Plastic Piping

Install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" and with the applicable requirements of ASTM D 2774 and ASTM D 2855, unless otherwise specified. Handle solvent cements used to join plastic piping in accordance with ASTM F 402.

a. Jointing: Make solvent-cemented joints for PVC plastic piping using the solvent cement previously specified for this material; assemble

joints in accordance with ASTM D 2855. Make plastic pipe joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.

b. Plastic Pipe Connections to Appurtenances: Connect plastic pipe service lines to corporation stops and gate valves in accordance with the recommendations of the plastic pipe manufacturer.

3.1.5 Disinfection

Prior to disinfection, obtain Contracting Officer approval of the proposed method for disposal of waste water from disinfection procedures. Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with AWWA C651. Fill piping systems with solution containing minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with domestic water until maximum residual chlorine content is within the range of 0.2 and 0.5 parts per million, or the residual chlorine content of domestic water supply. Obtain at least two consecutive satisfactory bacteriological samples from new water piping, analyze by a certified laboratory, and submit the results prior to the new water piping being placed into service. Disinfection of systems supplying nonpotable water is not required.

3.2 FIELD QUALITY CONTROL

3.2.1 Field Tests and Inspections

Prior to hydrostatic testing, obtain Contracting Officer approval of the proposed method for disposal of waste water from hydrostatic testing. The Contracting Officer will conduct field inspections and witness field tests specified in this section. The Contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing. The Contractor shall produce evidence, when required, that any item of work has been constructed in accordance with the drawings and specifications. Do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete.

3.2.2 Testing Procedure

Test water mains and water service lines in accordance with the applicable specified standard, except for the special testing requirements given in paragraph entitled "Special Testing Requirements." Test ductile-iron water mains and water service lines in accordance with the requirements of AWWA C600 for hydrostatic testing. The amount of leakage on ductile-iron pipelines with mechanical-joints or push-on joints shall not exceed the amounts given in AWWA C600; no leakage will be allowed at joints made by any other method. Test PVC plastic water mains and water service lines made with PVC plastic water main pipe in accordance with the requirements of UBPPA UNI-B-3 for pressure and leakage tests. The amount of leakage on pipelines made of PVC plastic water main pipe shall not exceed the amounts given in UBPPA UNI-B-3, except that at joints made with sleeve-type mechanical couplings, no leakage will be allowed. Repair of welded joints to stop leakage shall be done by welding only. Test water service lines in accordance with applicable requirements of AWWA C600 for hydrostatic testing. No leakage will be allowed at copper pipe joints, plastic pipe joints, flanged joints, and screwed joints.

3.2.3 Special Testing Requirements

For pressure test, use a hydrostatic pressure 50 psi greater than the maximum working pressure of the system, except that for those portions of the system having pipe size larger than 2 inches in diameter, hydrostatic test pressure shall be not less than 200 psi. Hold this pressure for not less than 2 hours. Prior to the pressure test, fill that portion of the pipeline being tested with water for a soaking period of not less than 24 hours. For leakage test, use a hydrostatic pressure not less than the maximum working pressure of the system. Leakage test may be performed at the same time and at the same test pressure as the pressure test.

3.3 CLEANUP

Upon completion of the installation of water lines, and appurtenances, all debris and surplus materials resulting from the work shall be removed.

-- End of Section --

SECTION 33 11 23

NATURAL GAS AND LIQUID PETROLEUM PIPING
11/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z21.45	(1995) Flexible Connectors of Other Than All-Metal Construction for Gas Appliances

ASME INTERNATIONAL (ASME)

ASME B1.1	(2003; R 2008) Unified Inch Screw Threads (UN and UNR Thread Form)
ASME B16.33	(2002; R 2007) Manually Operated Metallic Gas Valves for Use in Gas Piping Systems Up to 125 psi, Sizes NPS 1/2 - NPS 2
ASME B16.38	(2007) Large Metallic Valves for Gas Distribution (Manually Operated, NPS 2 1/2 to 12, 125 psig Maximum)
ASME B16.40	(2008) Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution Systems
ASME B18.2.1	(2010) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(2010) Standard for Square and Hex Nuts
ASME B31.8	(2010; Supplement 2010) Gas Transmission and Distribution Piping Systems

ASTM INTERNATIONAL (ASTM)

ASTM A 193/A 193M	(2010a) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service and Other Special Purpose Applications
ASTM A 194/A 194M	(2010) Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both
ASTM D 2513	(2009a) Thermoplastic Gas Pressure Pipe, Tubing, and Fittings

ASTM D 2683	(2010) Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 54	(2009; TIA 10-3) National Fuel Gas Code

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

49 CFR 192	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards

1.2 RELATED REQUIREMENTS

Section 23 03 00.00 20 BASIC MECHANICAL MATERIALS AND METHODS applies to this section, with additions and modifications specified herein.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Valve box

Valves

Warning and identification tape

Risers

Transition fittings

SD-07 Certificates

Welder's qualifications

PE welder's qualifications

Welder's identification symbols

SD-08 Manufacturer's Instructions

PE pipe and fittings

Submit manufacturer's installation instructions and manufacturer's visual joint appearance chart.

1.4 QUALITY ASSURANCE

1.4.1 Welder's Qualifications

Comply with ASME B31.8. The steel welder shall have a copy of a certified

ASME B31.8 qualification test report. The PE welder shall have a certificate from a PE pipe manufacturer's sponsored training course. Contractor shall also conduct a qualification test. Submit each welder's identification symbols, assigned number, or letter, used to identify work of the welder. Affix symbols immediately upon completion of welds. Welders making defective welds after passing a qualification test shall be given a requalification test and, upon failing to pass this test, shall not be permitted to work this contract.

1.4.2 PE Welder's Qualifications

Prior to installation, Contractor shall have supervising and installing personnel trained by a PE pipe manufacturer's sponsored course of not less than one week duration, or present proof satisfactory to the Contracting Officer that personnel are currently working in the installation of PE gas distribution lines.

1.4.3 Safety Standards

49 CFR 192.

1.5 DELIVERY, STORAGE, AND HANDLING

Handle, transport, and store plastic pipe and fittings carefully. Plug or cap pipe ends during transportation or storage to minimize dirt and moisture entry. Do not subject to abrasion or concentrated external loads. Discard PE pipe sections and fittings that have been damaged.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Conform to NFPA 54 and with requirements specified herein. Supply piping to appliances or equipment shall be at least as large as the inlets thereof.

2.2 PIPE AND FITTINGS

2.2.1 Underground Polyethylene (PE)

PE pipe and fittings are as follows:

a. Pipe: ASTM D 2513, 100 psig working pressure, Standard Dimension Ratio (SDR), the ratio of pipe diameter to wall thickness, 11.5 maximum.

b. Socket Fittings: ASTM D 2683.

c. Butt-Fusion Fittings: ASTM D 2513, molded.

2.2.2 Risers

Manufacturer's standard riser, transition from plastic to steel pipe with 7 to 12 mil thick epoxy coating. Use swaged gas-tight construction with O-ring seals, metal insert, and protective sleeve. Provide remote bolt-on or bracket or wall-mounted riser supports.

2.2.3 Transition Fittings

a. Steel to Plastic (PE): As specified for "riser" except designed for steel-to-plastic with tapping tee or sleeve. Coat or wrap exposed

steel pipe with heavy plastic coating.

b. Plastic to Plastic: Manufacturer's standard slip-on PE mechanical coupling, molded, with stainless-steel ring support, O-ring seals, and rated for 150 psig gas service.

2.3 SHUTOFF VALVES, BELOW GROUND

2.3.1 Metallic Ball Valves

ASME B16.33 corrosion-resisting steel, with threaded or flanged ends. Provide polytetrafluoroethylene (PTFE) seats.

2.3.2 PE Ball or Plug Valves

ASME B16.40 and ASTM D 2513, Class C materials (PE 2306 or PE 3406), strength rating of Class 4 location with class factor of 0.20, and SDR matching PE pipe dimensions and working pressure.

2.4 VALVES, ABOVEGROUND

2.4.1 Shutoff Valves, Sizes Larger Than 2 Inches

Steel body ball valve with flanged ends in accordance with ASME B16.38. Provide PTFE seats.

2.4.2 Shutoff Valves, Sizes 2 Inches and Smaller

Steel body ball valve in accordance with ASME B16.33, full port pattern, reinforced PTFE seals, threaded ends, and PTFE seat.

Steel body plug valve in accordance with ASME B16.33, straightway, taper plug, regular pattern with a port opening at least equal to the internal pipe area or round port full bore pattern, non-lubricated, PTFE packing, flat or square head stem with lever operator, 125 psig rating, threaded ends.

2.5 GAS EQUIPMENT CONNECTORS

a. Flexible Connectors: ANSI Z21.45.

b. Quick Disconnect Couplings: ANSI Z21.41.

c. Semi-Rigid Tubing and Fittings: ANSI Z21.69.

2.6 VALVE BOX

Provide street valve box with cast-iron cover and two-piece 5 1/4 inch shaft-slip valve box extension. Cast the word "Gas" into the box cover. Use valve box for areas as follows:

a. Roads and Traffic Areas: Heavy duty, cast iron cover.

b. Other Areas: Standard duty, concrete cover.

2.7 BURIED UTILITY WARNING AND IDENTIFICATION TAPE

Provide detectable aluminum-foil plastic-backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of

buried piping. Tape shall be detectable by an electronic detection instrument. Provide tape in rolls, 3 inch minimum width, color-coded yellow for natural gas, with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Warning and identification shall be "CAUTION BURIED GAS PIPING BELOW" or similar wording. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material.

2.8 WELDING FILLER METAL

ASME B31.8.

2.9 PIPE-THREAD TAPE

Antiseize and sealant tape of polytetrafluoroethylene (PTFE).

2.10 BOLTING (BOLTS AND NUTS)

Stainless steel bolting; ASTM A 193/A 193M, Grade B8M or B8MA, Type 316, for bolts; and ASTM A 194/A 194M, Grade 8M, Type 316, for nuts. Dimensions of bolts, studs, and nuts shall conform with ASME B18.2.1and ASME B18.2.2 with coarse threads conforming to ASME B1.1, with Class 2A fit for bolts and studs and Class 2B fit for nuts. Bolts or bolt-studs shall extend through the nuts and may have reduced shanks of a diameter not less than the diameter at root of threads. Bolts shall have American Standard regular square or heavy hexagon heads; nuts shall be American Standard heavy semifinished hexagonal.

2.11 GASKETS

Fluorinated elastomer, compatible with flange faces.

PART 3 EXECUTION

3.1 INSTALLATION

Install gas piping, appliances, and equipment in accordance with NFPA 54. Install distribution piping in accordance with ASME B31.8.

3.1.1 Excavating and Backfilling

Perform excavating and backfilling of pipe trenches as specified in Section 31 00 00 EARTHWORK. Place pipe directly in trench bottom and cover with minimum 3 inches of sand to top of pipe. If trench bottom is rocky, place pipe on a 3 inch bed of sand and cover as above. Provide remaining backfilling. Coordinate provision of utility warning and identification tape with backfill operation. Bury utility warning and identification tape with printed side up at a depth of 12 inches below the top surface of earth or the top surface of the subgrade under pavements.

3.1.2 Piping

Cut pipe to actual dimensions and assemble to prevent residual stress. Provide supply connections entering the buildings as indicated. Within buildings, run piping parallel to structure lines and conceal in finished spaces. Terminate each vertical supply pipe to burner or appliance with tee, nipple and cap to form a sediment trap. To supply multiple items of gas-burning equipment, provide manifold with inlet connections at both ends.

3.1.2.1 Cleanliness

Clean inside of pipe and fittings before installation. Blow lines clear using 80 to 100 psig clean dry compressed air. Rap steel lines sharply along entire pipe length before blowing clear. Cap or plug pipe ends to maintain cleanliness throughout installation.

3.1.2.2 Buried Plastic Lines

Provide totally PE piping. Prior to installation, obtain printed instructions and technical assistance in proper installation techniques from pipe manufacturer.

a. PE Piping: Prior to installation, Contractor shall have supervising and installing personnel, certified in accordance with paragraph entitled "Welder's Qualifications." Provide fusion-welded joints except where transitions have been specified. Use electrically heated tools, thermostatically controlled and equipped with temperature indication. (Where connection must be made to existing plastic pipe, contractor shall be responsible for determination of compatibility of materials and procedural changes in fusion process necessary to attain maximum integrity of bond.)

b. Laying PE Pipe: Bury pipe 24 inches below finish grade or deeper when indicated. Lay in accordance with manufacturer's printed instructions.

3.1.2.3 Connections to Existing Pipeline

When making connections to live gas mains, use pressure tight installation equipment operated by workmen trained and experienced in making hot taps. For connections to existing underground pipeline or service branch, use transition fittings for dissimilar materials.

3.1.2.4 Wrapping

Where connection to existing steel line is made underground, tape wrap new steel transition fittings and exposed existing pipe having damaged coating. Clean pipe to bare metal. Initially stretch first layer of tape to conform to the surface while spirally half-lapping. Apply a second layer, half-lapped and spiraled as the first layer, but with spirals perpendicular to first wrapping. Use 10 mil minimum thick polyethylene tape. In lieu of tape wrap, heat shrinkable 10 mil minimum thick polyethylene sleeve may be used.

3.1.3 Valves

Install valves approximately at locations indicated. Orient stems vertically, with operators on top, or horizontally. Provide support for valves to resist operating torque applied to PE pipes.

3.1.3.1 Stop Valve and Shutoff Valve

Provide stop valve on service branch at connection to main and shut-off valve on riser outside of building.

3.2 FIELD QUALITY CONTROL

3.2.1 Metal Welding Inspection

Inspect for compliance with ASME B31.8. Replace, repair, and then re-inspect defective welds.

3.2.2 PE Fusion Welding Inspection

Visually inspect butt joints by comparing with, manufacturer's visual joint appearance chart. Inspect fusion joints for proper fused connection. Replace defective joints by cutting out defective joints or replacing fittings. Inspect 100 percent of all joints and reinspect all corrections. Arrange with the pipe manufacturer's representative in the presence of the Contracting Officer to make first time inspection.

3.2.3 Pressure Tests

Use test pressure of 1 1/2 times maximum working pressure, but in no case less than 50 psig. Do not test until every joint has set and cooled at least 8 hours at temperatures above 50 degrees F. Conduct testing before backfilling; however, place sufficient backfill material between fittings to hold pipe in place during tests. Test system gas tight in accordance with ASME B31.8. Use clean dry air or inert gas, such as nitrogen or carbon dioxide, for testing. Systems which may be contaminated by gas shall first be purged as specified. Make tests on entire system or on sections that can be isolated by valves. After pressurization, isolate entire piping system from sources of air during test period. Maintain test pressure for at least 8 hours between times of first and last reading of pressure and temperature. Take first reading at least one hour after test pressure has been applied. Do not take test readings during rapid weather changes. Provide temperature same as actual trench conditions. There shall be no reduction in the applied test pressure other than that due to a change in ambient temperature. Allow for ambient temperature change in accordance with the relationship PF + 14.7 = (P1 + 14.7) (T2 + 460) / T1 + 460), in which "T" and "PF" represent Fahrenheit temperature and gage pressure, respectively, subscripts "1" and "2" denote initial and final readings, and "PF" is the calculated final pressure. If "PF" exceeds the measured final pressure (final gage reading) by 1/2 psi or more, isolate sections of the piping system, retest each section individually, and apply a solution of warm soapy water to joints of each section for which a reduction in pressure occurs after allowing for ambient temperature change. Repair leaking joints and repeat test until no reduction in pressure occurs. In performing tests, use a test gage calibrated in one psi increments and readable to 1/2 psi.

3.2.4 System Purging

After completing pressure tests, and before testing a gas contaminated line, purge line with nitrogen at junction with main line to remove all air and gas. Clear completed line by attaching a test pilot fixture at capped stub-in line at building location and let gas flow until test pilot ignites. Procedures shall conform to ASME B31.8.

-CAUTION-

Failure to purge may result in explosion within line when air-to-gas is at correct mixture.

-CAUTION-

-- End of Section --

SECTION 33 30 00

SANITARY SEWERS
04/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C104/A21.4	(2008; Errata 2010) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C110/A21.10	(2008) Ductile-Iron and Gray-Iron Fittings for Water
AWWA C111/A21.11	(2007) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C153/A21.53	(2006) Ductile-Iron Compact Fittings for Water Service
AWWA C600	(2010) Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C605	(2005) Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C900	(2007; Errata 2008) Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Distribution
AWWA M23	(2002; 2nd Ed) Manual: PVC Pipe - Design and Installation

ASTM INTERNATIONAL (ASTM)

ASTM C 270	(2010) Standard Specification for Mortar for Unit Masonry
ASTM C 443	(2005ae1) Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C 478	(2009) Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 923	(2008) Standard Specification for Resilient Connectors Between Reinforced

	Concrete Manhole Structures, Pipes and Laterals
ASTM C 969	(2002; R 2009) Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
ASTM C 972	(2000; R 2006) Compression-Recovery of Tape Sealant
ASTM C 990	(2009) Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM D 2321	(2009) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D 2412	(2010) Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
ASTM D 2680	(2001; R 2009) Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping
ASTM D 2751	(2005) Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings
ASTM D 3034	(2008) Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D 3139	(1998; R 2005) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D 3212	(2007) Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D 3753	(2005e1) Glass-Fiber-Reinforced Polyester Manholes and Wetwells
ASTM D 412	(2006ae2) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D 624	(2000; R 2007) Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM F 477	(2010) Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F 949	(2010) Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-60005	(Basic; Notice 2) Frames, Covers, Gratings, Steps, Sump And Catch Basin, Manhole

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.27	Fixed Ladders

1.2 SYSTEM DESCRIPTION

1.2.1 Sanitary Sewer Gravity Pipeline

Provide mains and laterals of polyvinyl chloride (PVC) plastic pipe. Provide new and modify existing exterior sanitary gravity sewer piping and appurtenances. Provide each system complete and ready for operation. The exterior sanitary gravity sewer system includes equipment, materials, installation, and workmanship as specified herein more than 5 feet outside of building walls.

1.2.2 USACE Project

The construction required herein shall include appurtenant structures and building sewers to points of connection with the building drains 5 feet outside the building to which the sewer system is to be connected. Replace damaged material and redo unacceptable work at no additional cost to the Government. Backfilling shall be accomplished after inspection by the Contracting Officer. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. Keep a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install the plastic pipe shall be stored in accordance with the manufacturer's recommendation and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Existing Conditions

SD-02 Shop Drawings

Drawings

Precast concrete manhole
Metal items
Frames, covers, and gratings

SD-03 Product Data

Pipeline materials

SD-06 Test Reports

Reports

SD-07 Certificates

Portland Cement
Gaskets

1.4 QUALITY ASSURANCE

1.4.1 Installer Qualifications

Install specified materials by a licensed underground utility Contractor licensed for such work in the state where the work is to be performed. Installing Contractor's License shall be current and be state certified or state registered.

1.4.2 Drawings

a. Submit Installation Drawings showing complete detail, both plan and side view details with proper layout and elevations.

b. Submit As-Built Drawings for the complete sanitary sewer system showing complete detail with all dimensions, both above and below grade, including invert elevation.

c. Sign and seal As-Built Drawings by a Professional Surveyor and Mapper. Include the following statement: "All potable water lines crossed by sanitary hazard mains are in accordance with the permitted utility separation requirements."

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery and Storage

1.5.1.1 Piping

Inspect materials delivered to site for damage; store with minimum of handling. Store materials on site in enclosures or under protective coverings. Store plastic piping and jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

1.5.1.2 Metal Items

Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.

1.5.1.3 Cement, Aggregate, and Reinforcement

As specified in Section 03 30 00.00 10 CAST-IN-PLACE CONCRETE.

1.5.2 Handling

Handle pipe, fittings, and other accessories in such manner as to ensure delivery to the trench in sound undamaged condition. Carry, do not drag, pipe to trench.

PART 2 PRODUCTS

2.1 PIPELINE MATERIALS

Pipe shall conform to the respective specifications and other requirements specified below. Submit manufacturer's standard drawings or catalog cuts.

2.1.1 PVC Plastic Gravity Sewer Piping

2.1.1.1 PVC Plastic Gravity Pipe and Fittings

ASTM D 3034, SDR 35, or ASTM F 949 with ends suitable for elastomeric gasket joints.

2.1.1.2 PVC Plastic Gravity Joints and Jointing Material

Joints shall conform to ASTM D 3212. Gaskets shall conform to ASTM F 477.

2.1.2 PVC Plastic Pressure Pipe and Associated Fittings

2.1.2.1 PVC Plastic Pressure Pipe and Fittings

a. Pipe and Fittings 4 inch Diameter to 12 inch: Pipe shall conform to AWWA C900 and shall be plain end or gasket bell end, Pressure Class 150 (DR 18), with cast-iron-pipe-equivalent OD. Fittings shall be gray-iron or ductile-iron conforming to AWWA C110/A21.10 or AWWA C153/A21.53 and shall have cement-mortar lining conforming to AWWA C104/A21.4, standard thickness. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends, except that bell design shall be modified, as approved, for push-on joint suitable for use with the PVC plastic pressure pipe specified in this paragraph.

2.1.2.2 PVC Plastic Pressure Joints and Jointing Material

Joints for pipe, 4 inch to 12 inch diameter, shall be push-on joints as specified in ASTM D 3139. Joints between pipe and fittings shall be push-on joints as specified in ASTM D 3139 or shall be compression-type joints/mechanical-joints as respectively specified in ASTM D 3139 and AWWA C111/A21.11. Each joint connection shall be provided with an elastomeric gasket suitable for the bell or coupling with which it is to be used. Gaskets for push-on joints for pipe shall conform to ASTM F 477. Gaskets for push-on joints and compression-type joints/mechanical-joints for joint connections between pipe and fittings shall be as specified in AWWA C111/A21.11, respectively, for push-on joints and mechanical-joints.

2.2 CONCRETE MATERIALS

2.2.1 Cement Mortar

Cement mortar shall conform to ASTM C 270, Type M with Type II cement.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Precast Concrete Manholes & Glass-Fiber-Reinforced Polyester Manholes

Precast concrete manhole risers, base sections, and tops shall conform to ASTM C 478 and be manufactured in accordance with Section 03 40 00.00 10 PLANT-PRECAST CONCRETE PRODUCTS FOR BELOW GRADE CONSTRUCTION; base and first riser shall be monolithic. Glass-Fiber-Reinforced Polyester Manholes shall conform to ASTM D 3753.

2.3.2 Gaskets and Connectors

Gaskets for joints between manhole sections shall conform to ASTM C 443. Resilient connectors for making joints between manhole and pipes entering manhole shall conform to ASTM C 923 or ASTM C 990.

2.3.3 External Preformed Rubber Joint Seals

An external preformed rubber joint seal shall be an accepted method of sealing cast iron covers to precast concrete sections to prevent ground water infiltration into sewer systems. All finished and sealed manholes constructed in accordance with paragraph entitled "Manhole Construction" shall be tested for leakage in the same manner as pipelines as described in paragraph entitled "Leakage Tests." The seal shall be multi-section with a neoprene rubber top section and all lower sections made of Ethylene Propylene Diene Monomer (EPDM) rubber with a minimum thickness of 60 mils. Each unit shall consist of a top and bottom section and shall have mastic on the bottom of the bottom section and mastic on the top and bottom of the top section. The mastic shall be a non-hardening butyl rubber sealant and shall seal to the cone/top slab of the manhole/catch basin and over the lip of the casting. Extension sections shall cover up to two more adjusting rings. Properties and values are listed in the following tables:

Properties, Test Methods and Minimum Values for
Rubber used in Preformed Joint Seals

Physical Properties	Test Methods	EPDM	Neoprene	Butyl mastic
Tensile, psi	ASTM D 412	1840	2195	-
Elongation percent	ASTM D 412	553	295	350
Tear Resistance, ppi	ASTM D 624 (Die B)	280	160	-
Rebound, percent, 5 minutes	ASTM C 972 (mod.)	-	-	11
Rebound, percent, 2 hours	ASTM C 972	-	-	12

2.3.4 Metal Items

2.3.4.1 Frames, Covers, and Gratings for Manholes

CID A-A-60005, cast iron; figure numbers shall be as follows:

a. Traffic manhole: Provide in paved areas.

Frame: Figure 1, Size 22A
Cover: Figure 8, Size 22A
Steps: Figure 19

b. Non-traffic manhole:

Frame: Figure 4, Size 22
Cover: Figure 12, Size 22
Steps: Figure 19

Frames and covers shall be cast iron, ductile iron or reinforced concrete. Cast iron frames and covers shall be as indicated or shall be of type suitable for the application, circular, without vent holes. The frames and covers shall have a combined weight of not less than 400 pounds. Reinforced concrete frames and covers shall be as indicated or shall conform to ASTM C 478. The word "Sanitary Sewer" shall be stamped or cast into covers so that it is plainly visible.

2.3.4.2 Manhole Steps

Zinc-coated steel conforming to 29 CFR 1910.27. Aluminum steps or rungs will not be permitted. Steps are not required in manholes less than 4 feet deep.

2.3.4.3 Manhole Ladders

A steel ladder shall be provided where the depth of a manhole exceeds 12 feet. The ladder shall not be less than 16 inches in width, with 3/4 inch diameter rungs spaced 12 inches apart. The two stringers shall be a minimum 3/8 inch thick and 2 inches wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123.

2.4 REPORTS

Submit Test Reports. Compaction and density test shall be in accordance with Section 31 00 00 EARTHWORK. Submit Inspection Reports for daily activities during the installation of the sanitary system. Information in the report shall be detailed enough to describe location of work and amount of pipe laid in place, measured in linear feet.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPELINES AND APPURTENANT CONSTRUCTION

3.1.1 General Requirements for Installation of Pipelines

These general requirements apply except where specific exception is made in the following paragraphs entitled "Special Requirements."

3.1.1.1 Location

The work covered by this section shall terminate at a point approximately 5 feet from the building, unless otherwise indicated. Where the location of the sewer is not clearly defined by dimensions on the drawings, do not lay sewer line closer horizontally than 10 feet to a water main or service line.

Install pressure sewer lines beneath water lines only, with the top of the sewer line being at least 2 feet below bottom of water line. Where sanitary sewer lines pass above water lines, encase sewer in concrete for a distance of 10 feet on each side of the crossing, or substitute rubber-gasketed pressure pipe for the pipe being used for the same distance.

Where sanitary sewer lines pass below water lines, lay pipe so that no joint in the sewer line will be closer than 3 feet, horizontal distance, to the water line.

a. Sanitary piping installation parallel with water line:

(1) Normal conditions: Sanitary piping or manholes shall be laid at least 10 feet horizontally from a water line whenever possible. The distance shall be measured edge-to-edge.

(2) Unusual conditions: When local conditions prevent a horizontal separation of 10 feet, the sanitary piping or manhole may be laid closer to a water line provided that:

(a) The top (crown) of the sanitary piping shall be at least 18 inches below the bottom (invert) of the water main.

(b) Where this vertical separation cannot be obtained, the sanitary piping shall be constructed of AWWA-approved ductile iron water pipe pressure tested in place without leakage prior to backfilling.

(c) The sewer manhole shall be of watertight construction and tested in place.

b. Installation of sanitary piping crossing a water line:

(1) Normal conditions: Lay sanitary sewer piping by crossing under water lines to provide a separation of at least 18 inches between the top of the sanitary piping and the bottom of the water line whenever possible.

(2) Unusual conditions: When local conditions prevent a vertical separation described above, use the following construction:

(a) Sanitary piping passing over or under water lines shall be constructed of AWWA-approved ductile iron water pipe, pressure tested in place without leakage prior to backfilling.

(b) Sanitary piping passing over water lines shall, in addition, be protected by providing:

(3) A vertical separation of at least 18 inches between the bottom of the sanitary piping and the top of the water line.

(4) Adequate structural support for the sanitary piping to prevent excessive deflection of the joints and the settling on and breaking of the water line.

(5) That the length, minimum 20 feet, of the sanitary piping be centered at the point of the crossing so that joints shall be equidistant and as far as possible from the water line.

c. Sanitary sewer manholes: No water piping shall pass through or come in contact with any part of a sanitary sewer manhole.

3.1.1.2 Earthwork

Perform earthwork operations in accordance with Section 31 00 00 EARTHWORK.

3.1.1.3 Pipe Laying and Jointing

Inspect each pipe and fitting before and after installation; replace those found defective and remove from site. Provide proper facilities for lowering sections of pipe into trenches. Lay nonpressure pipe with the bell ends in the upgrade direction. Adjust spigots in bells to give a uniform space all around. Blocking or wedging between bells and spigots will not be permitted. Replace by one of the proper dimensions, pipe or fittings that do not allow sufficient space for installation of joint material. At the end of each work day, close open ends of pipe temporarily with wood blocks or bulkheads. Provide batterboards not more than 25 feet apart in trenches for checking and ensuring that pipe invert elevations are as indicated. Laser beam method may be used in lieu of batterboards for the same purpose. Branch connections shall be made by use of regular fittings or solvent cemented saddles as approved. Saddles for ABS and PVC composite pipe shall conform to Figure 2 of ASTM D 2680; saddles for ABS pipe shall comply with Table 3 of ASTM D 2751; and saddles for PVC pipe shall conform to Table 4 of ASTM D 3034.

3.1.1.4 Connections to Existing Lines

Obtain approval from the Contracting Officer before making connection to existing line. Conduct work so that there is minimum interruption of service on existing line.

3.1.2 Special Requirements

3.1.2.1 Installation of PVC Plastic Piping

Install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" of this section and with the requirements of ASTM D 2321 for laying and joining pipe and fittings. Make joints with the gaskets specified for joints with this piping and assemble in accordance with the requirements of ASTM D 2321 for assembly of joints. Make joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.

3.1.2.2 Installation of PVC Plastic Pressure Pipe and Fittings

Unless otherwise specified, install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines" of this section; with the requirements of AWWA C605 for laying of pipe, joining PVC pipe to fittings and accessories, and setting of hydrants, valves, and fittings; and with the recommendations for pipe joint assembly and appurtenance installation in AWWA M23, Chapter 7, "Installation."

a. Pipe 4 Inch Diameter Joints: Make push-on joints with the elastomeric

gaskets specified for this type joint, using either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings. For pipe-to-pipe push-on joint connections, use only pipe with push-on joint ends having factory-made bevel; for push-on joint connections to fittings, cut spigot end of pipe off square and re-bevel pipe end to a bevel approximately the same as that on ductile-iron pipe used for the same type of joint. Use an approved lubricant recommended by the pipe manufacturer for push-on joints. Assemble push-on joints for pipe-to-pipe joint connections in accordance with the requirements of AWWA C605 for laying the pipe and the recommendations in AWWA M23, Chapter 7, "Installation," for pipe joint assembly. Assemble push-on joints for connection to fittings in accordance with the requirements of AWWA C605 for joining PVC pipe to fittings and accessories and with the applicable requirements of AWWA C600 for joint assembly. Make compression-type joints/mechanical-joints with the gaskets, glands, bolts, nuts, and internal stiffeners specified for this type joint and assemble in accordance with the requirements of AWWA C605 for joining PVC pipe to fittings and accessories, with the applicable requirements of AWWA C600 for joint assembly, and with the recommendations of Appendix A to AWWA C111/A21.11. Cut off spigot end of pipe for compression-type joint/mechanical-joint connections and do not re-bevel.

b. Pipe anchorage: Provide concrete thrust blocks (reaction backing) for pipe anchorage. Size and position thrust blocks as indicated. Use concrete conforming to ASTM C 94 having a minimum compressive strength of 2,000 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2 1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.

3.1.3 Concrete Work

Cast-in-place concrete is included in Section 03 30 00.00 10 CAST-IN-PLACE CONCRETE. The pipe shall be supported on a concrete cradle, or encased in concrete where indicated or directed.

3.1.4 Manhole Construction

Construct base slab of cast-in-place concrete or use precast concrete base sections. Make inverts in cast-in-place concrete and precast concrete bases with a smooth-surfaced semi-circular bottom conforming to the inside contour of the adjacent sewer sections. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit. For cast-in-place concrete construction, either pour bottom slabs and walls integrally or key and bond walls to bottom slab. No parging will be permitted on interior manhole walls. For precast concrete construction, make joints between manhole sections with the gaskets specified for this purpose; install in the manner specified for installing joints in concrete piping. Parging will not be required for precast concrete manholes. Cast-in-place concrete work shall be in accordance with the requirements specified under paragraph entitled "Concrete Work" of this section. Make joints between concrete manholes and pipes entering manholes with the resilient connectors specified for this purpose; install in accordance with the recommendations of the connector manufacturer. Where a new manhole is constructed on an existing line, remove existing pipe as necessary to construct the manhole. Cut existing pipe so that pipe ends are approximately flush with the interior face of manhole wall, but not protruding into the manhole. Use resilient connectors as previously specified for pipe connectors to concrete manholes.

3.1.5 Miscellaneous Construction and Installation

3.1.5.1 Metal Work

a. Workmanship and finish: Perform metal work so that workmanship and finish will be equal to the best practice in modern structural shops and foundries. Form iron to shape and size with sharp lines and angles. Do shearing and punching so that clean true lines and surfaces are produced. Make castings sound and free from warp, cold shuts, and blow holes that may impair their strength or appearance. Give exposed surfaces a smooth finish with sharp well-defined lines and arises. Provide necessary rabbets, lugs, and brackets wherever necessary for fitting and support.

3.1.6 Installations of Wye Branches

Cutting into piping for connections shall not be done except in special approved cases. When the connecting pipe cannot be adequately supported on undisturbed earth or tamped backfill, the pipe shall be encased in concrete backfill or supported on a concrete cradle as directed. Concrete required because of conditions resulting from faulty construction methods or negligence shall be installed at no additional cost to the Government. The installation of wye branches in an existing sewer shall be made by a method which does not damage the integrity of the existing sewer. One acceptable method consists of removing one pipe section, breaking off the upper half of the bell of the next lower section and half of the running bell of wye section. After placing the new section, it shall be rotated so that the broken half of the bell will be at the bottom. The two joints shall then be made with joint packing and cement mortar.

3.2 FIELD QUALITY CONTROL

3.2.1 Field Tests and Inspections

The Contracting Officer will conduct field inspections and witness field tests specified in this section. Perform field tests and provide labor, equipment, and incidentals required for testing. Be able to produce evidence, when required, that each item of work has been constructed in accordance with the drawings and specifications.

3.2.2 Tests for Nonpressure Lines

Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically full circle of light through the pipeline when viewed from the adjoining end of line. When pressure piping is used in a nonpressure line for nonpressure use, test this piping as specified for nonpressure pipe.

3.2.2.1 Leakage Tests

Test lines for leakage by either infiltration tests or exfiltration tests, or by low-pressure air tests. Prior to testing for leakage, backfill trench up to at least lower half of pipe. When necessary to prevent pipeline movement during testing, place additional backfill around pipe sufficient to prevent movement, but leaving joints uncovered to permit inspection. When leakage or pressure drop exceeds the allowable amount specified, make satisfactory correction and retest pipeline section in the same manner. Correct visible leaks regardless of leakage test results.

a. Infiltration tests and exfiltration tests: Perform these tests for sewer lines made of the specified materials, not only concrete, in accordance with ASTM C 969. Make calculations in accordance with the Appendix to ASTM C 969.

3.2.2.2 Deflection Testing

Perform a deflection test on entire length of installed plastic pipeline on completion of work adjacent to and over the pipeline, including leakage tests, backfilling, placement of fill, grading, paving, concreting, and any other superimposed loads determined in accordance with ASTM D 2412. Deflection of pipe in the installed pipeline under external loads shall not exceed 4.5 percent of the average inside diameter of pipe. Determine whether the allowable deflection has been exceeded by use of a pull-through device or a deflection measuring device.

a. Pull-through device: This device shall be a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a common shaft. Circular sections shall be so spaced on the shaft that distance from external faces of front and back sections will equal or exceed diameter of the circular section. Pull-through device may also be of a design promulgated by the Uni-Bell Plastic Pipe Association, provided the device meets the applicable requirements specified in this paragraph, including those for diameter of the device, and that the mandrel has a minimum of 9 arms. Ball, cylinder, or circular sections shall conform to the following:

(1) A diameter, or minor diameter as applicable, of 95 percent of the average inside diameter of the pipe; tolerance of plus 0.5 percent will be permitted.

(2) Homogeneous material throughout, shall have a density greater than 1.0 as related to water at 39.2 degrees F, and shall have a surface Brinell hardness of not less than 150.

(3) Center bored and through-bolted with a 1/4 inch minimum diameter steel shaft having a yield strength of not less than 70,000 psi, with eyes or loops at each end for attaching pulling cables.

(4) Each eye or loop shall be suitably backed with a flange or heavy washer such that a pull exerted on opposite end of shaft will produce compression throughout remote end.

b. Deflection measuring device: Sensitive to 1.0 percent of the diameter of the pipe being tested and shall be accurate to 1.0 percent of the indicated dimension. Deflection measuring device shall be approved prior to use.

c. Pull-through device procedure: Pass the pull-through device through each run of pipe, either by pulling it through or flushing it through with water. If the device fails to pass freely through a pipe run, replace pipe which has the excessive deflection and completely retest in same manner and under same conditions.

d. Deflection measuring device procedure: Measure deflections through each run of installed pipe. If deflection readings in excess of 4.5 percent of average inside diameter of pipe are obtained, retest pipe by a run from the opposite direction. If retest continues to show a

deflection in excess of 4.5 percent of average inside diameter of pipe, replace pipe which has excessive deflection and completely retest in same manner and under same conditions.

3.2.3 Tests for Pressure Lines

Test pressure lines in accordance with the applicable standard specified in this paragraph, except for test pressures. For hydrostatic pressure test, use a hydrostatic pressure 50 psi in excess of the maximum working pressure of the system, but not less than 100 psi, holding the pressure for a period of not less than one hour. For leakage test, use a hydrostatic pressure not less than the maximum working pressure of the system. Leakage test may be performed at the same time and at the same test pressure as the pressure test. Test PVC plastic pressure lines in accordance with the requirements of AWWA C605 for pressure and leakage tests, using the allowable leakage given therein.

-- End of Section --

SECTION 33 40 00

STORM DRAINAGE UTILITIES
02/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 198	(2010) Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

AMERICAN RAILWAY ENGINEERING AND MAINTENANCE-OF-WAY ASSOCIATION (AREMA)

AREMA Eng Man	(2010) Manual for Railway Engineering

ASTM INTERNATIONAL (ASTM)

ASTM A 536	(1984; R 2009) Standard Specification for Ductile Iron Castings
ASTM C 1103	(2003; R 2009) Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
ASTM C 139	(2005) Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
ASTM C 1433	(2010) Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
ASTM C 270	(2010) Standard Specification for Mortar for Unit Masonry
ASTM C 32	(2009) Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C 425	(2004; R 2009) Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings
ASTM C 443	(2005ae1) Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C 478	(2009) Standard Specification for Precast

	Reinforced Concrete Manhole Sections
ASTM C 507	(2010b) Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C 55	(2009) Concrete Brick
ASTM C 62	(2010) Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 76	(2010a) Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 828	(2006) Low-Pressure Air Test of Vitrified Clay Pipe Lines
ASTM C 923	(2008) Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM C 924	(2002; R 2009) Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method
ASTM D 1557	(2009) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D 1751	(2004; R 2008) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	(2004a; R 2008) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion
ASTM D 1784	(2008) Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D 2167	(2008) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2321	(2009) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D 3212	(2007) Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D 3350	(2010) Polyethylene Plastics Pipe and Fittings Materials

ASTM D 6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM F 1417	(1992; R 2005) Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low Pressure Air
ASTM F 679	(2008) Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F 714	(2008) Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Placing Pipe

SD-04 Samples

Pipe for Culverts and Storm Drains

SD-07 Certificates

Resin Certification
Pipeline Testing
Hydrostatic Test on Watertight Joints
Determination of Density
Frame and Cover for Gratings

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. Keep a copy of the manufacturer's instructions available at the construction site at all times and follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe

Manufactured in accordance with and conforming to ASTM C 76, Class III minimum. Stronger classes of pipe may be required due to depth of cover. Class shall be as designated by MDOT.

2.1.1.1 Reinforced Elliptical Culvert and Storm Drainpipe

Manufactured in accordance with and conforming to ASTM C 507. Horizontal elliptical pipe shall be Class HE-IV.

2.1.2 PVC Pipe

Submit the pipe manufacturer's resin certification, indicating the cell classification of PVC used to manufacture the pipe, prior to installation of the pipe.

2.1.2.1 Smooth Wall PVC Pipe

ASTM F 679 produced from PVC certified by the compounder as meeting the requirements of ASTM D 1784, minimum cell class 12454-B.

2.1.3 PE Pipe

Submit the pipe manufacturer's resin certification, indicating the cell classification of PE used to manufacture the pipe, prior to installation of the pipe. The minimum cell classification for polyethylene plastic shall apply to each of the seven primary properties of the cell classification limits in accordance with ASTM D 3350.

2.1.3.1 Smooth Wall PE Pipe

ASTM F 714, maximum DR of 21 for pipes 3 to 24 inches in diameter and maximum DR of 26 for pipes 26 to 48 inches in diameter. Pipe shall be produced from PE certified by the resin producer as meeting the requirements of ASTM D 3350, minimum cell class 335434C.

2.2 DRAINAGE STRUCTURES

2.2.1 Flared End Sections

Sections shall be of a standard design conforming to MDOT requirements and fabricated from zinc coated steel sheets meeting requirements of ASTM A 929.

2.2.2 Precast Reinforced Concrete Box

Manufactured in accordance with and conforming to ASTM C 1433.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 4000 psi concrete under Section 03 30 00.00 10 CAST-IN-PLACE CONCRETE. The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 5 to 7 percent when maximum size of coarse aggregate exceeds 1-1/2 inches. Air content shall be determined in accordance with ASTM C231. The concrete covering over steel reinforcing shall not be less than 1 inch thick for covers and not less than 1-1/2 inches thick for walls and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground. Expansion-joint filler material shall conform to ASTM D 1751, or ASTM D 1752, or shall be resin-impregnated fiberboard conforming to the physical requirements of ASTM D 1752.

2.3.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar but in no case shall exceed the required gallons of water per sack of cement. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.3.3 Precast Concrete Segmental Blocks

Precast concrete segmental block shall conform to ASTM C 139, not more than 8 inches thick, not less than 8 inches long, and of such shape that joints can be sealed effectively and bonded with cement mortar.

2.3.4 Brick

Brick shall conform to ASTM C 62, Grade SW; ASTM C 55, Grade S-I or S-II; or ASTM C 32, Grade MS. Mortar for jointing and plastering shall consist of one part portland cement and two parts fine sand. Lime may be added to the mortar in a quantity not more than 25 percent of the volume of cement. The joints shall be filled completely and shall be smooth and free from surplus mortar on the inside of the structure. Brick structures shall be plastered with 1/2 inch of mortar over the entire outside surface of the walls. For square or rectangular structures, brick shall be laid in stretcher courses with a header course every sixth course. For round structures, brick shall be laid radially with every sixth course a stretcher course.

2.3.5 Precast Reinforced Concrete Manholes

Conform to ASTM C 478. Joints between precast concrete risers and tops

shall be full-bedded in cement mortar and shall be smoothed to a uniform surface on both interior and exterior of the structure or made with flexible watertight, rubber-type gaskets meeting the requirements of paragraph JOINTS.

2.3.6 Frame and Cover for Gratings

Submit certification on the ability of frame and cover or gratings to carry the imposed live load. Frame and cover for gratings shall be cast gray iron, ASTM A 48, Class 35B; cast ductile iron, ASTM A 536, Grade 65-45-12; or cast aluminum, ASTM B 26, Alloy 356.OT6. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the plans. The word "Storm Sewer" shall be stamped or cast into covers so that it is plainly visible.

2.3.7 Joints

2.3.7.1 Flexible Watertight Joints

a. Materials: Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe and with factory-fabricated resilient materials for clay pipe. The design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198, and rubber-type gaskets shall conform to ASTM C 443. Factory-fabricated resilient joint materials shall conform to ASTM C 425. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the nominal diameter of the pipe being gasketed exceeds 54 inches.

b. Test Requirements: Watertight joints shall be tested and shall meet test requirements of paragraph HYDROSTATIC TEST ON WATERTIGHT JOINTS. Rubber gaskets shall comply with the oil resistant gasket requirements of ASTM C 443. Certified copies of test results shall be delivered to the Contracting Officer before gaskets or jointing materials are installed. Alternate types of watertight joint may be furnished, if specifically approved.

2.3.7.2 PVC Plastic Pipes

Joints shall be solvent cement or elastomeric gasket type in accordance with the specification for the pipe and as recommended by the pipe manufacturer.

2.3.7.3 Smooth Wall PE Plastic Pipe

Pipe shall be joined using butt fusion method as recommended by the pipe manufacturer.

2.4 STEEL LADDER

Steel ladder shall be provided where the depth of the storm drainage structure exceeds 12 feet. These ladders shall be not less than 16 inches in width, with 3/4 inch diameter rungs spaced 12 inches apart. The two stringers shall be a minimum 3/8 inch thick and 2-1/2 inches wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123.

2.5 RESILIENT CONNECTORS

Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C 923.

2.6 HYDROSTATIC TEST ON WATERTIGHT JOINTS

2.6.1 Concrete, Clay, PVC and PE Pipe

A hydrostatic test shall be made on the watertight joint types as proposed. Only one sample joint of each type needs testing; however, if the sample joint fails because of faulty design or workmanship, an additional sample joint may be tested. During the test period, gaskets or other jointing material shall be protected from extreme temperatures which might adversely affect the performance of such materials. Performance requirements for joints in reinforced and nonreinforced concrete pipe shall conform to AASHTO M 198 or ASTM C 443. Test requirements for joints in clay pipe shall conform to ASTM C 425. Test requirements for joints in PVC and PE plastic pipe shall conform to ASTM D 3212.

2.7 EROSION CONTROL RIPRAP

Provide nonerodible rock not exceeding 15 inches in its greatest dimension and choked with sufficient small rocks to provide a dense mass with a minimum thickness of 8 inches as indicated in the construction drawings.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 31 00 00 EARTHWORK and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 24 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing, where required, shall be placed within the trench width as specified, without any overexcavation. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures will be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2 inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as specified and defined in Section 31 00 00 EARTHWORK.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor while performing shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Concrete Pipe Requirements

When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded in granular material minimum 4 inch in depth in trenches with soil foundation. Depth of granular bedding in trenches with rock foundation shall be 1/2 inch in depth per foot of depth of fill, minimum depth of bedding shall be 8 inch up to maximum depth of 24 inches. The middle third of the granular bedding shall be loosely placed. Bell holes and depressions for joints shall be removed and formed so entire barrel of pipe is uniformly supported. The bell hole and depressions for the joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

3.2.2 Plastic Pipe

Bedding for PVC and PE pipe shall meet the requirements of ASTM D 2321. Bedding, haunching, and initial backfill shall be either Class IB or II material.

3.3 PLACING PIPE

Submit printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Plastic pipe shall be protected from exposure to direct sunlight prior to laying, if necessary to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated metal pipe shall be placed in the same vertical plane as the major axis of the pipe. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed flexible pipe shall not exceed the following limits:

TYPE OF PIPE	MAXIMUM ALLOWABLE DEFLECTION (%)
Plastic (PVC & HDPE)	5

3.3.1 Concrete, PVC, Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.3.2 Elliptical and Elliptical Reinforced Concrete Pipe

The manufacturer's reference lines, designating the top of the pipe, shall be within 5 degrees of a vertical plane through the longitudinal axis of the pipe, during placement. Damage to or misalignment of the pipe shall be prevented in all backfilling operations.

3.3.3 Jacking Pipe Through Fills

Methods of operation and installation for jacking pipe through fills shall conform to requirements specified in Volume 1, Chapter 1, Part 4 of AREMA Eng Man.

3.4 JOINTING

3.4.1 Concrete Pipe

3.4.1.1 Cement-Mortar Bell-and-Spigot Joint

The first pipe shall be bedded to the established grade line, with the bell end placed upstream. The interior surface of the bell shall be thoroughly cleaned with a wet brush and the lower portion of the bell filled with mortar as required to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into a bell so that sections are closely fitted. After each section is laid, the remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside of the joint with sufficient additional mortar. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped or bandaged with cheesecloth to hold mortar in place.

3.4.1.2 Cement-Mortar Tongue-and-Groove Joint

The first pipe shall be bedded carefully to the established grade line with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint and filled with mortar to provide a bed for the pipe. The grooved end of the first pipe shall be thoroughly cleaned with a wet brush, and a layer of soft mortar applied to the lower half of the groove. The tongue of the second pipe shall be cleaned with a wet brush; while in horizontal position, a layer of soft mortar shall be applied to the upper half of the tongue. The tongue end of the second pipe shall be inserted in the grooved end of the first pipe until mortar is squeezed out on interior and exterior surfaces. Sufficient mortar shall be used to fill the joint completely and to form a bead on the outside.

3.4.1.3 Plastic Sealing Compound Joints for Tongue-and-Grooved Pipe

Sealing compounds shall follow the recommendation of the particular manufacturer in regard to special installation requirements. Surfaces to receive lubricants, primers, or adhesives shall be dry and clean. Sealing compounds shall be affixed to the pipe not more than 3 hours prior to installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Sealing compounds shall

be inspected before installation of the pipe, and any loose or improperly affixed sealing compound shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pulled together. If, while making the joint with mastic-type sealant, a slight protrusion of the material is not visible along the entire inner and outer circumference of the joint when the joint is pulled up, the pipe shall be removed and the joint remade. After the joint is made, all inner protrusions shall be cut off flush with the inner surface of the pipe. If non-mastic-type sealant material is used, the "Squeeze-Out" requirement above will be waived.

3.4.1.4 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

3.4.1.5 External Sealing Band Joint for Noncircular Pipe

Surfaces to receive sealing bands shall be dry and clean. Bands shall be installed in accordance with manufacturer's recommendations.

3.5 DRAINAGE STRUCTURES

3.5.1 Manholes and Inlets

Construction shall be of reinforced concrete, plain concrete, brick, precast reinforced concrete, precast concrete segmental blocks, prefabricated corrugated metal, or bituminous coated corrugated metal; complete with frames and covers or gratings; and with fixed galvanized steel ladders where indicated. Pipe studs and junction chambers of prefabricated corrugated metal manholes shall be fully bituminous-coated and paved when the connecting branch lines are so treated. Pipe connections to concrete manholes and inlets shall be made with flexible, watertight connectors.

3.5.2 Walls and Headwalls

Construction shall be as indicated.

3.6 STEEL LADDER INSTALLATION

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet vertically, and shall be installed to provide at least 6 inches of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

3.7 BACKFILLING

3.7.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation equal to the midpoint (spring line) of RCP or has reached an elevation of at least 12 inches above the top of the pipe for flexible pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 8 inches. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Contracting Officer, that sheeting or portions of bracing used be left in place, the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.7.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified below. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 8 inches. Use select granular material for this entire region of backfill for flexible pipe installations.

3.7.3 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.7.4 Compaction

3.7.4.1 General Requirements

Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

3.7.4.2 Minimum Density

Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted at the approved moisture content to the following applicable minimum density, which will be determined as specified below.

a. Under airfield and heliport pavements, paved roads, streets, parking areas, and similar-use pavements including adjacent shoulder areas, the density shall be not less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material, up to the elevation where requirements for pavement subgrade materials and compaction shall control.

b. Under unpaved or turfed traffic areas, density shall not be less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material.

c. Under nontraffic areas, density shall be not less than that of the surrounding material.

3.7.5 Determination of Density

Testing is the responsibility of the Contractor and performed at no additional cost to the Government. Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D 1557 except that mechanical tampers may be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM D 2167 or ASTM D 6938. When ASTM D 6938 is used, the calibration curves shall be checked and adjusted, if necessary, using the sand cone method as described in paragraph Calibration of the referenced publications. ASTM D 6938 results in a wet unit weight of soil and ASTM D 6938 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 6938. Test results shall be furnished the Contracting Officer. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

3.8 PIPELINE TESTING

3.8.1 Leakage Tests

Lines shall be tested for leakage by low pressure air or water testing or exfiltration tests, as appropriate. Low pressure air testing for vitrified clay pipes shall conform to ASTM C 828. Low pressure air testing for concrete pipes shall conform to ASTM C 924. Low pressure air testing for plastic pipe shall conform to ASTM F 1417. Low pressure air testing procedures for other pipe materials shall use the pressures and testing times prescribed in ASTM C 828 or ASTM C 924, after consultation with the pipe manufacturer. Testing of individual joints for leakage by low pressure air or water shall conform to ASTM C 1103. Prior to exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to

permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Contracting Officer. An exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by the exfiltration test shall not exceed 250 gallons per inch in diameter per mile of pipeline per day. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished.

3.8.2 Deflection Testing

No sooner than 30 days after completion of installation and final backfill, an initial post installation inspection shall be accomplished. Clean or flush all lines prior to inspection. Perform a deflection test on entire length of installed flexible pipeline on completion of work adjacent to and over the pipeline, including leakage tests, backfilling, placement of fill, grading, paving, concreting, and any other superimposed loads. Deflection of pipe in the installed pipeline under external loads shall not exceed limits in paragraph PLACING PIPE above as percent of the average inside diameter of pipe. Determine whether the allowable deflection has been exceeded by use of a mandrel.

a. Pull-Through Device Inspection: Pass the pull-through device through each run of pipe by pulling it by hand. If deflection readings in excess of the allowable deflection of average inside diameter of pipe are obtained, retest pipe by a run from the opposite direction. If retest continues to show excess allowable deflections of the average inside diameter of pipe, remove pipe which has excessive deflection, replace with new pipe, and completely retest in same manner and under same conditions. Pull-through device: The mandrel shall be rigid, nonadjustable having a minimum of 9 fins, including pulling rings at each end, engraved with the nominal pipe size and mandrel outside diameter. The mandrel shall be 5 percent less than the certified-actual pipe diameter for Plastic Pipe, 5 percent less than the certified-actual pipe diameter for Corrugated Steel and Aluminum Alloy, 3 percent less than the certified-actual pipe diameter for Concrete-Lined Corrugated Steel and Ductile Iron Culvert provided by manufacturer. When mandrels are utilized to verify deflection of flexible pipe products, the Government will verify the mandrel OD through the use of proving rings that are manufactured with an opening that is certified to be as shown above.

b. Deflection measuring device: Shall be approved by the Contracting Officer prior to use.

c. Warranty period test: Pipe found to have a deflection of greater than allowable deflection in paragraph PLACING PIPE above, just prior to end of one-year warranty period shall be replaced with new pipe and tested as specified for leakage and deflection. Inspect 100 percent of all pipe systems under the travel lanes, including curb and gutter. Random inspections of the remaining pipe system outside of the travel lanes shall represent at least 10 percent of the total pipe footage of each

pipe size. Inspections shall be made, depending on the pipe size, with video camera or visual observations. In addition, for flexible pipe installations, perform deflection testing on 100 percent of all pipes under the travel lanes, including curb and gutter, with either a laser profiler or 9-fin mandrel. For flexible pipe, random deflection inspections of the pipe system outside of the travel lanes shall represent at least 10 percent of the total pipe footage of each pipe size. When mandrels are utilized to verify deflection of flexible pipe products during the final post installation inspection, the Government will verify the mandrel OD through the use of proving rings.

3.8.3 Post-Installation Inspection

One hundred percent of all reinforced concrete pipe installations shall be checked for joint separations, soil migration through the joint, cracks greater than 0.01 inches, settlement and alignment. One hundred percent of all flexible pipes (HDPE, PVC, CMP) shall be checked for rips, tears, joint separations, soil migration through the joint, cracks, localized bucking, bulges, settlement and alignment.

a. Replace pipes having cracks greater than 0.1 inches in width or deflection greater than 5 percent deflection. An engineer shall evaluate all pipes with cracks greater than 0.01 inches but less than 0.10 inches to determine if any remediation or repair is required. RCP with crack width less than 0.10 inches and located in a non-corrosive environment (pH 5.5) are generally acceptable. Repair or replace any pipe with crack exhibiting displacement across the crack, exhibiting bulges, creases, tears, spalls, or delamination.

b. Reports: The deflection results and finial post installation inspection report shall include: a copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design, grade, deviation from line, deflection and deformation of flexible pipe systems, inspector notes, condition of joints, condition of pipe wall (e.g. distress, cracking, wall damage dents, bulges, creases, tears, holes, etc.).

-- End of Section --

APPENDIX BB
Engineering & Construction Bulletin (ECB) 2011-1

US Army Corps of Engineers

ENGINEERING AND CONSTRUCTION BULLETIN

No. 2011-1 **Issuing Office:** CECW-CE **Issued:** 19 Jan 2011 **Expires:** 19 Jan 2013

Subject: High Performance Energy and Sustainability Policy

Applicability: Directive and Guidance

References:

a. Engineering and Construction Bulletin (ECB) 2010-14, 28 Jun 2010, Subject: Improving Building Performance through Enhanced Requirements for Energy Performance and Selected LEED Credits

b. Memorandum of Understanding (MOU), 06 Mar 06, *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*

c. Memorandum, DUSD (I&E), 25 Oct 10, subject: Department of Defense Sustainable Buildings Policy

d. Memorandum, ASA (IE&E), 27 Oct 10, subject: Sustainable Design and Development Update (Environmental and Energy Performance)

e. U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) NC rating tool v2.2 and 2009/v3

1. The purpose of this Engineering and Construction Bulletin (ECB) is to implement new policies and procedures into the Military Construction, Army (MCA) program. This ECB is effective when issued and, together with ECB 2010-14 (Reference a), defines the Energy and Sustainability performance requirements for projects in the various phases of the Planning, Programming, Budgeting, and Execution process. ECB 2010-14 was intended to start the process by taking advantage of the good bid environment to fund additional energy enhancements for projects that were already authorized and appropriated. After the FY13 Program, ECB 2010-14 will no longer be applicable.

2. National energy security and sustainability concerns continue to drive construction programs to build higher performance buildings than ever before. Building more energy efficient and sustainable facilities is a mission objective of the US Army. We must continue to implement improved energy standards and sustainability objectives that are cost effective over the life of our facilities, installations, and infrastructure to meet energy security and independence goals.

3. Project Delivery Teams (PDT) are authorized and encouraged to aggressively enhance the energy and sustainability performance of our projects. Project features referenced by Attachment A that accomplish this objective whether programmed or incorporated by change during design or construction are to be considered technical requirements and not User Requested Changes. The PDT should be aware of how these features affect the scope of projects

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that have a congressionally approved DD1391, as well as how they affect the PDR/3086 process for projects under design.

4. PDTs are to perform a Life Cycle Cost Analysis (LCCA) on energy-related design decisions of major systems and features that will exceed 1% of the Programmed Amount (PA) in cost. This Life Cycle Cost Analysis shall be documented as part of design analysis and/or basis of design files and kept available for review.

5. This ECB is intended to enhance conformance with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* (Reference b) which continues to be in effect. See also *High Performance and Sustainable Buildings Guidance* issued by Office of Management and Budget in December 2008 for further information.

6. All MCA projects will comply with the Department of Defense Sustainable Buildings Policy (Reference c) and the Department of the Army Sustainable Design and Development Policy Update (Reference d) pursuant to the following implementation plan by program year:

a. **Guidance for All Program Years**: Studies by the Department of Energy in conjunction with our own Construction Engineering Research Laboratory have shown the energy and sustainability enhancements listed in Attachment A to be consistently cost effective for multiple facility types and climatic regions. Therefore, project teams are to incorporate as many of these enhancements as practicable at the discretion of the PDT as a mandatory change without further approval necessary, provided the following conditions are met. The PDT is responsible for selecting a comprehensive suite of enhancements that work in concert to achieve a low energy consumption facility as a whole and with respect to the facility type and climatic region of the site.

(1) No energy enhancement can result in the project exceeding the total of any unit attribute (such as Square Feet, Linear Feet, etc,) of any line item within the Primary Facility portion of an approved DD Form 1391.

(2) For projects in Planning: Energy enhancements that affect the scope of a DD Form 1391 should be addressed in the Project Definition Report (PDR) and coordinated with HQUSACE and HQDA.

(3) For projects in Design: If the Current Working Estimate (CWE) with energy enhancements added exceeds the authorized Programmed Amount (PA), per existing guidance, the PDT must identify bid options. These options shall not include the required Energy Enhancements listed in Attachment A.

(4) For projects in Construction: Energy and sustainability enhancements referenced in Attachment A may be incorporated into the project by the PDT using funds available. If additional funding is required, the PDT shall submit the requested change to Headquarters with a supporting LCCA. If the change is authorized, update the Design Analysis to include the Life Cycle Cost Analysis (LCCA) to document the change.

(5) Energy and sustainability enhancements not referenced in Attachment A are to be considered User Requested Changes and follow the approval process already established.

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If the installed feature exceeds 1% of the Programmed Amount (PA) request should be supported by a LCCA documented in the design analysis and/or basis of design. The LCCA shall show the enhancements will either reduce source Green House Gas (GHG) emissions or pay for themselves within the life cycle of the facility or both.

b. **FY11 and Prior Year Programs**: ECB 2010-14 (Reference a) continues to apply. For clarification, note that the use of the Bid Option to achieve 50% better energy savings as described in ECB 2010-14 is not automatically included by use of the RFP wizard, but needs to be included manually in the CLIN table added to each new RFP. This option shall be listed after all base options. If the Current Working Estimate (CWE) exceeds the Program Amount (PA) the approval must be obtained from HQDA prior to advertising. Likewise, HQDA approval must still be obtained to Award in excess of PA per existing guidance. HQDA will continue to have the final decision regarding Below or Above Threshold Reprogrammings. When performing Site Selection and Master Planning activities, teams are encouraged to review the requirements of the SDD policy (Reference d) as well as local Renewable Energy availability data from the Department of Energy's National Renewable Energy Laboratory (NREL) at http://www.nrel.gov/. Use this information to generate future development plans with respect to energy and sustainability.

c. **FY12 Program:** ECB 2010-14 (Reference a) continues to apply to the FY12 MCA program; specifically, applicable projects are to be designed to achieve energy performance 40% better than as prescribed in ASHRAE 90.1-2007. Further, an Option to achieve 50% better shall be included in the CLIN table added to each new RFP. Headquarters has worked with DA to adjust the allowable square footage shown on the current DD Form 1391s to accommodate some energy and sustainability strategies such as thicker exterior walls. These adjustments in allowable square footage will not change current PA or early gross square-footage based CWE. If the final approved DD Form 1391s reflect this change the PDT is expected to incorporate these energy enhancements; e.g. include the additional wall thickness and insulation as a design requirement. The additional square footage authorized shall not be used for any other purpose than to increase energy and sustainability performance.

d. **FY13 Program**: Design projects to fully comply with the SDD policy (Reference d) and include energy enhancements from Attachment A, as appropriate to the project site and facility type. The PA and square footage will be adjusted by DA after the 3086 review to incorporate energy enhancements in Attachment A to fully comply with the SDD policy. Installations have opportunities to gain better financial efficiency and other benefits by consolidating the renewable energy requirements of multiple buildings into a larger-scale "central plant" type projects. Therefore, the SDD policy (Reference d) contains language in Paragraph 5.b that allows an exemption to installing renewable energy systems on each building per ASHRAE 189.1 in favor of aggregating the requirements installation-wide or program-wide. Centralized Renewable Energy plants used to meet consolidated renewable requirements of ASHRAE 189.1 are not required to be built concurrently in FY13, but may be planned to be executed in FY15 to allow for the additional master planning and design required. Additional energy enhancements, such as renewable energy systems, that can be easily separable from the base design may be included as contract options or alternates.

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PDTs, the Centers of Standardization, HQUSACE will work together to determine the best acquisition strategy to maximize energy innovation. The use of Waiver requests to the Standard Designs is encouraged if necessary to facilitate innovation.

e. **FY 14 program**: The renewable energy components of the SDD policy (Reference d) will begin to be addressed by aggregating the requirements of multiple facilities into larger scale renewable energy projects to the extent practical and that funding allows. Installations are encouraged to seek partnerships with the private sector, including using power purchase agreements (PPA), enhanced-use leases (EUL), energy savings performance contracts (ESPC), and utilities energy service contracts (UESCs) as vehicles to optimize renewable energy sources and leverage Federal, State, and local utility incentives. USACE will continue to pursue low energy models and will issue additional guidance.

f. **FY 15 Program and beyond:** Starting with the FY 15 Program, all projects will be planned and programmed to achieve the renewable energy component of ASHRAE 189.1 (per Paragraph 5(b) of Reference d) either within each project's scope or by a consolidated renewable energy solution for an aggregate of multiple project requirements.

7. Sustainability Certification:

a. All MCA projects meeting the Minimum Program Requirements (MPR) for the Leadership in Energy and Environmental Design (Reference e) program shall be planned, designed, and built to be certified at the SILVER level or higher from the Green Building Certification Institute (GBCI)

(1) Projects previously registered under LEED 2.2 may continue to pursue the version 2.2 points and seek USGBC certification under LEED 2.2 scoring at the discretion of the PDT, subject to GBCI approval.

(2) Any project not registered under 2.2 shall register and seek certification with GBCI under LEED NC/MR version 2009/3.0 or later.

(3) At its discretion, the PDT may pursue achieving Gold level certification and is authorized to seek certification at the highest attainable level of certification within available funding provided that doing so continues to reduce the total cost of ownership over the life cycle of the facility.

(4) In accordance with the Department of Defense Sustainable Buildings Policy (Reference c) at least 40% of the minimum points required for Silver level certification shall be earned in any combination of these credit categories:

(a)	SS 7.1	Heat Island Effect, Non-Roof
(b)	SS 7.2	Heat Island Effect, Roof
(c)	SS 8	Light Pollution Reduction
(d)	WE 1.1	Water Efficient Landscaping - Reduce Potable Water Use by 50%

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(e)	WE 1.2	Water Efficient Landscaping - No Potable Use or No Irrigation
(f)	WE 2	Innovative Wastewater Technologies
(g)	WE 3	Water Use Reduction
(h)	EA 1	Optimize Energy Performance
(i)	EA 2	On-Site Renewable Energy
(j)	EA 3	Enhanced Commissioning
(k)	EA 5	Measurement & Verification
(l)	EA 6	Green Power
(m)	IEQ 1	Outside Air Delivery Monitoring
(n)	IEQ 8.1	Daylight & Views - Daylight 75% of Spaces
(o)	ID 1.1-1.5	Innovative Design, if achieved for energy and/or water savings
(p)	RP 1.1-1.4	Regional Priorities, if achieved for energy and/or water savings

(5) In addition to the prerequisites, the following LEED-NC/NR credits shall be included in all MCA projects where applicable:

(a)	SS 6.1	Stormwater Design, Quantity Control
(b)	SS 6.2	Stormwater Design, Quality Control
(c)	WE 1	Water Efficient Landscaping: No potable water used for irrigation.
(d)	WE 3	Water Use Reduction: earn at least two points under this credit
(e)	EA 1	Optimize Energy: earn at least 15 points under this credit
(f)	EA 3	Enhanced Commissioning
(g)	EA 5	Measurement and Verification
(h)	MR 2	Construction Waste Management
(i)	MR 4	Recycled Content
(j)	IEQ 3.1	Construction IAQ Management Plans
(k)	IEQ 3.2	Construction IAQ Management Plans
(l)	IEQ 7.1	Thermal Comfort Design

b. Army Family Housing projects may be certified at the LEED for Homes SILVER level or higher from the GBCI or Energy Star Qualified New Homes, or will be designed to achieve energy consumption levels 45% below the baseline set by International Energy Conservation Code (IECC) 2009.

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c. The definitions and guidance on the LEED minimum program requirements are provided in a document, titled Supplemental Guidance, available on the USGBC website (http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2102)

d. Projects not falling within the scope of the LEED program will be designed and built to incorporate the maximum LEED components or equivalent sustainable design features available as allowed by project scope. If such a project is of a significant size, has high visibility or public interest, the use of alternative standards and certification systems available to the project is encouraged, such as Green Globes or Host Nation programs.

8. A request for an exemption through HQ USACE may be made for any specific requirement included herein or by reference that the PDT determines would adversely affect mission performance, security requirements, health, safety, or welfare. The exemption shall only apply to the specific requirements in conflict. Any approved exemptions to this policy shall be documented with reference to the specific requirement in conflict and included in the project documentation.

9. Reporting and documentation of Energy and SDD performance: New energy enhancements above our current standard design or criteria included in a solicitation, or incorporated through the modification process, must be reported to HQUSACE. A list of these enhancements, and any associated costs and Life Cycle Cost Analyses available will be kept to further our knowledge about the costs associated with these enhancements, and to answer inquiries about the Army's progress towards the Energy mandates and requirements that will come from HQDA, OSD, and Congress. The District (through the MSC) will submit to their Regional Integration Team (RIT) a list of new energy enhancements with the estimated costs shown on a new tab of an updated Current Working Estimate (CWE) worksheet and include a brief descriptive justification with pertinent design details. All projects shall report the following information, at a minimum:

a. LEED credits earned, with percentage in Water and Energy

b. Gross percentage of anticipated energy savings versus baseline

c. Gross percentage of anticipated water savings versus baseline

10. The Headquarters USACE point of contact is Eric Mucklow, at 202-761-0522 or eric.mucklow@usace.army.mil. The Army Program Manager is Gary Skusek, 202-761-5749.

ENCL

JAMES C. DALTON, P.E., SES
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Directorate of Military Programs

ATTACHEMENT A
VIABLE ENERGY AND SUSTAINABILITY ENHANCEMENTS

The following enhancements may be considered viable for a wide range of building types and climactic regions. From these, a comprehensive suite of enhancements may be selected that work in concert to achieve a low energy consumption facility as a whole and with respect to the facility type and climatic region of the site. These enhancements are to be implemented by the PDT as practicable with respect to the project's scope, schedule, and existing conditions.

The list below contains only brief descriptions representing strategies and design criteria that enhance the energy performance or sustainability of facilities. It is assumed members of the design team will be familiar with these concepts. More in-depth guidance regarding specific criteria and implementation information can be found by consulting the *Energy and Water Conservation Design Guide (for Sustainment, Restoration and Modernization (SRM) and MILCON Projects)* on the Whole Building Design Guide site at http://www.wbdg.org/references/pa_dod_energy.php

1. Optimize building orientation (East-West Axis with Passive Solar shading geometry)
2. Tight construction with Infiltration less than .15 cfm per square foot of exterior envelope area at 75 PA
3. Added insulation to high performance 'Passivhaus' levels (See the Building Envelope section of the *Energy and Water Conservation Design Guide* referred to above for minimum R/U values per climatic zone)
4. Design detailing to avoid thermal bridges that allow heat to bypass insulation
5. Windows: Triple-pane, Energy Star, with low-E coatings appropriate to climatic zone.
6. Lighting: lower lighting consumption to average 0.75W/ft2 or less. To achieve this performance, consider the following:
    a. Low maintenance, low wattage-per-lumen technologies, e.g. SSL/LED fixtures
    b. Occupancy, Vacancy, and Daylighting sensors for active ambient light control
    c. Increase vertical glazing by 50% over standard designs
    d. Increase Skylight to Floor Area (SFA) fraction to 3% over corridors, admin areas and office areas
    e. Use digital multi-zone lighting controls with individually addressable fixtures
7. 'Cool Roof' finishes where cooling load exceeds heating (e.g. Climate Zones 1-5)
8. Top Tier Energy Star or FEMP rated appliances and equipment
9. Demand/user controlled High Efficiency HVAC equipment per ASHRAE 189.1
10. Optimize HVAC zones with respect to user schedules and occupancy
11. Include Energy Recovery Ventilation (ERV) systems with >75% efficiency

12. Dedicated Outside Air System (DOAS) for ventilation with heat recovery for assembly and heat/fume generating activities

13. Indirect Evaporative Pre-Cooling (IEPC or IDEC) for Dry Climates (Climate Zones *x*B)

14. HVAC equipment efficiency ratings (e.g. COP) that exceed ASHRAE 189.1 (C) requirements

15. High Efficiency condensing boilers with >90% efficiency and/or incorporate Ground-Source Heat Pump technology

16. NEMA MG1 Premium Efficiency/ Electronically Commutated Motors (ECM) motors

17. Variable Air Volume (VAV) or hydronic distribution; consider:

    a. radiant heating systems, especially in maintenance bays, and

    b. "Radiant" cooling systems in ceilings

18. Measurement and Verification (M&V) systems

19. On-site Renewable Energy elements:

    a. Transpired Solar Collectors in Climate Zones 2A to 8.

    b. SSL/LED parking and street lighting; site-specific light distribution patterns

    c. Prepackaged pole-mounted solar site lighting solutions

    d. Include 30% demand solar water heating in areas where the average sun exposure is equal or greater than 4.0 kWh/m^2 per day according to the National Renewable Energy Lab (http://www.nrel.gov/gis/solar.html) in accordance with the SDD policy (Reference d.)

20. Maximum flow rates for plumbing fixtures per ASHRAE 189.1

    a. Dual-flush toilets

    b. Waterless Urinals: urinals that use either no water or no potable water (e.g. may use harvested rainwater or reclaimed greywater)

21. Stormwater management: Meet local codes and Low Impact Development (LID) best practices (e.g. pervious pavement, rainwater harvesting, swales, bioretention ponds)

See the Whole Building Design Guide (http://www.wbdg.org/) and the USACE Centers of Standardization website at https://eportal.usace.army.mil/sites/COS/Pages/Default.aspx for more information about these technologies. As projects progress, PDT members may find peers who have shared their success stories and share your own on the Energy Hall of Fame website at https://www.us.army.mil/suite/page/639754 (AKO login required.)

APPENDIX CC
Existing Building Drawings

"Quality & Integrity Since 1968"

INDEX OF INFORMATION

DWG/PG #	DESCRIPTION	DWG. DATE	LAST REV. DATE
S1	COVER SHEET	8/21/07	11/30/06
S2-S3	SPECIFICATIONS	8/21/07	9/15/08
F1	BLOCKING PLAN	8/21/06	11/30/06
L1	LEGENDS / NOTES	8/21/06	1/8/07
A1	ARCHITECTURAL PLAN	8/21/06	1/8/07
A2 - A2B	ELEVATIONS	8/21/06	11/30/06
A3	FLOOR COVERING PLAN	8/21/06	11/30/06
A4	WALL COVERING PLAN	8/21/06	11/30/06
A5	CEILING COVERING PLAN	8/21/06	11/30/06
E1	ELECTRICAL PLAN	8/21/06	1/8/07
E2-E4	ELECTRICAL CALCULATIONS	8/21/06	1/8/07
H1-H2	HVAC PLAN	8/21/06	9/15/08
D1-D3	DETAILS	8/21/06	1/8/07
D5-D9,D12,D22	DETAILS	8/21/06	1/8/07
D10-D11	PLAYGROUND LAYOUT	12/6/06	*
P1-P4	PLUMBING SCHEMATICS	8/21/06	1/8/07

LOCATION OF INFORMATION LABELS: DATA PLATE & INSIGNIA ARE ON WALL @ ELECTRICAL PANEL

TOTAL NUMBER OF SHEETS IN EACH SET: 34

DESIGN CRITERIA

MODEL:	(9) 1274 (8) 1474
ACTUAL BUILDING SIZE:	258'-3"X 70'-0"
BUILDING SQUARE FOOTAGE:	18,078
OCCUPANT LOAD:	233 CHILDREN 36 ADULTS

GENERAL NOTES:

THE JOB SPECIFICATIONS SUPERCEDE THE DETAIL SPECIFICATIONS WHERE THERE IS A CONFLICT.

EXIT DOORS TO REMAIN OPENABLE DURING BUSINESS HOURS FROM THE INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE.

ALL SINGLE OCCUPANT TOILET ROOMS ARE TO HAVE PRIVACY LATCHSETS.

A 1/2"X 2-1/2" SHIM, CORRESPONDING WITH THE FINISH MATERIAL THICKNESS, BETWEEN TOP AND BOTTOM PLATE BEARING SURFACE IN LIEU OF COMPRESSABLE MATERIALS, E.G. GYPSUM OR CARPET. (LOAD BEARING WALLS ONLY).

DATA PLATE NOTES:

THE BELOW NOTE(S) TO BE PLACED ON THE DATA PLATE

MURILLO IS RESPONSIBLE FOR SUPPLYING AND/OR INSTALLING THE FOLLOWING ITEMS IN ACCORDANCE WITH THE ABOVE APPLICABLE CODES:

- MAIN DISTRIBUTION PANEL
- EXIT DISCHARGE LIGHTING
- ACCESSIBLE ACCESS TO BUILDING
- SUPPLY AND WASTE LINES BELOW AND/OR OUTSIDE BUILDING
- ROOF VENTS, STACKS AND CAPS ABOVE BUILDING
- FIRE ALARM SYSTEM.
- NFPA 13 SPRINKLER SYSTEM
- DRAFTSTOPPING IN ATTIC OF SITE BUILT ROOF PER IBC SEC. 716.4.3

IBC

CODE CRITERIA

CONSTRUCTION TYPE:	VB SPRINKLED
OCCUPANT GROUP:	E & A3
BUILDING LOCATION:	DETROIT, MI
HEIGHT ABOVE GRADE:	20'-0" MAXIMUM

DESIGN LOADS

ROOF LIVE LOAD; PSF:	30
ROOF DEAD LOAD; PSF:	13.10 FOR SITE INSTALLED ROOF
FLOOR LIVE LOAD; PSF:	50 CHILDCARE & OFFICES
FLOOR LIVE LOAD; PSF:	100 ACTIVITY AREAS
FLOOR LIVE LOAD; PSF:	125 STORAGE ROOM
CORRIDOR LIVE LOAD; PSF:	100
BASIC WIND SPEED; MPH:	90
IMPORTANCE FACTOR:	1.00
EXPOSURE:	C
FLOOR 'U' VALUE:	0.050
WALL 'U' VALUE:	0.074
ROOF 'U' VALUE:	0.035
DESIGN TEMPERATURE INSIDE °: OUTSIDE °:	 72 8
SEISMIC DESIGN	
USE GROUP:	II
RESPONSE COEFFICIENTS; (Sds) (Sd1)	 0.16 0.08
SITE CLASS:	D
WOOD FRAME:	
BASE SHEAR; (V):	0.032W

CODES

2005	NATIONAL ELECTRICAL CODE
2003	INTERNATIONAL BUILDING CODE
2000	ASHRAE ENERGY CONSV. CODE
2003	INTERNATIONAL MECHANICAL CODE
2003	NATIONAL STANDARD PLUMBING CODE
	ADA ACCESSIBILITY
2003	NFPA 101 LIFE SAFETY CODE
	DOD UNIFIED FACILITIES CRITERIA
	OSHA AND EM 385-1-1 ARMY CORPS OF ENGINEERS SAFETY MANUAL

IBC NOTES:

15 CFM PER OCCUPANT OUTSIDE AIR, TAKEN FROM OUTSIDE ATMOSPHERE.

CHILD DEVELOPMENT CENTERS
PERMANENT MODULAR FACILITIES
FOR THE
US ARMY AND THE US MARINE CORPS

BASE: DETROIT ARSENAL, MICHIGAN
(BLDG. # DET-01)

US ARMY COMMUNITY AND FAMILY SUPPORT CENTER
NAF CONTRACTING DIRECTORATE
MAJOR PROJECTS DIVISION (CFSC-NCC)
4700 KING STREET, 5TH FLOOR
ALEXANDRIA, VIRGINIA 22302-4415
(703) 681-5292

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

© 2002 MARK LINE INDUSTRIES

MURILLO MODULAR

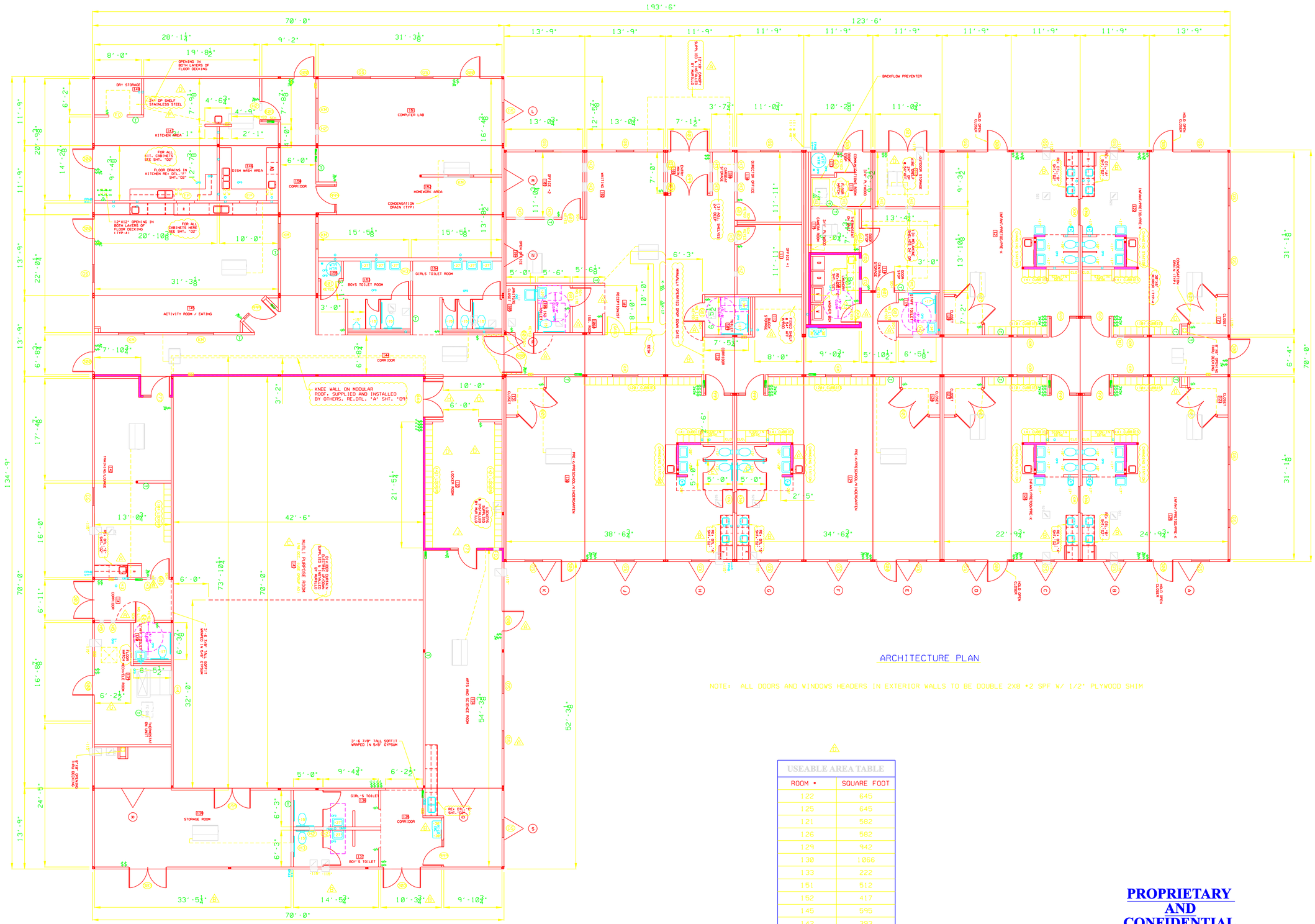
PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: TW/JR
DRAWING SCALE: AS NOTED
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: S1

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"



ARCHITECTURE PLAN

NOTE: ALL DOORS AND WINDOWS HEADERS IN EXTERIOR WALLS TO BE DOUBLE 2X8 #2 SPF W/ 1/2" PLYWOOD SHIM

USEABLE AREA TABLE

ROOM #	SQUARE FOOT
122	645
125	645
121	582
126	582
129	942
130	1066
133	222
151	512
152	417
145	595
142	393
134	638

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
1	CEIL. SPACE VENTILATION	9/24/07	IW
2	CUSTOMER	4/12/07	IW
3	CUSTOMER	3/7/07	IW
4	CUSTOMER	1/23/07	IW
5	THIRD PARTY	1/23/07	IW
6	CUSTOMER	1/8/07	JR
7	CUSTOMER	11/30/06	BR
8	CUSTOMER MULTI PURPOSE DOOR CHANGE	9/28/07	IW
9	CUSTOMER	10/5/07	IW

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/8"=1'-0"

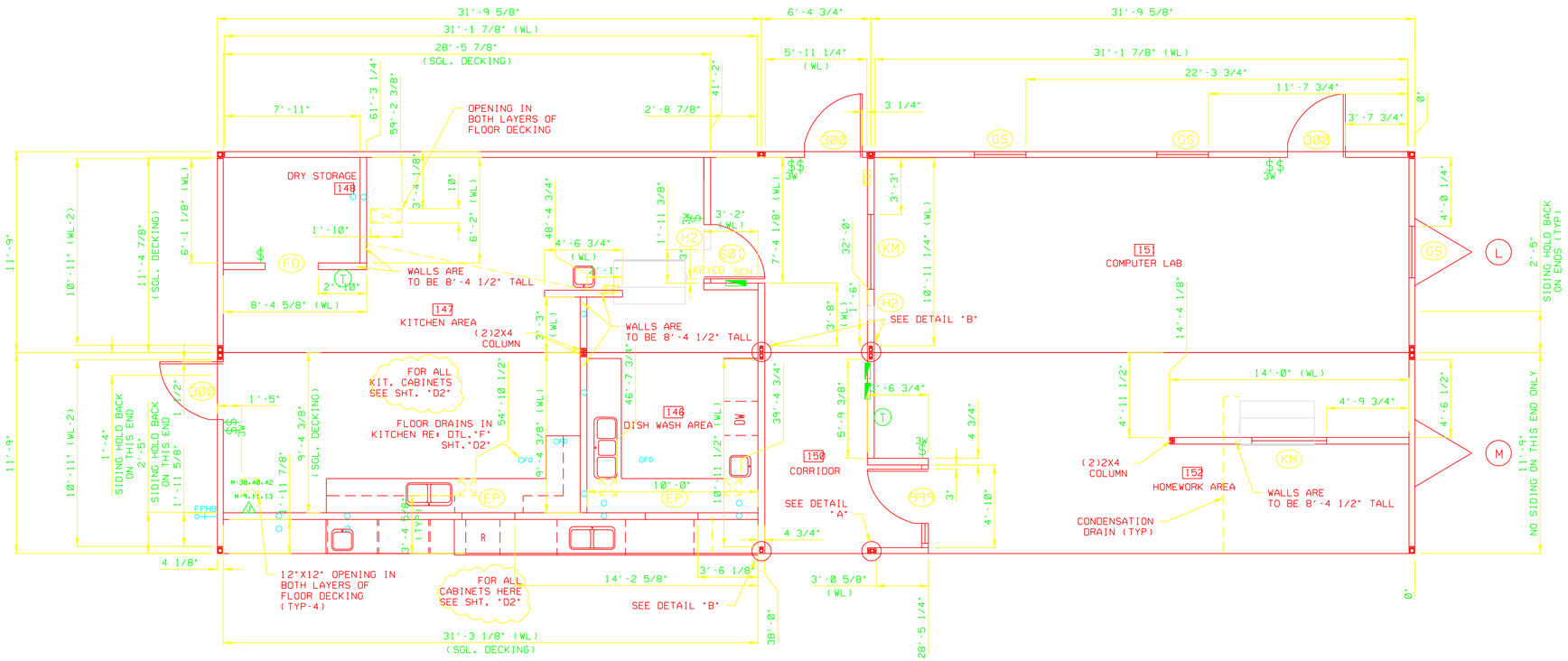
QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A1

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR., EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD, ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING
	FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT
	STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL
	STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE
	IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE
	IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN
	CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL
	ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER
	(BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED
	CEILING, FIRE ALARM PULL &
	AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED
	CEILING, FIRE ALARM SIGNAL 82" AFF
	J-BOX IN CEILING
HD	HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING
	SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU
	SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR
	CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH
	3-WAY, 48" AFF
	120 V., 20 AMP, TOGGLE TYPE SWITCH
	48" AFF
GFI WP	120 V., 15 AMP, DUPLEX GFI RECEPT
	WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT
	STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP, DUPLEX GFI RECEPT
	48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP, GFI HEAT TAPE REC. (BELOW
	FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED.
	CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT
	STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT
	LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED
	EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT
	W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL
	WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN
	TROFFER LIGHT
	LOAD CENTER

SYMBOL — DESCRIPTION

DRAWING LEGEND

	4' DOUBLE TUBE SURFACE MOUNTED
	FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF
	STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER
	115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC.
	W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP, SINGLE RECEPT
	STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW &
	BATTERY BACK UP, 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT
	80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED
	CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM
	SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF
	W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN
	CEILING
	EXTERIOR CCTV CAMERA
	SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA
	SUPPLIED AND INSTALLED BY OTHERS

SYMBOL — DESCRIPTION

DRAWING LEGEND

FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4", 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2", 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37", 33 1/4" AFF
808	7280 INT STEEL DOOR. (20 MIN), W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7280 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7280 INT STEEL DOOR. (45 MIN), W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR. (45 MIN), STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR. (45 MIN), STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR. (20 MIN), STEEL JAMB W/SIDE LITE R.O. 52" X 81"
FD	FINISHED OPENING R.O. 37 1/4" X 80 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 10 1/2" X 25" 36" AFF
CS	3660 VERTICAL SLIDE WINDOW, ALUM. FRAME R.O. 36" X 60", VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW, STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46"X95"
601	3680 INT L.O. S.C. DOOR. (20 MIN), STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

MARK — DESCRIPTION

OPENING SCHEDULE

M1	FRAMED OPENING R.O. 12" X 1[illegible]
KNA	MATE LINE OPENING R.O. 43 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW, STEEL JAMB R.O. 40 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

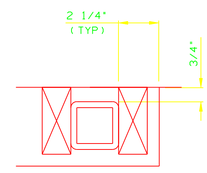
MARK — DESCRIPTION

OPENING SCHEDULE

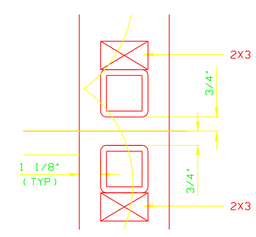
ARCHITECTURE NOTES

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS, BUBBLERS, DRINKING FOUNTAIN, GRAB BARS, & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED. RE: DTL."" SHT.""
7) CORRIDOR WALLS ARE LOAD BEARING, COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM



A COLUMN DETAIL
SCALE: 1/4"=1'-0"



B COLUMN DETAIL
SCALE: 1/4"=1'-0"

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A10

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

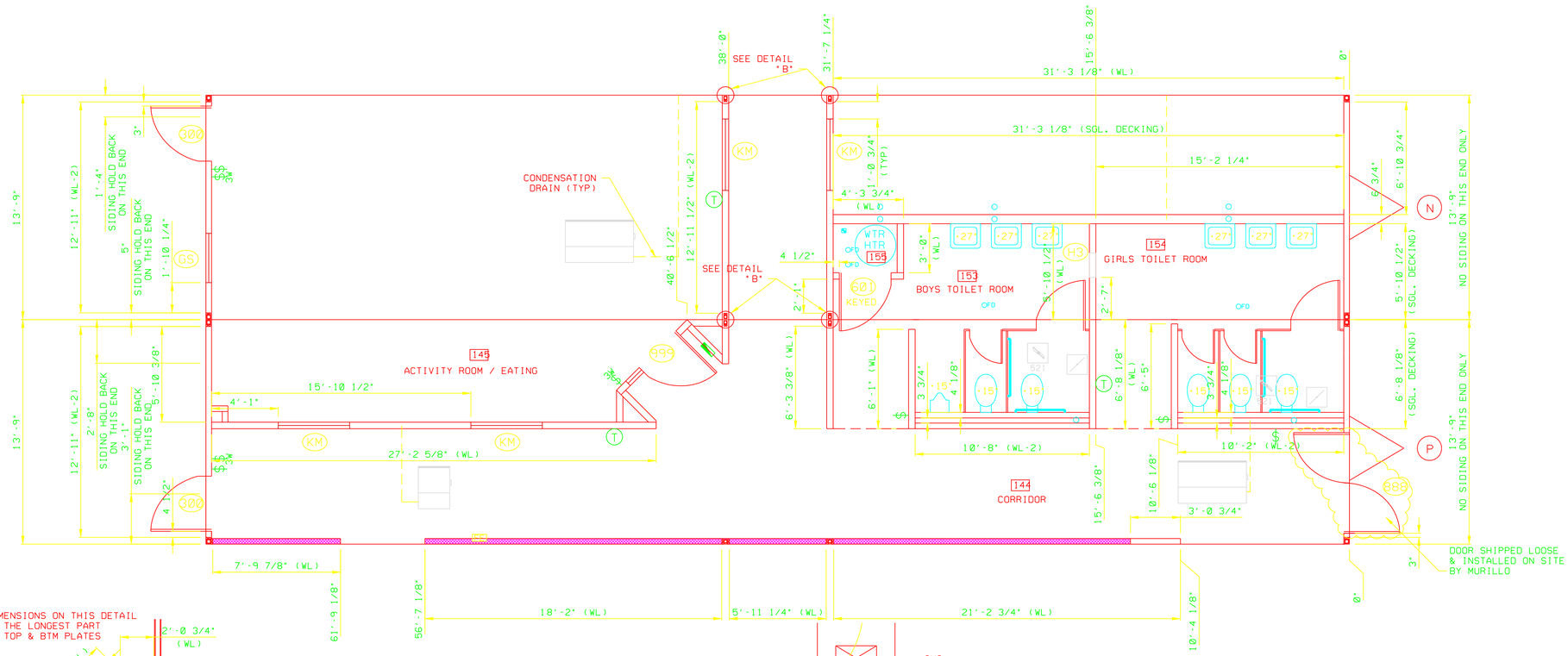
"Quality & Integrity Since 1968"

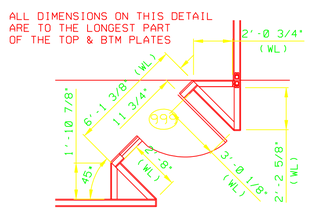
SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
	J-BOX IN CEILING
HD	HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GF1 WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GF1 HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VP WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

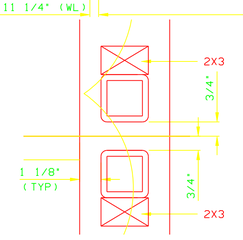
SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND

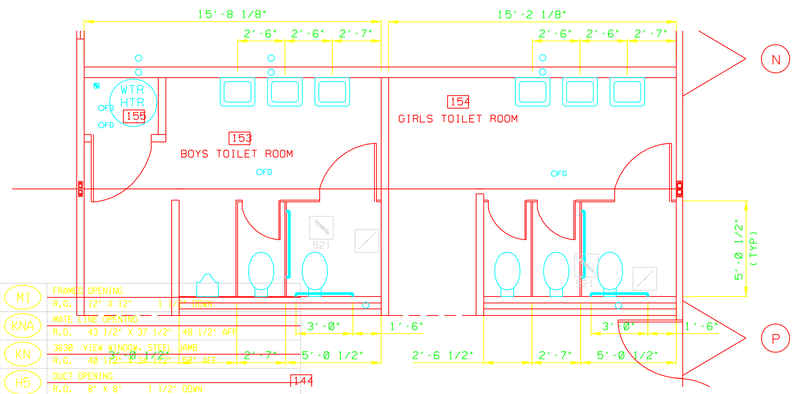




ANGLED WALL DETAIL
SCALE: 1/4"=1'-0"



COLUMN DETAIL
SCALE: 1/4"=1'-0"



TOILET ROOM BACKER DETAILS
SCALE: 1/4"=1'-0"

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4", 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2", 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37", 33 1/4" AFF
888	7280 INT STEEL DOOR. (20 MIN). W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7280 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7280 INT STEEL DOOR. (45 MIN). W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB W/SIDE LITE R.O. 52" X 81"
FD	FINISHED OPENING R.O. 37 1/4" X 80 5/8"
FE	RECESSED FIRE EXTINGUISHER CABINET R.O. 10 1/2" X 25" 36" AFF
CS	3660 VERTICAL SLIDE WINDOW. ALUM. FRAME R.O. 36" X 60", VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O. 46"X85"
601	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 48 1/2"X82 5/8"

OPENING SCHEDULE

MARK	DESCRIPTION
M1	FRAMED OPENING R.O. 12" X 12" 1 1/2" DOWN
KNA	MATE LINE OPENING R.O. 43 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW. STEEL JAMB R.O. 40 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

OPENING SCHEDULE

ARCHITECTURE PLAN

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS. BUBBLERS. DRINKING FOUNTAIN. GRAB BARS. & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED. RE: DTL."" SHT."
7) CORRIDOR WALLS ARE LOAD BEARING. COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE *2 SPF 2X6'S W/ 1/2" PLYWOOD SHIM

PROPRIETARY AND CONFIDENTIAL
These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)
PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: LW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: A11

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FAP	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R/G	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

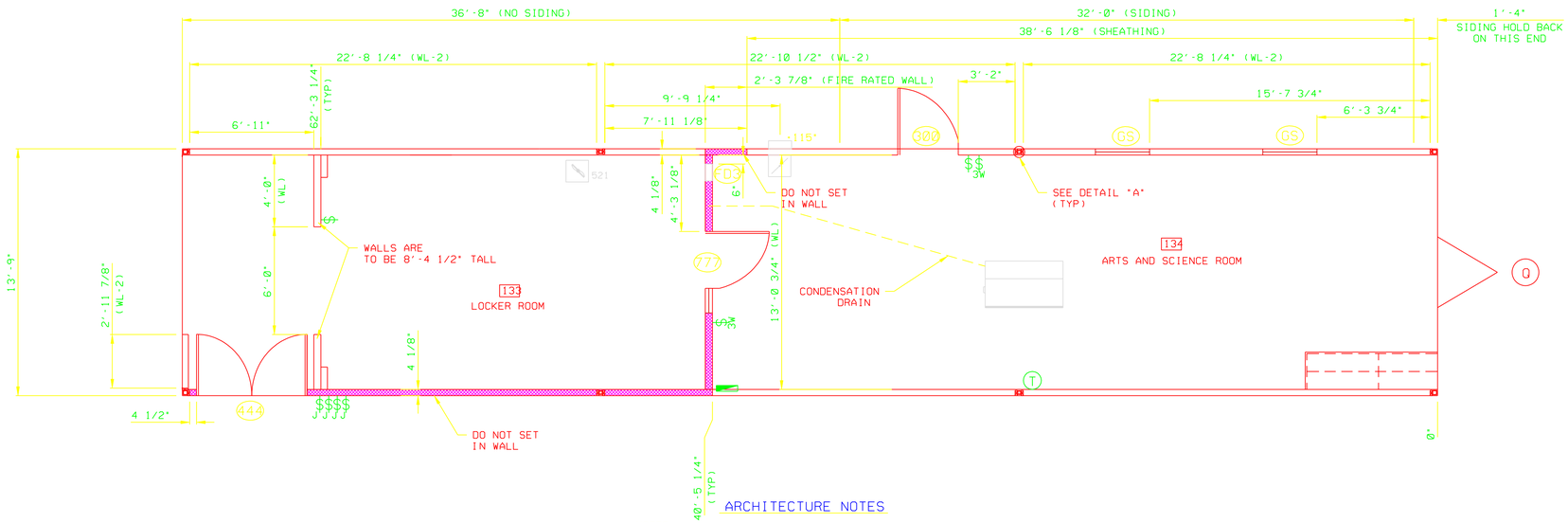
DRAWING LEGEND

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4". 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2". 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37". 33 1/4" AFF
888	7280 INT STEEL DOOR. (20 MIN). W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7280 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7280 INT STEEL DOOR. (45 MIN). W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB W/SIDE LITE R.O. 52" X 81"
FO	FINISHED OPENING R.O. 37 1/4" X 88 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 18 1/2" X 25" 36" AFF
CS	3660 VERTICAL SLIDE WINDOW. ALUM. FRAME R.O. 36" X 60". VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46'X85"
601	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

OPENING SCHEDULE

MARK	DESCRIPTION
MI	FRAMED OPENING R.O. 12" X 12" 1 1/2" DOWN
KNA	MATE LINE OPENING R.O. 43 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW. STEEL JAMB R.O. 40 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

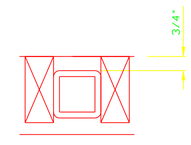
OPENING SCHEDULE



ARCHITECTURE NOTES

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS, BUBBLERS, DRINKING FOUNTAIN, GRAB BARS, & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED. RE: DTL."" SHT."
7) CORRIDOR WALLS ARE LOAD BEARING, COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM



A COLUMN DETAIL
SCALE: 1/4"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 146' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A12

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

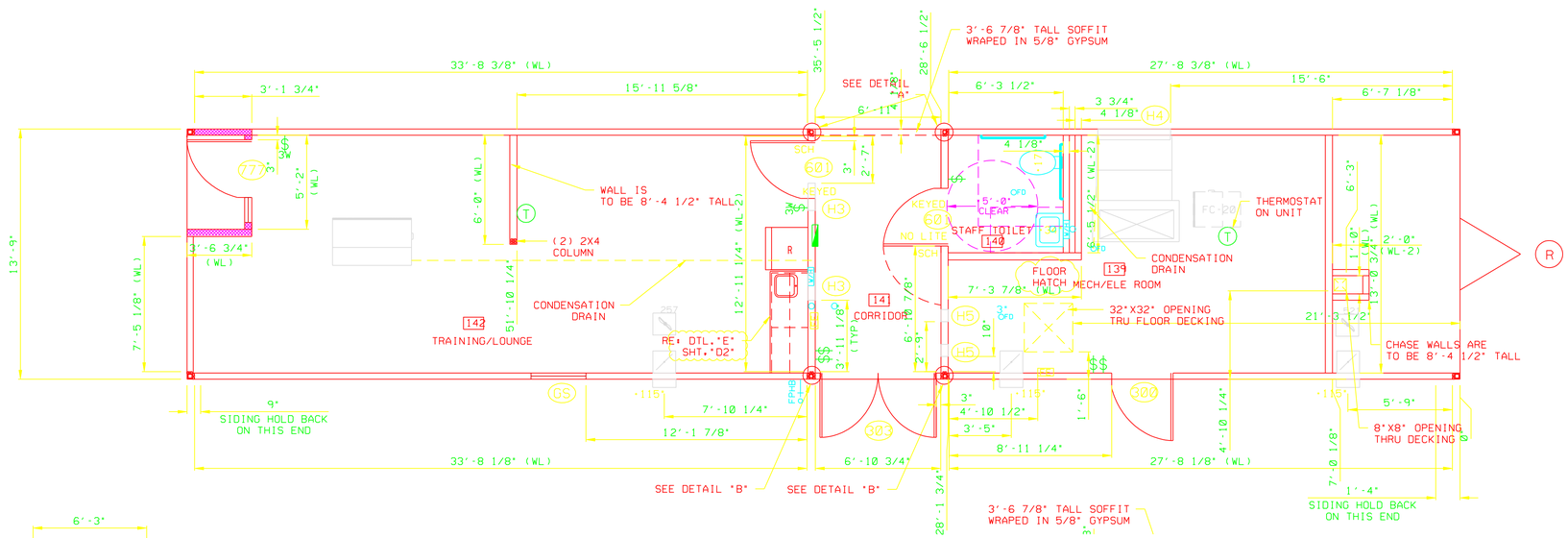
"Quality & Integrity Since 1968"

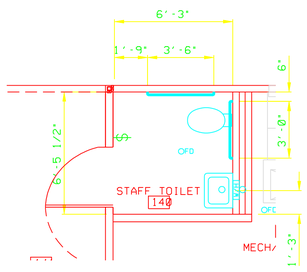
SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY, 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4" DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
GFP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R/G	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



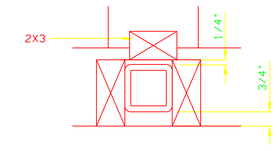


TOILET ROOM BACKER DETAIL
SCALE: 1/4"=1'-0"

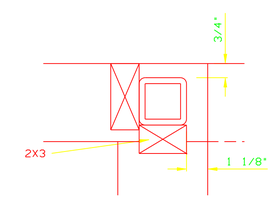
ARCHITECTURE NOTES

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS, BUBBLERS, DRINKING FOUNTAIN, GRAB BARS, & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED, RE: DTL."E" SHT."
7) CORRIDOR WALLS ARE LOAD BEARING, COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM



B COLUMN DETAIL
SCALE: 1/4"=1'-0"



A COLUMN DETAIL
SCALE: 1/4"=1'-0"

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4", 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2", 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37", 33 1/4" AFF
888	7280 INT STEEL DOOR. (20 MIN). W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7280 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7280 INT STEEL DOOR. (45 MIN). W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB W/SIDE LITE R.O. 52" X 81"
FO	FINISHED OPENING R.O. 37 1/4" X 88 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 18 1/2" X 25" 36" AFF
CS	3660 VERTICAL SLIDE WINDOW. ALUM. FRAME R.O. 36" X 60", VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46'X85"
601	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

OPENING SCHEDULE

MARK	DESCRIPTION
M1	FRAMED OPENING R.O. 12" X 12" 1 1/2" DOWN
KNA	MATE LINE OPENING R.O. 43 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW. STEEL JAMB R.O. 40 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

OPENING SCHEDULE

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A13

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
	J-BOX IN CEILING
HD	HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

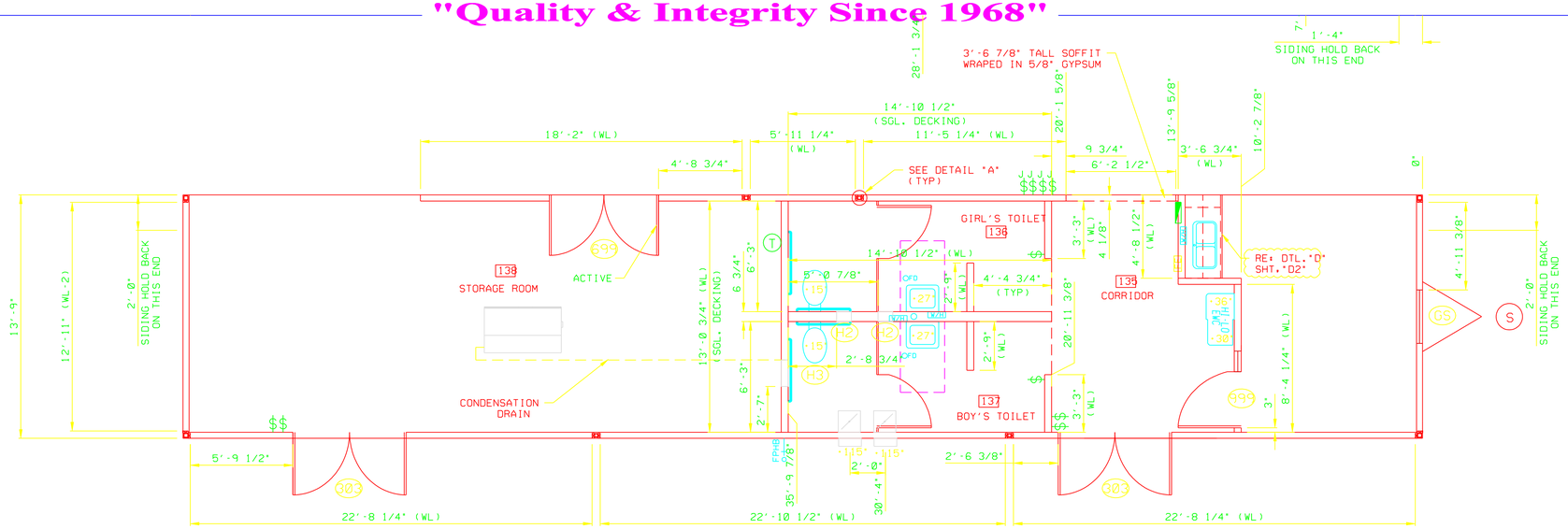
DRAWING LEGEND

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4", 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2", 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37", 33 1/4" AFF
888	7280 INT STEEL DOOR. (20 MIN). W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7280 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7280 INT STEEL DOOR. (45 MIN). W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB W/SIDE LITE R.O. 52" X 81"
FD	FINISHED OPENING R.O. 37 1/4" X 80 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 10 1/2" X 25" 36" AFF
CS	3660 VERTICAL SLIDE WINDOW. ALUM. FRAME R.O. 36" X 60", VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46"X85"
601	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

OPENING SCHEDULE

MARK	DESCRIPTION
M1	FRAMED OPENING R.O. 12" X 12" 1 1/2" DOWN
KNA	MATE LINE OPENING R.O. 43 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW. STEEL JAMB R.O. 40 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

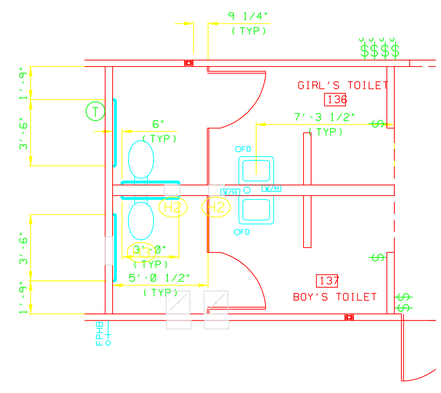
OPENING SCHEDULE



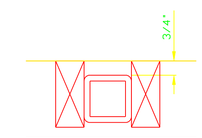
ARCHITECTURE NOTES

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS. BUBBLERS. DRINKING FOUNTAIN. GRAB BARS. & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED. RE: DTL."" SHT.""
7) CORRIDOR WALLS ARE LOAD BEARING. COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM



TOILET ROOM BACKER DETAIL
SCALE: 1/4"=1'-0"



A COLUMN DETAIL
SCALE: 1/4"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "16W" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

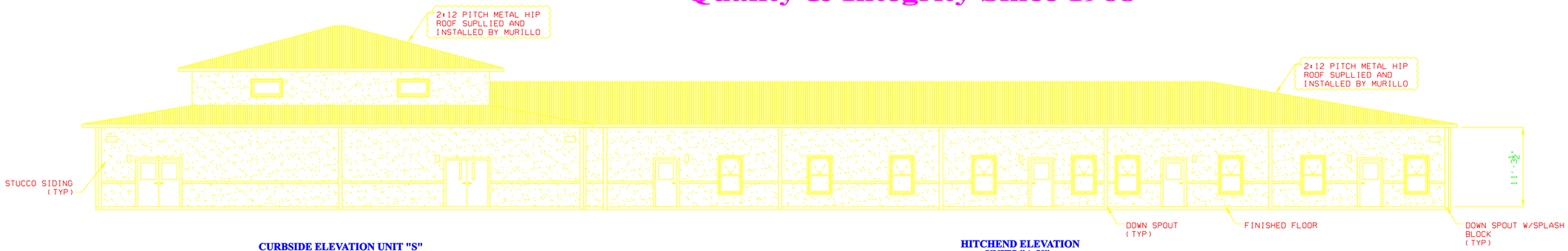
DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

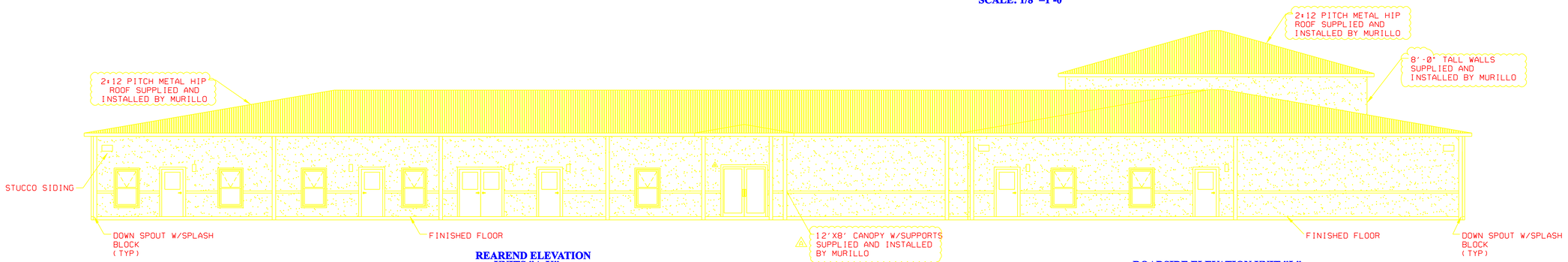
DRAWING NUMBER: A14

"Quality & Integrity Since 1968"



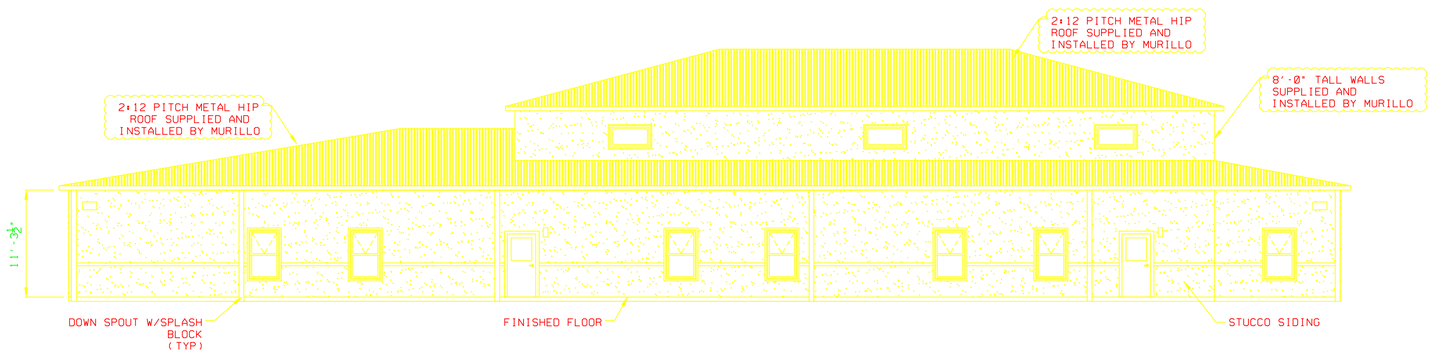
CURBSIDE ELEVATION UNIT "S"
SCALE: 1/8"=1'-0"

HITCHEND ELEVATION UNITS "A-K"
SCALE: 1/8"=1'-0"



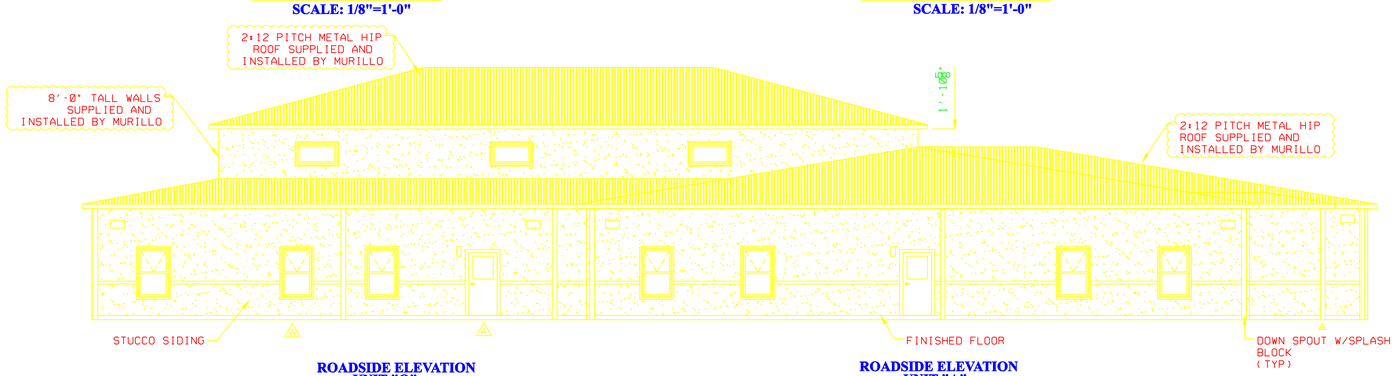
REAREND ELEVATION UNITS "A-K"
SCALE: 1/8"=1'-0"

ROADSIDE ELEVATION UNIT "L"
SCALE: 1/8"=1'-0"



REARHEND ELEVATION UNITS "L-P"
SCALE: 1/8"=1'-0"

CURBSIDE ELEVATION UNIT "R"
SCALE: 1/8"=1'-0"



ROADSIDE ELEVATION UNIT "Q"
SCALE: 1/8"=1'-0"

ROADSIDE ELEVATION UNIT "A"
SCALE: 1/8"=1'-0"

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
0	CUSTOMER	11/30/06	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

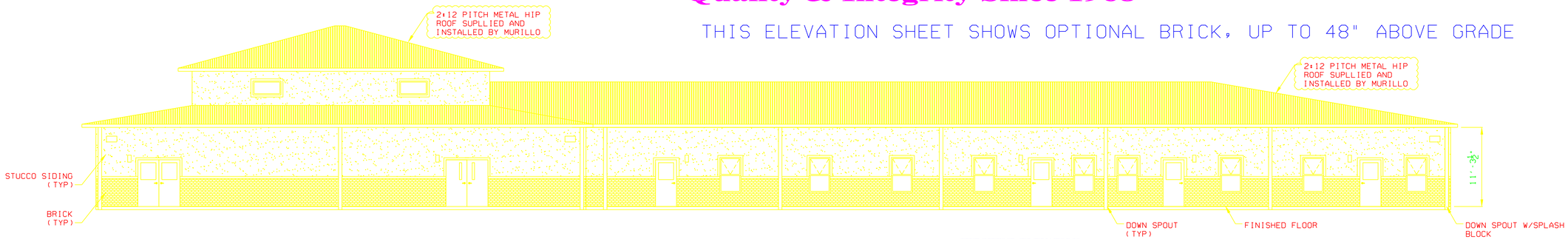
PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: TW/JR
DRAWING SCALE: 1/8"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: A2

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"

THIS ELEVATION SHEET SHOWS OPTIONAL BRICK, UP TO 48" ABOVE GRADE

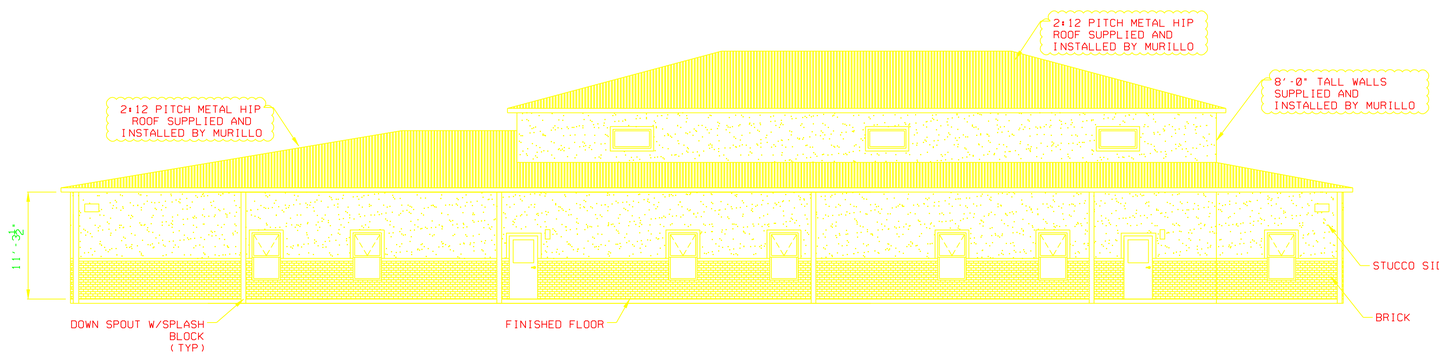


CURBSIDE ELEVATION UNIT "S"
SCALE: 1/8"=1'-0"

HITCHEND ELEVATION UNITS "A-K"
SCALE: 1/8"=1'-0"

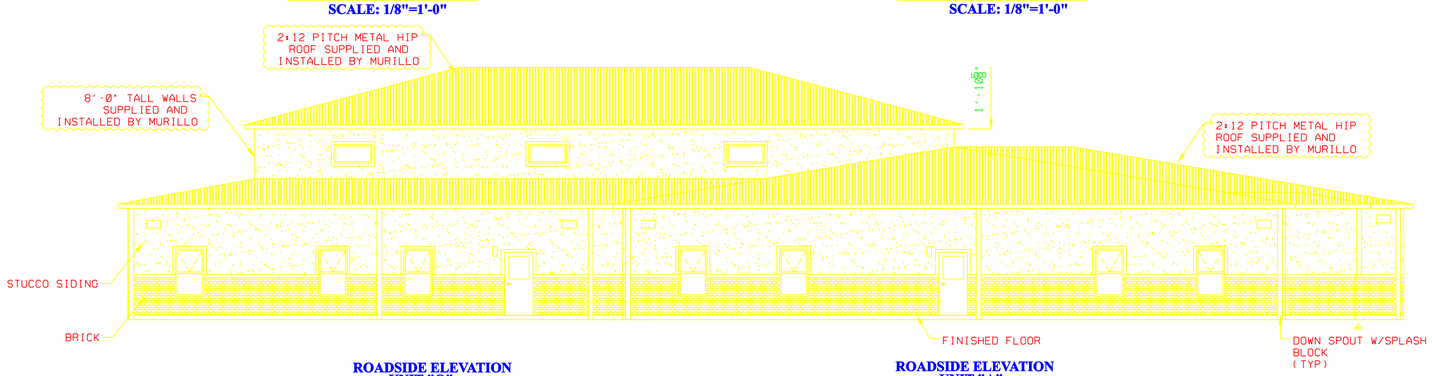
REAREND ELEVATION UNITS "A-K"
SCALE: 1/8"=1'-0"

ROADSIDE ELEVATION UNIT "L"
SCALE: 1/8"=1'-0"



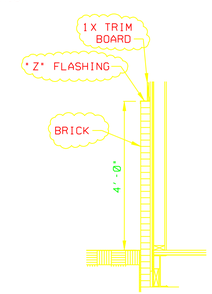
REARHEND ELEVATION UNITS "L-P"
SCALE: 1/8"=1'-0"

CURBSIDE ELEVATION UNIT "R"
SCALE: 1/8"=1'-0"



ROADSIDE ELEVATION UNIT "Q"
SCALE: 1/8"=1'-0"

ROADSIDE ELEVATION UNIT "A"
SCALE: 1/8"=1'-0"



(A) BRICK DETAIL
SCALE: N.T.S.

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REV	DESCRIPTION	DATE	BY
0	CUSTOMER	11/30/06	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: TW/JR
DRAWING SCALE: 1/8"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: A2A

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

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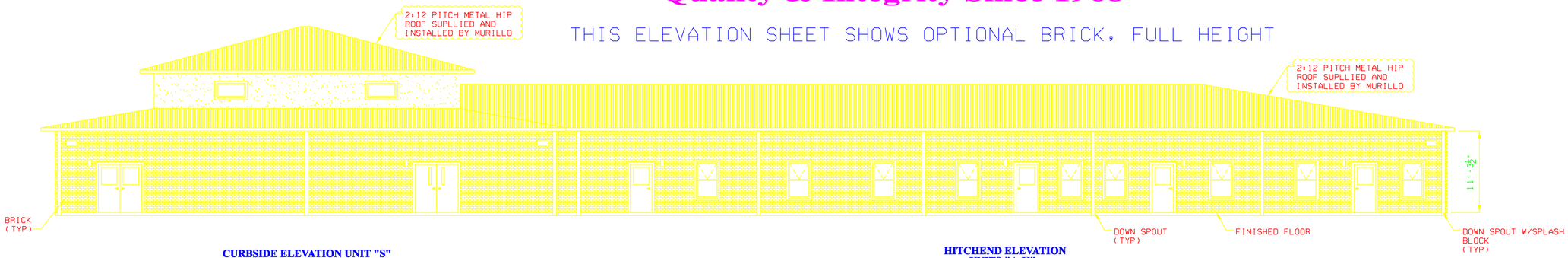
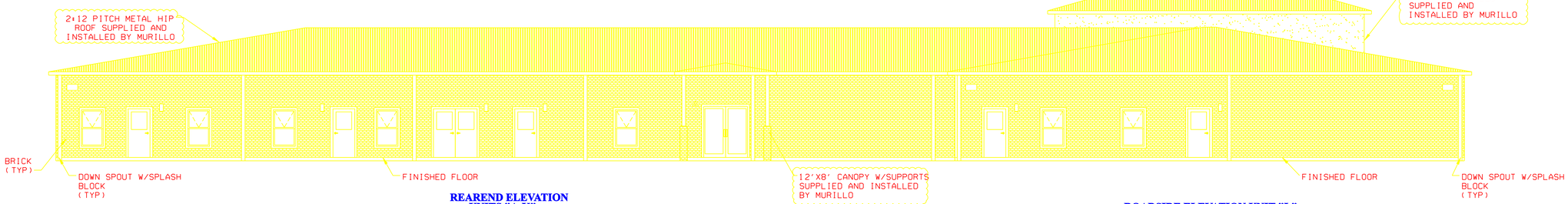
THIS ELEVATION SHEET SHOWS OPTIONAL BRICK, FULL HEIGHT

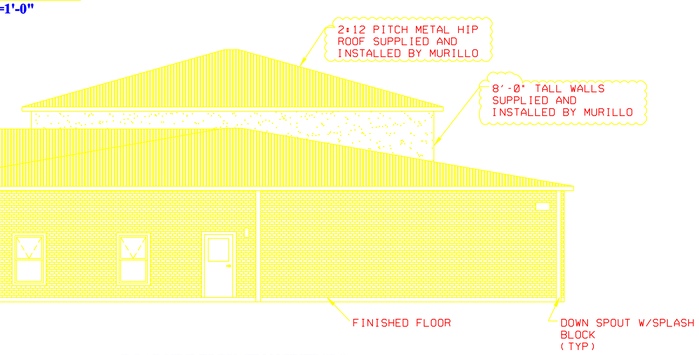


CURBSIDE ELEVATION UNIT "S"
SCALE: 1/8"=1'-0"

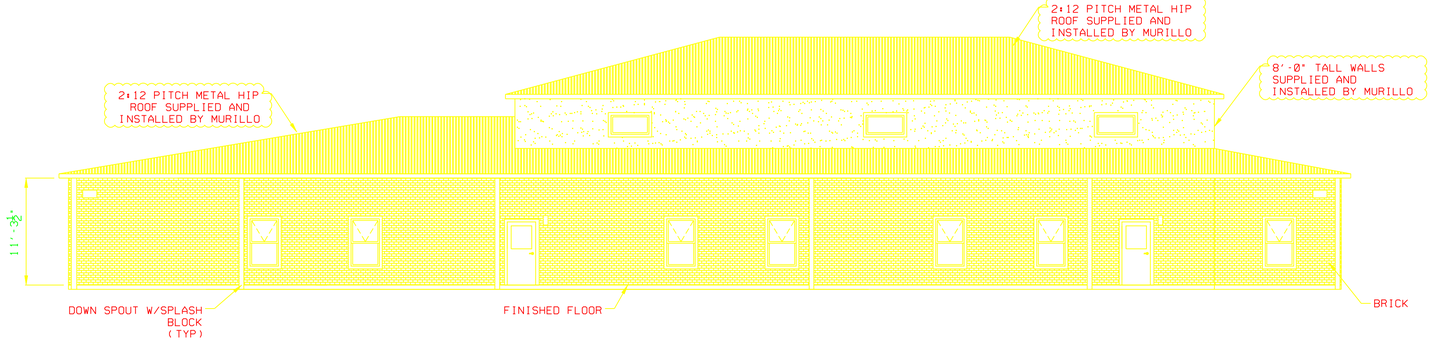
HITCHEND ELEVATION UNITS "A-K"
SCALE: 1/8"=1'-0"



REAREND ELEVATION UNITS "A-K"
SCALE: 1/8"=1'-0"

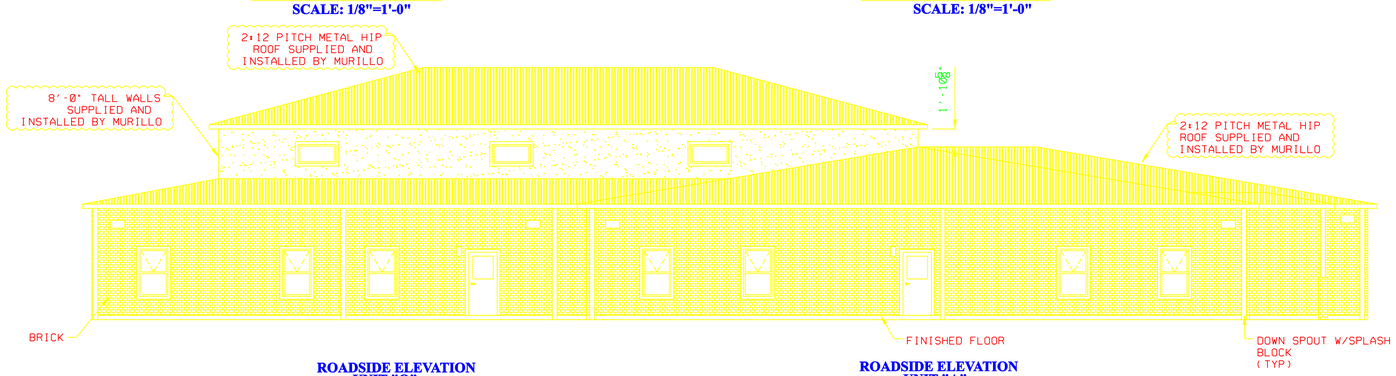


ROADSIDE ELEVATION UNIT "L"
SCALE: 1/8"=1'-0"



REARHEND ELEVATION UNITS "L-P"
SCALE: 1/8"=1'-0"

CURBSIDE ELEVATION UNIT "R"
SCALE: 1/8"=1'-0"



ROADSIDE ELEVATION UNIT "Q"
SCALE: 1/8"=1'-0"

ROADSIDE ELEVATION UNIT "A"
SCALE: 1/8"=1'-0"

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/8"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A2B

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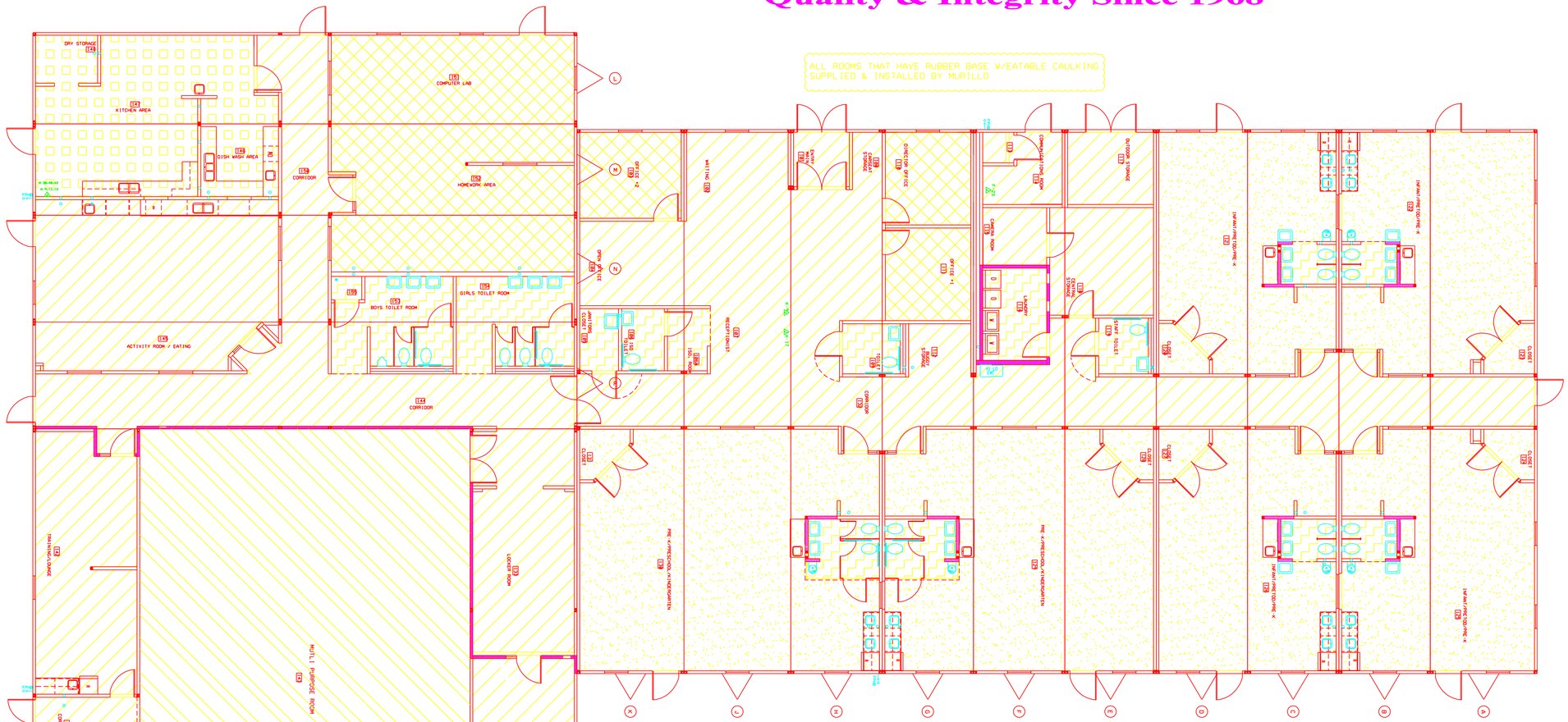

FLOOR COVERING PLAN

WILSON ART FLOORING
SUPPLIED & INSTALLED BY MURILLO

STATIC PROOF CARPET
SUPPLIED & INSTALLED BY MURILLO

QUARRY TILE
SUPPLIED & INSTALLED BY MURILLO

CERAMIC TILE
SUPPLIED & INSTALLED BY MURILLO

VINYL COMPOSITION TILE
SUPPLIED & INSTALLED BY MURILLO

SEAMLESS VINYL FLOORING
SUPPLIED & INSTALLED BY MURILLO

PRIMARY COLOR SCHEME

VINYL COMPOSITION TILE:		COVE BASE:	
MAIN CORRIDOR:	STEEL WHITE *161 (BASE)	ALL ROOMS W/TILE & CARPET:	PALE GRAY *68
ARTS & SCIENCE:	ATLANTIS *290 (ACCENT)	CARPET:	
ACTIVITY/EATING ROOM:	TERANIUM *208 (ACCENT)	COMPUTER LAB:	BLUE BONNET *08108
LOOKER ROOM:	MARIGOLD *253 (ACCENT)	HOMEWORK AREA:	BLUE BONNET *08108
MECHANICAL/ELECTRICAL:		OFFICES:	BLUE BONNET *08108
STORAGE ROOM:		CERAMIC TILE:	
MULTI PURPOSE CORRIDORS:		KITCHEN AREA:	SHADOW GRAY N46 (ABRASIVE GRAIN)
CAMERA, COMMUNICATION:		GROUT FOR QUARRY TILE:	
OUTDOOR STORAGE:		KITCHEN AREA:	PEWTER *19
CENTRAL STORAGE:			
SEAMLESS VINYL:			
ROOM *121 & 122:	DAHLIA SKY *86488		
ROOM *125 & 126:	DAHLIA SKY *86488		
ROOM *130 & 129:	DAHLIA SKY *86488		
CERAMIC TILE:			
TOILET ROOMS:	PEWTER *8613		
JANITORS CLOSET:	PEWTER *8613		
LAUNDRY ROOM:	PEWTER *8613		

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY
1	CUSTOMER	11/30/06	JR

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CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

MURILLO MODULAR

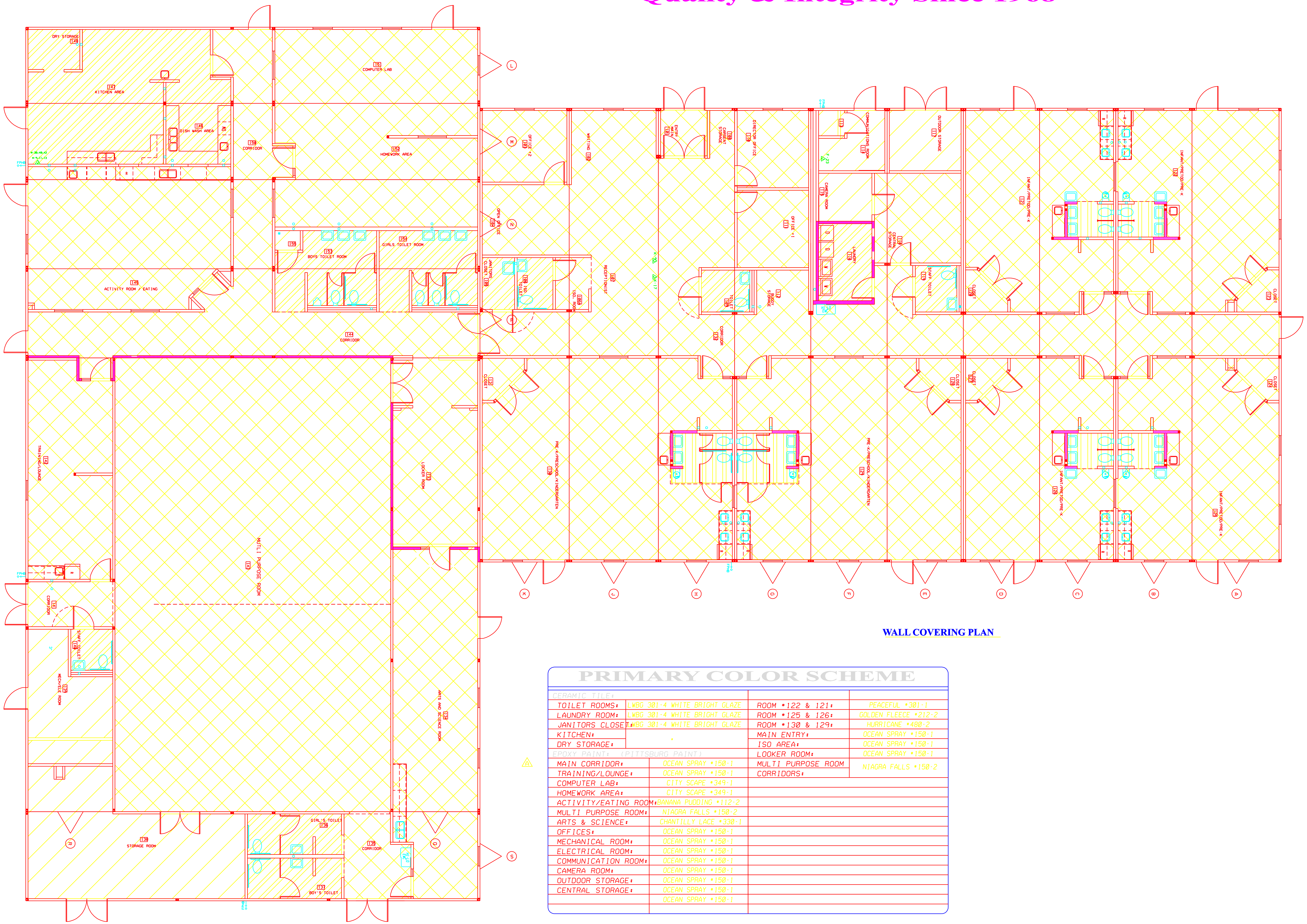
PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL:	(9)1274, (8)1474
DATE:	8/21/06
DRAWN BY:	TW/JR
DRAWING SCALE:	1/8"=1'-0"
QUOTE NO.:	
SERIAL NO.:	36133-49
DRAWING NUMBER:	A3

"Quality & Integrity Since 1968"



- EPOXY PAINTED GYPSUM
  TAPE, MUD & PAINT, SUPPLIED & INSTALLED BY MURILLO
- CERAMIC TILE
  SUPPLIED & INSTALLED BY MURILLO
- PAINTED GYPSUM
  SUPPLIED & INSTALLED BY MURILLO
- CERAMIC TILE UP TO 48" AFF W/ EPOXY PAINTED GYPSUM ABOVE TILE
  CERAMIC TILE SUPPLIED & INSTALLED BY MURILLO

WALL COVERING PLAN

PRIMARY COLOR SCHEME

CERAMIC TILE:			
TOILET ROOMS:	LWBG 301-4 WHITE BRIGHT GLAZE	ROOM #122 & 121:	PEACEFUL #301-1
LAUNDRY ROOM:	LWBG 301-4 WHITE BRIGHT GLAZE	ROOM #125 & 126:	GOLDEN FLEECE #212-2
JANITORS CLOSET:	LWBG 301-4 WHITE BRIGHT GLAZE	ROOM #130 & 129:	HURRICANE #480-2
KITCHEN:		MAIN ENTRY:	OCEAN SPRAY #150-1
DRY STORAGE:		ISO AREA:	OCEAN SPRAY #150-1
EPOXY PAINT: (PITTSBURG PAINT)		LOOKER ROOM:	OCEAN SPRAY #150-1
MAIN CORRIDOR:	OCEAN SPRAY #150-1	MULTI PURPOSE ROOM	NIAGRA FALLS #150-2
TRAINING/LOUNGE:	OCEAN SPRAY #150-1	CORRIDORS:	
COMPUTER LAB:	CITY SCAPE #349-1		
HOMEWORK AREA:	CITY SCAPE #349-1		
ACTIVITY/EATING ROOM:	BANANA PUDDING #112-2		
MULTI PURPOSE ROOM:	NIAGRA FALLS #150-2		
ARTS & SCIENCE:	CHANTILLY LACE #330-1		
OFFICES:	OCEAN SPRAY #150-1		
MECHANICAL ROOM:	OCEAN SPRAY #150-1		
ELECTRICAL ROOM:	OCEAN SPRAY #150-1		
COMMUNICATION ROOM:	OCEAN SPRAY #150-1		
CAMERA ROOM:	OCEAN SPRAY #150-1		
OUTDOOR STORAGE:	OCEAN SPRAY #150-1		
CENTRAL STORAGE:	OCEAN SPRAY #150-1		
	OCEAN SPRAY #150-1		

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
A	CUSTOMER	11/30/06	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/8"=1'-0"

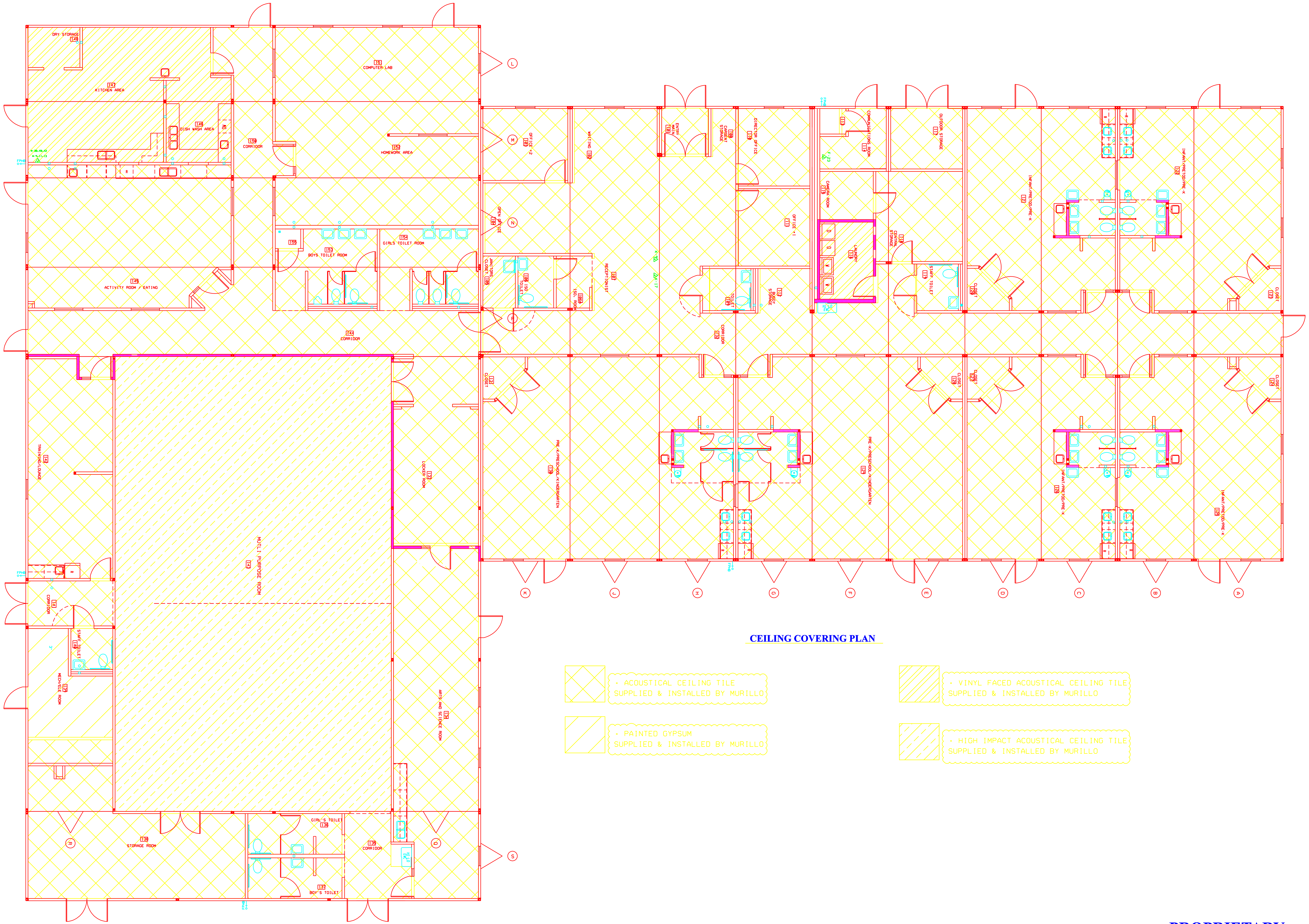
QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A4

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



CEILING COVERING PLAN

- ACOUSTICAL CEILING TILE SUPPLIED & INSTALLED BY MURILLO
- PAINTED GYPSUM SUPPLIED & INSTALLED BY MURILLO
- VINYL FACED ACOUSTICAL CEILING TILE SUPPLIED & INSTALLED BY MURILLO
- HIGH IMPACT ACOUSTICAL CEILING TILE SUPPLIED & INSTALLED BY MURILLO

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/8"=1'-0"

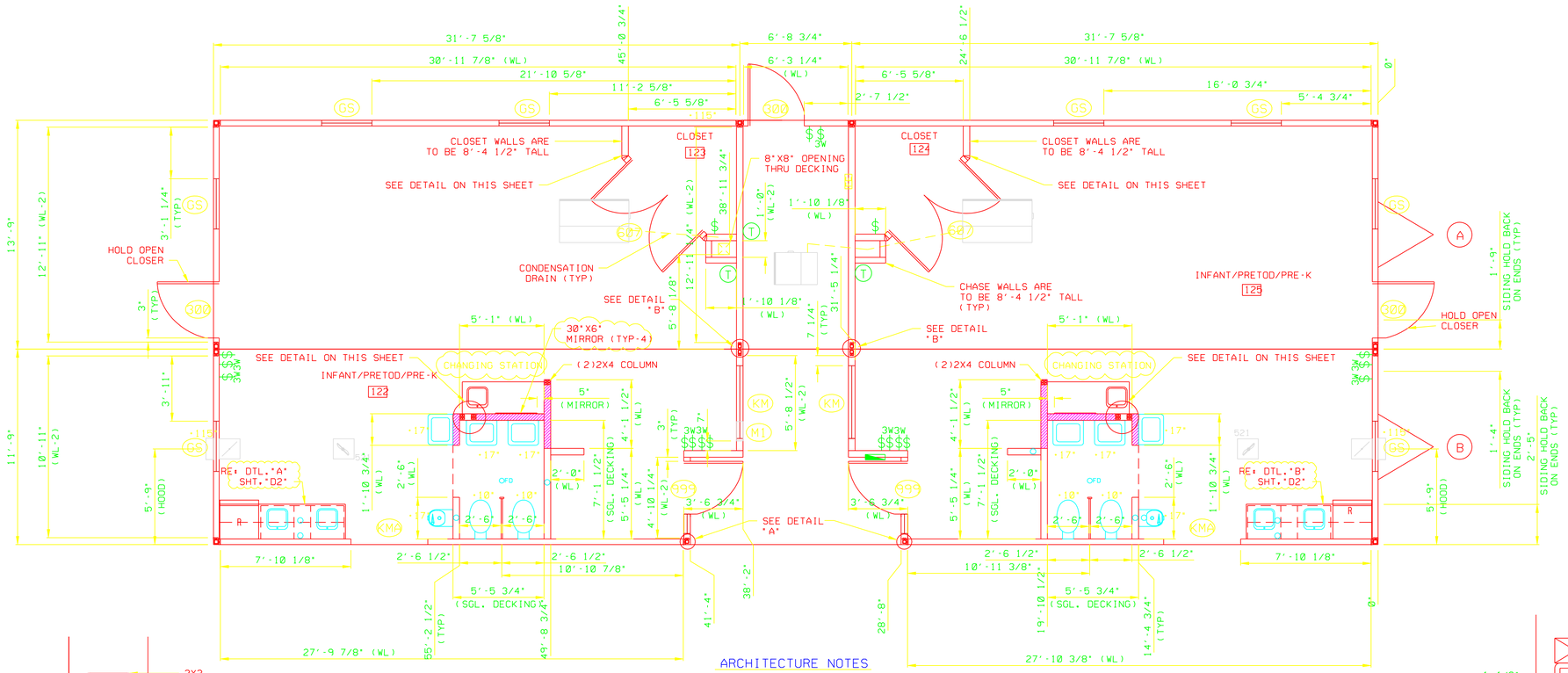
QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A5

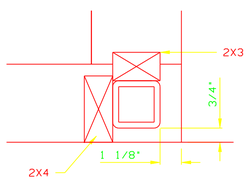
CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



SYMBOL	DESCRIPTION
	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING
	FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT
	STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL
	STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE
	IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE
	IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN
	CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL
	ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER
	(BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED
	CEILING. FIRE ALARM PULL &
	AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED
	CEILING. FIRE ALARM SIGNAL 82" AFF
MD	J-BOX IN CEILING
	HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING
	SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU
	SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR
	CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH
	3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH
	48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT
	WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT
	STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT
	48" AFF (UNLESS NOTED)
GFI HAT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW
	FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED.
	CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT
	STANDARD HEIGHT (UNLESS NOTED)
VP WP	VANDAL RESISTANT EXT. INCANDESCENT
	LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED
	EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT
	W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL
	WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN
	TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND



A COLUMN DETAIL
SCALE: 1/4"=1'-0"

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED
	FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF
	STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER
	115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC.
	W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT
	STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
SD	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW &
	BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT
	80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED
	CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM
	SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF
	W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN
	CEILING
	EXTERIOR CCTV CAMERA
	SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA
	SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4". 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2". 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37". 33 1/4" AFF
888	7280 INT STEEL DOOR. (20 MIN). W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7280 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7280 INT STEEL DOOR. (45 MIN). W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB W/SIDE LITE R.O. 52" X 81"
FO	FINISHED OPENING R.O. 37 1/4" X 80 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 18 1/2" X 25" 36" AFF
CS	3660 VERTICAL SLIDE WINDOW. ALUM. FRAME R.O. 36" X 60". VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46"X85"
601	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

OPENING SCHEDULE

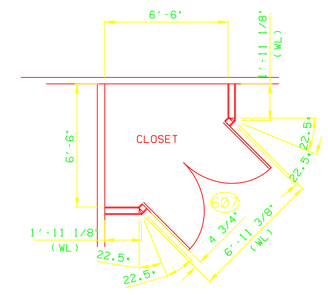
MARK	DESCRIPTION
MI	FRAMED OPENING R.O. 12" X 12" 1 1/2" DOWN
KNA	MATE LINE OPENING R.O. 43 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW. STEEL JAMB R.O. 40 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

OPENING SCHEDULE

ARCHITECTURE NOTES

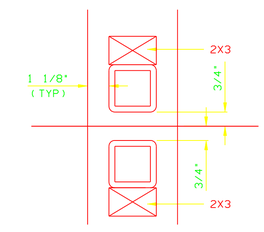
NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS, BUBBLERS, DRINKING FOUNTAIN, GRAB BARS, & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED. RE: DTL."" SHT.""
7) CORRIDOR WALLS ARE LOAD BEARING. COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE -2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE -2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM

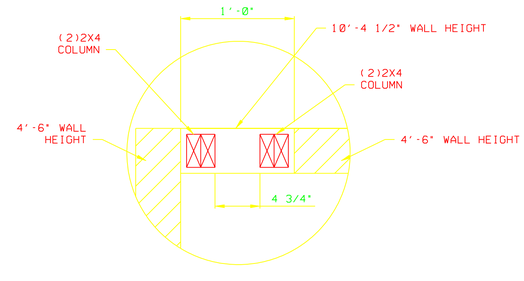


WALL LENGTH DIMENSIONS ARE TO THE LONGEST PART OF THE TOP & BOTTOM PLATES

CLOSET DETAIL
SCALE: 1/4"=1'-0"



B COLUMN DETAIL
SCALE: 1/4"=1'-0"



FULL HEIGHT COLUMN DETAIL
SCALE: 1 1/2"=1'-0"

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MURILLO MODULAR

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DATE: 8/21/06

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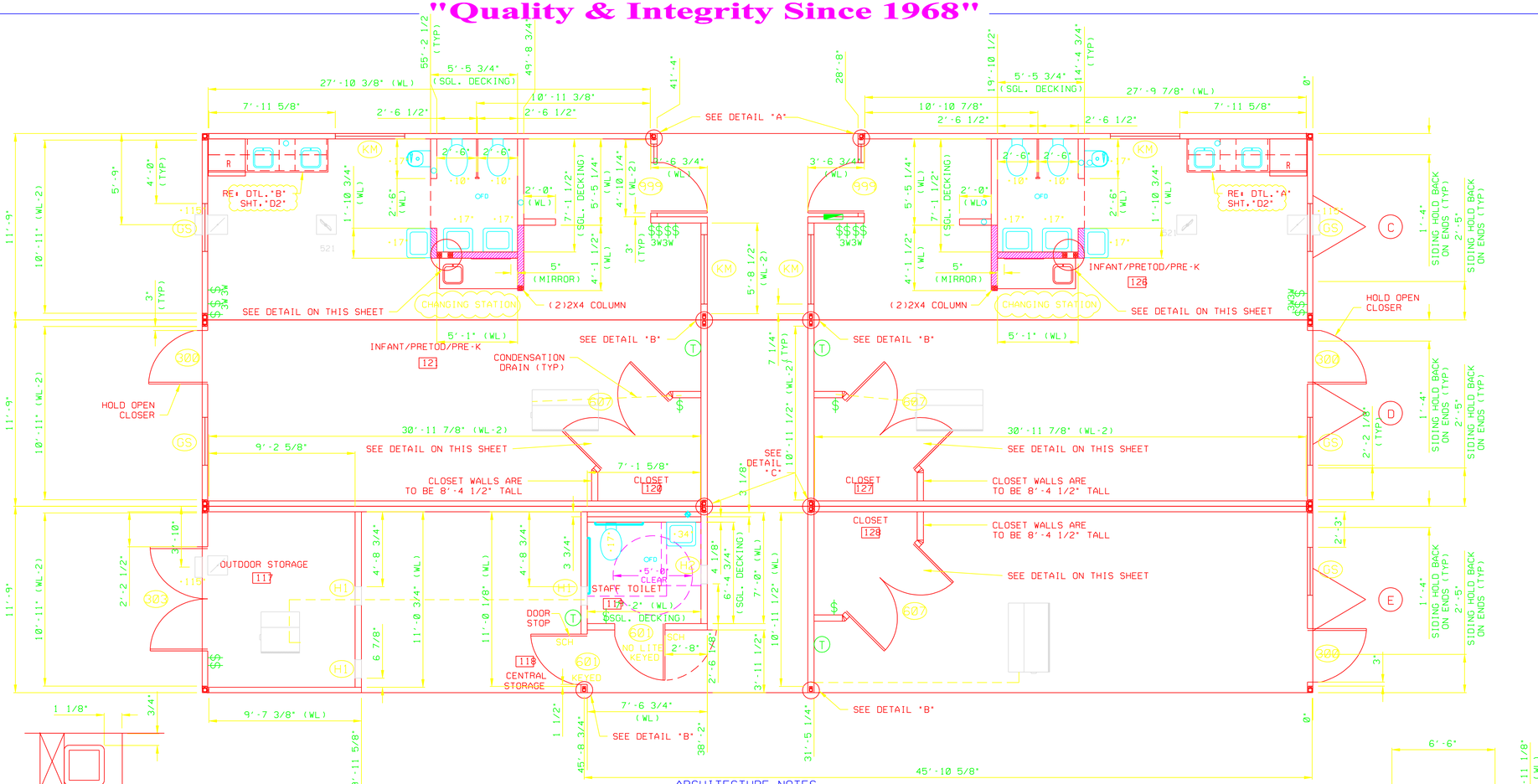
DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A6

"Quality & Integrity Since 1968"



ARCHITECTURE NOTES

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS, BUBBLERS, DRINKING FOUNTAIN, GRAB BARS, & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED, RE: DTL."" SHT."
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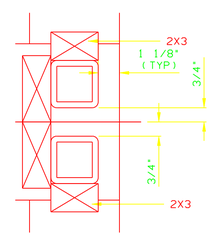
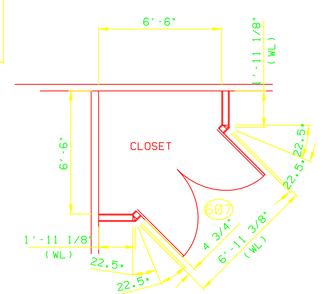
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE *2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM

COLUMN DETAIL
SCALE: 1/4"=1'-0"

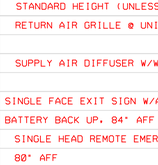


COLUMN DETAIL
SCALE: 1/4"=1'-0"

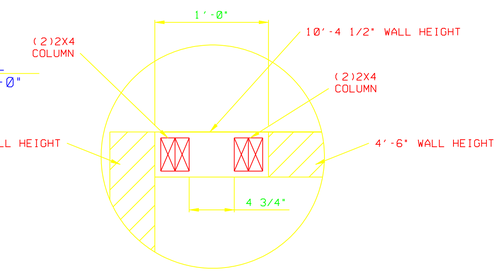


WALL LENGTH DIMENSIONS ARE TO THE LONGEST PART OF THE TOP & BOTTOM PLATES

CLOSET DETAIL
SCALE: 1/4"=1'-0"



COLUMN DETAIL
SCALE: 1/4"=1'-0"



FULL HEIGHT COLUMN DETAIL
SCALE: 1 1/2"=1'-0"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W $	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY, 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
A	4" DOUBLE TUBE SURFACE MOUNTED COLUMN DETAIL SCALE: 1/4"=1'-0"
	CLADE LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP, 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4", 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2", 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 32" X 27", 39 1/4" AFF
888	7200 INT STEEL DOOR, (20 MIN), W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7200 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7200 INT STEEL DOOR, (45 MIN), W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR, (45 MIN), STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR, (45 MIN), STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR, (20 MIN), STEEL JAMB W/SIDE LITE R.O. 52" X 81"
FO	FINISHED OPENING R.O. 37 1/4" X 88 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 18 1/2" X 25", 36" AFF
GS	3660 VERTICAL SLIDE WINDOW, ALUM. FRAME R.O. 36" X 60", VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW, STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46"X85"
601	3680 INT L.O. S.C. DOOR, (20 MIN), STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

OPENING SCHEDULE

MARK	DESCRIPTION
M1	FRAMED OPENING R.O. 12" X 12" 1 1/2" DOWN
KMA	MATE LINE OPENING R.O. 49 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW, STEEL JAMB R.O. 40 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

OPENING SCHEDULE

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ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/4"=1'-0"

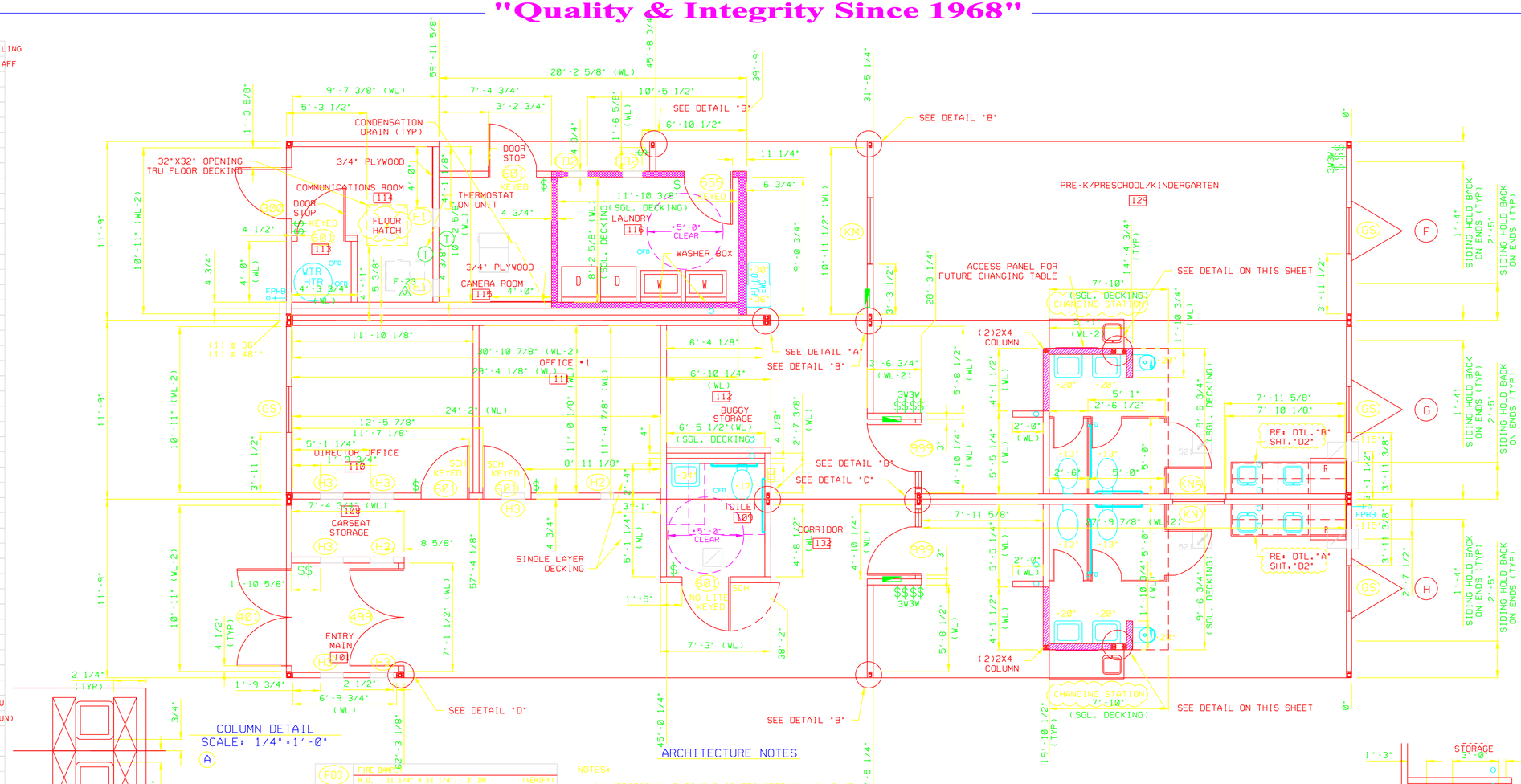
QUOTE NO.:

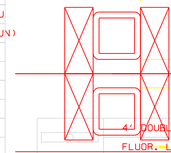
SERIAL NO.: 36133-49

DRAWING NUMBER: A7

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"



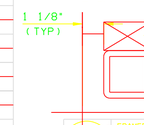


COLUMN DETAIL
SCALE: 1/4"=1'-0"
A

ARCHITECTURE NOTES

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS, BUBBLERS, DRINKING FOUNTAIN, GRAB BARS, & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED. RE: DTL."" SHT.""
7) CORRIDOR WALLS ARE LOAD BEARING. COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE •2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE •2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM



COLUMN DETAIL
SCALE: 1/4"=1'-0"
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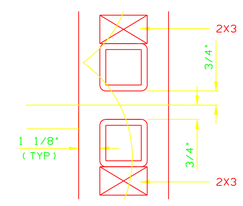
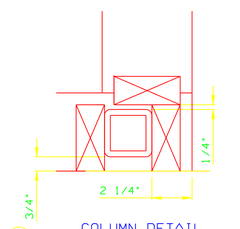
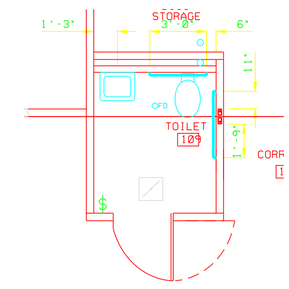


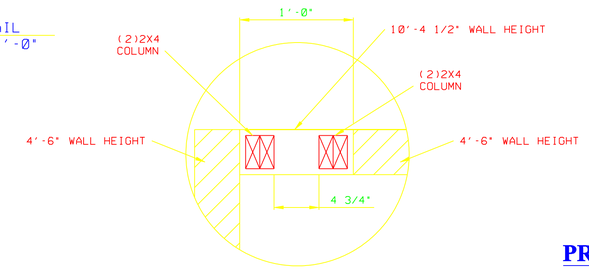
COLUMN DETAIL
SCALE: 1/4"=1'-0"
B



COLUMN DETAIL
SCALE: 1/4"=1'-0"
D



TOILET ROOM BACKER DETAIL
SCALE: 1/4"=1'-0"



FULL HEIGHT COLUMN DETAIL
SCALE: 1 1/2"=1'-0"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HAT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4" DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
MP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R/G	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4". 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2". 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37". 33 1/4" AFF
888	7280 INT STEEL DOOR. (20 MIN). W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7280 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7280 INT STEEL DOOR. (45 MIN). W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB W/SIDE LIGHT R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB W/SIDE LIGHT R.O. 52" X 81"
FO	FINISHED OPENING R.O. 37 1/4" X 88 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 18 1/2" X 25" 36" AFF
CS	3660 VERTICAL SLIDE WINDOW. ALUM. FRAME R.O. 36" X 60". VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46"X85"
601	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

OPENING SCHEDULE

MARK	DESCRIPTION
M1	FRAME OPENING R.O. 12" X 12" 1 1/2" DOWN
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KN	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

OPENING SCHEDULE

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 1160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: A8

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CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
	J-BOX IN CEILING
HD	HEAT DETECTOR (CEILING MOUNTED)
	J-BOX IN CEILING
SD	SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RA	RETURN AIR GRILLE @ UNIT
SA	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

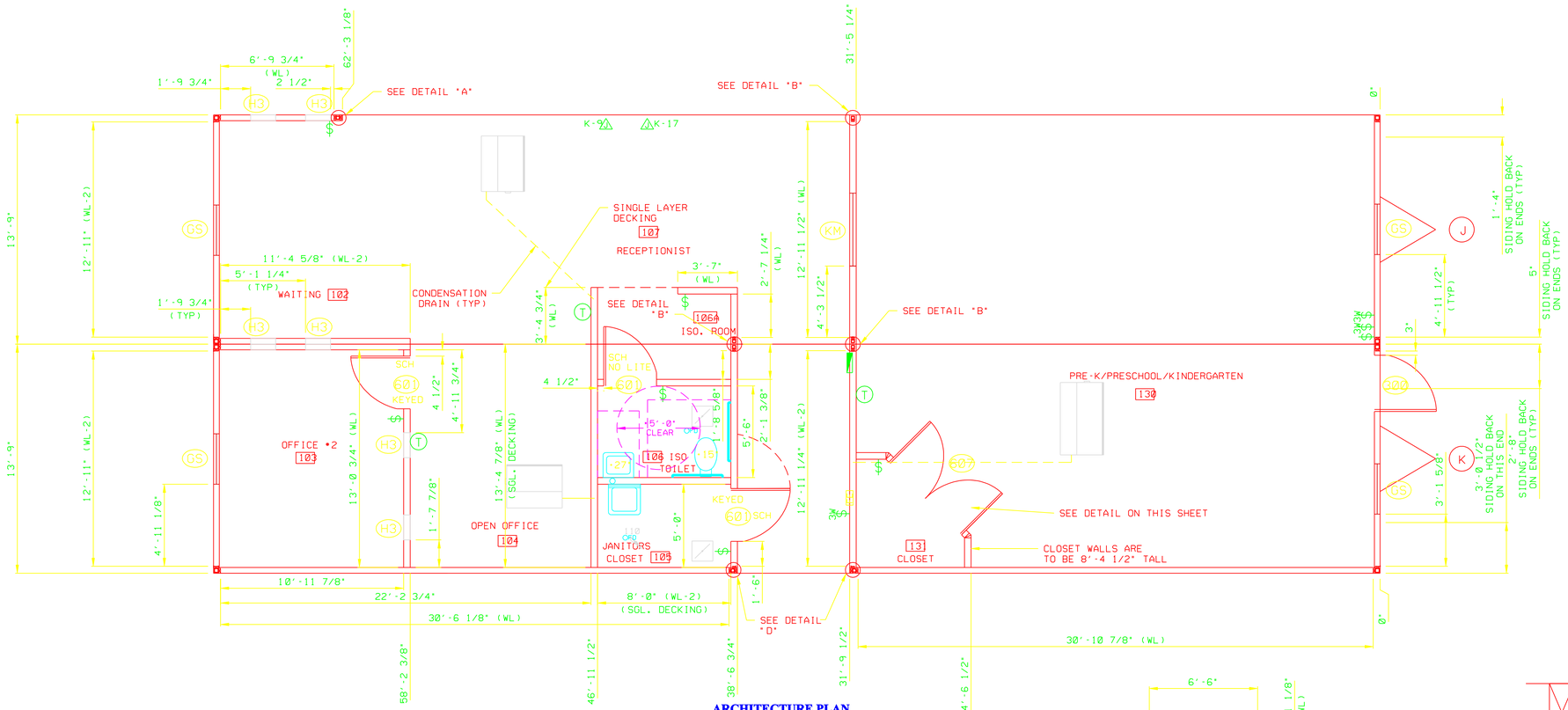
DRAWING LEGEND

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4". 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2". 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37". 33 1/4" AFF
888	7200 INT STEEL DOOR. (20 MIN). W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7200 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7200 INT STEEL DOOR. (45 MIN). W/STEEL JAMB R.O. 74" X 81"
555	3600 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB R.O. 38" X 81"
777	3600 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3600 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB W/SIDE LITE R.O. 62" X 81"
FO	FINISHED OPENING R.O. 37 1/4" X 80 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 18 1/2" X 26" 36" AFF
GS	3600 VERTICAL SLIDE WINDOW. ALUM. FRAME R.O. 36" X 68". VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 58" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7200 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46"X85"
601	3600 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7200 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3600 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

OPENING SCHEDULE

MARK	DESCRIPTION
M1	FRAMED OPENING R.O. 12' X 12' 1 1/2" DOWN
KNA	MATE LINE OPENING R.O. 43 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW. STEEL JAMB R.O. 40 1/2" X 37 1/2" 48 1/2" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

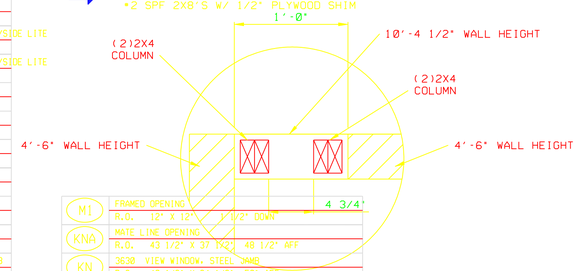
OPENING SCHEDULE



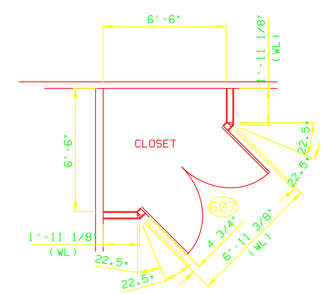
ARCHITECTURE PLAN

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS, BUBBLERS, DRINKING FOUNTAIN, GRAB BARS, & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED. RE: DTL.** SHT.**
7) CORRIDOR WALLS ARE LOAD BEARING. COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE #2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE #2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM

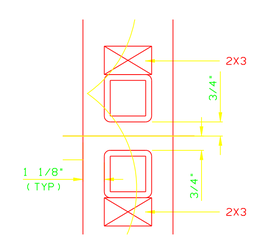


FULL HEIGHT COLUMN DETAIL
SCALE: 1 1/2"=1'-0"

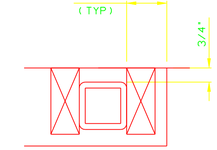


WALL LENGTH DIMENSIONS ARE TO THE LONGEST PART OF THE TOP & BOTTOM PLATES

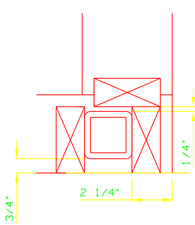
CLOSET DETAIL
SCALE: 1/4"=1'-0"



B COLUMN DETAIL
SCALE: 1/4"=1'-0"



A COLUMN DETAIL
SCALE: 1/4"=1'-0"



D COLUMN DETAIL
SCALE: 1/4"=1'-0"

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: TW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: A9

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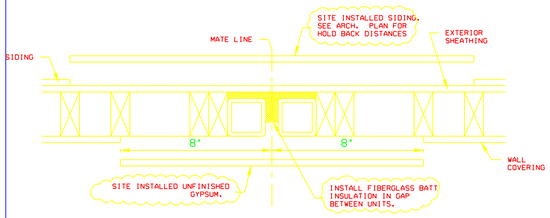
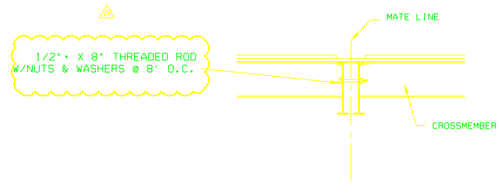
"Quality & Integrity Since 1968"



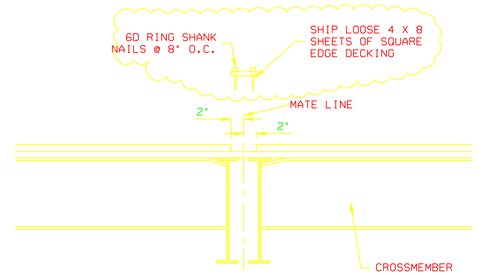
EXTERIOR WALL HOLD BACK DETAIL
SCALE: 3"=1'-0"

A



FRAME MATING DETAIL
SCALE: 1/2"=1'-0"

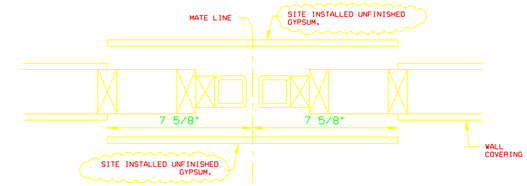
B



FLOOR DECKING HOLD BACK DETAIL
SCALE: 1"=1'-0"

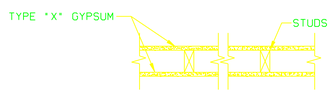
TEMPORARY FLOOR SHEATHING AT MATE LINE HOLD BACK IS TO BE REMOVED AT SITE BY OTHERS

C



CORRIDOR WALL HOLD BACK DETAIL
SCALE: 2"=1'-0"

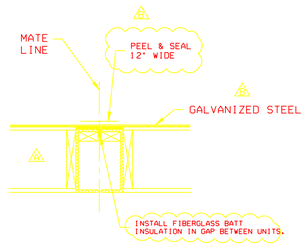
D



ONE LAYER 5/8" TYPE "X" PLAIN OR PREDECORATED GYPSUM WALLBOARD APPLIED PARALLEL TO EACH SIDE OF 2 X 4 WOOD STUDS 16" O.C. WITH 6D COATED NAILS 1 7/8" LONG, 0.0915" SHANK, 1/4" HEADS, 7" O.C. AT JOINTS AND 3/8" BEADS OF ADHESIVE ON INTERMEDIATE STUDS. WALLBOARD NAILED TO TOP AND BOTTOM PLATES AT 7" O.C. STAGGER JOINTS 16" O.C. EACH SIDE. (GA FILE WP 3520)

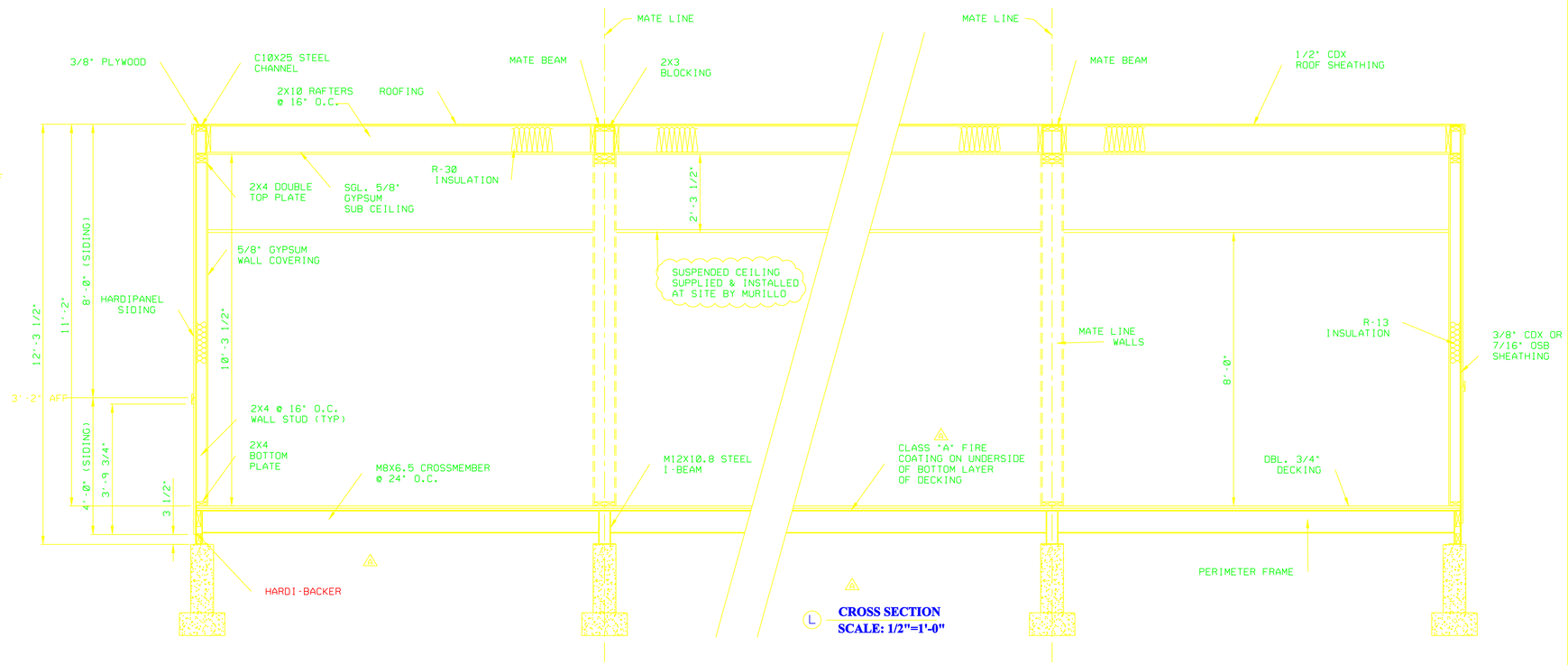
E

1 HOUR FIRE RATED WALL DETAIL
SCALE: 1"=1'-0"



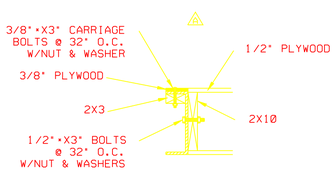
RUBBER ROOF TO ROOF CONNECTION DETAIL
SCALE: 1"=1'-0"

F



CROSS SECTION
SCALE: 1/2"=1'-0"

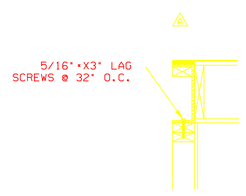
L



(SEE SHT. "D3" FOR LOCATIONS)

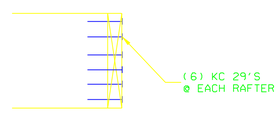
ROOF RAIL TO BEAM CONNECTION DETAIL
SCALE: 1"=1'-0"

G



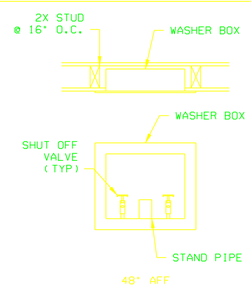
WALLS TO ROOF CONNECTION DETAIL
SCALE: 1"=1'-0"

H



RAFTER TO ROOF RAIL CONNECTION DETAIL
SCALE: 1 1/2"=1'-0"

J



WASHER BOX DETAIL
SCALE: 1"=1'-0"

K

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
	CUSTOMER VALUE ENGINEERING	10/30/07	IW
		9/27/07	IW

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D1

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

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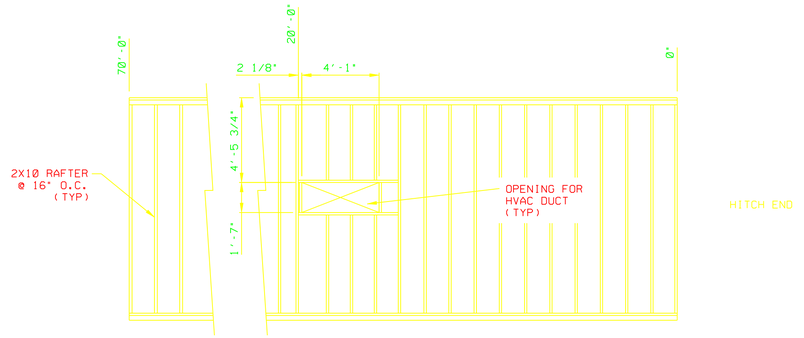
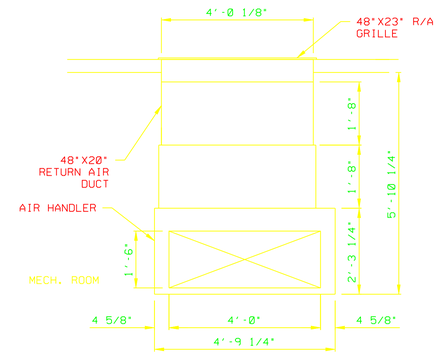


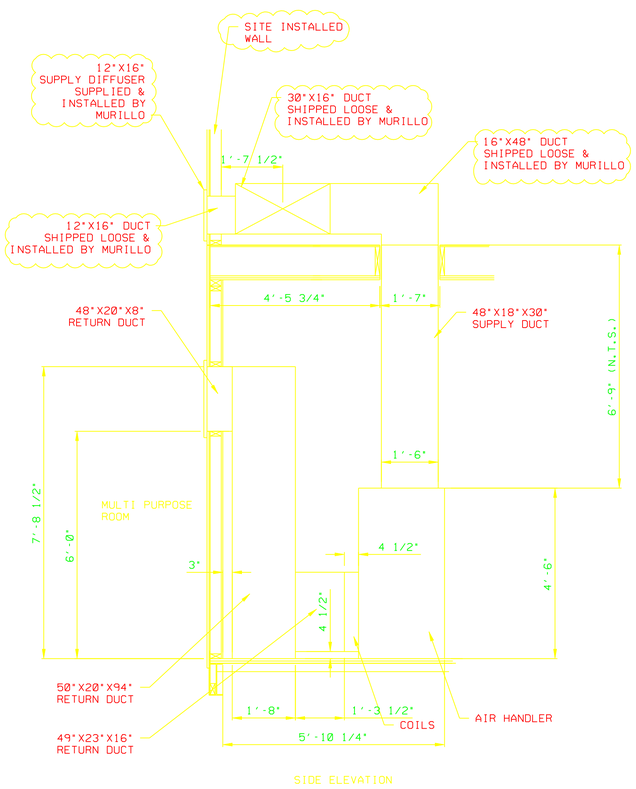
OPENINGS FOR HVAC DUCTS IN ROOF UNIT "R" ONLY
SCALE: 1/4"=1'-0"

A

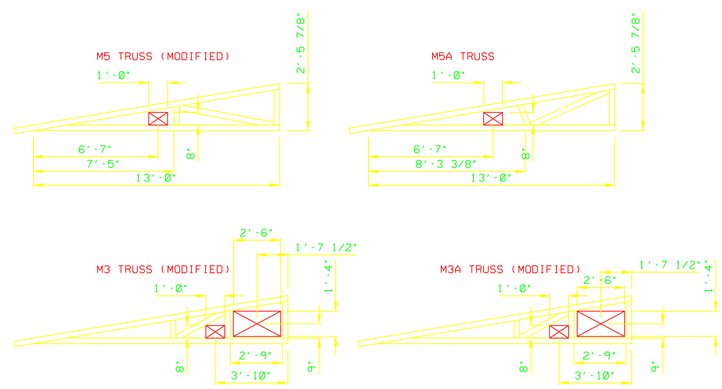
NOTE: ROUT OPENINGS IN CEILING & ROOF SHEATHING ONLY. DO NOT ROUT ROOFING. LABEL & MARK LOCATIONS ON ROOFING ONLY.



B PLAN VIEW AV40
SCALE 1/2"=1'-0"



D AV40 DETAIL
SCALE: 1/2"=1'-0"



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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: LW/JR
DRAWING SCALE: AS NOTED
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: D12

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

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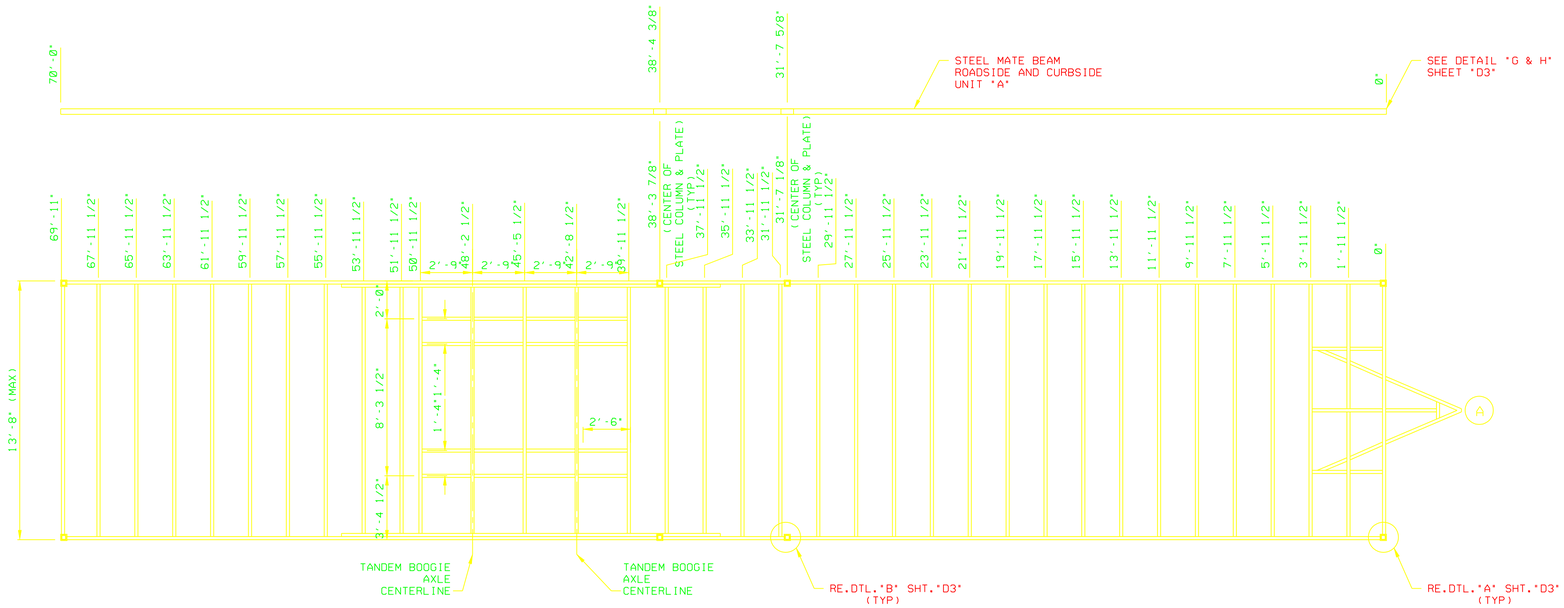
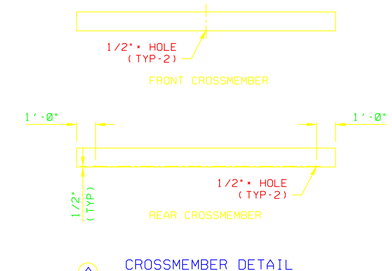
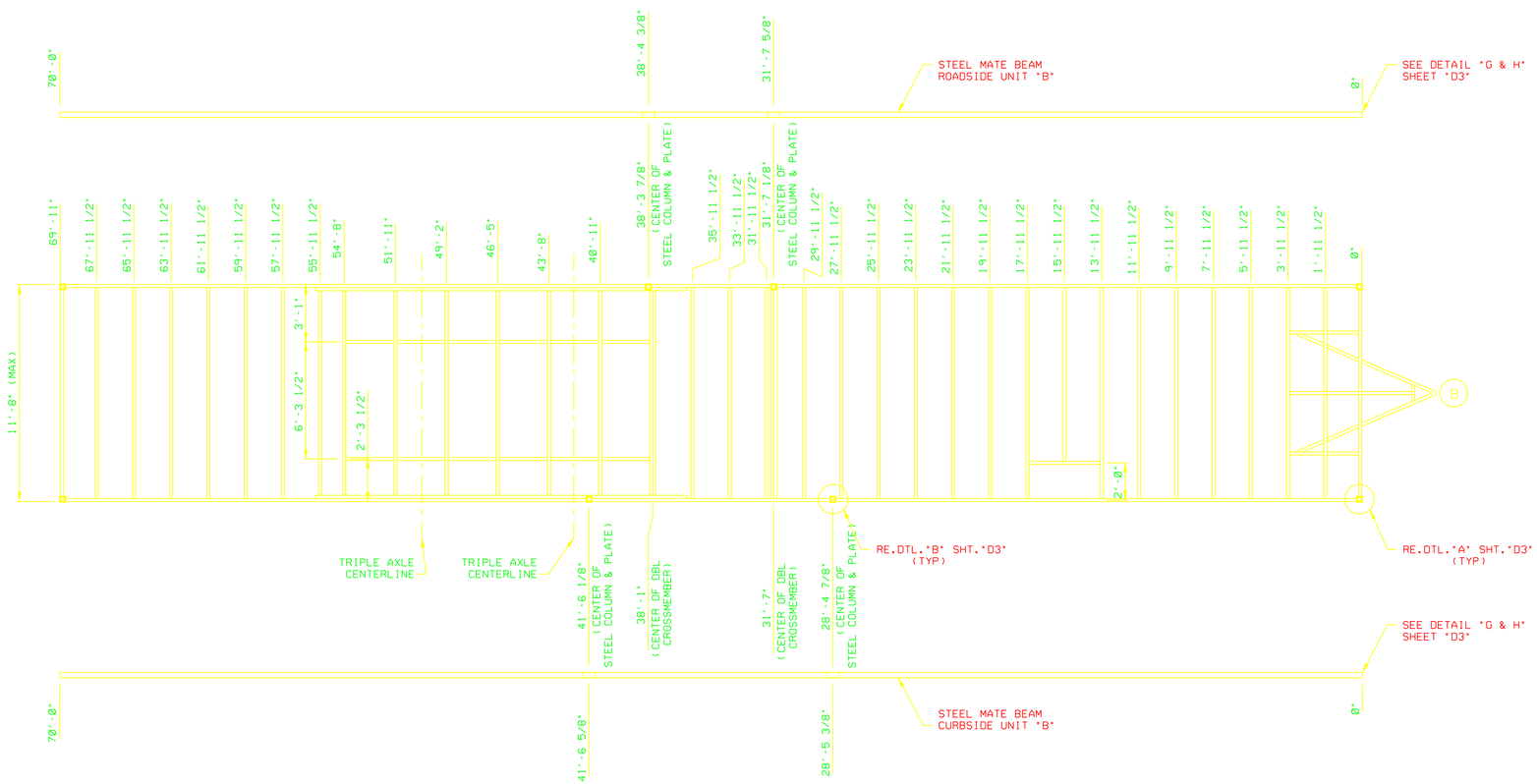




ALL DIMENSIONS ARE TO THE
CENTER OF THE CROSSMEMBER



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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL T160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D13

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

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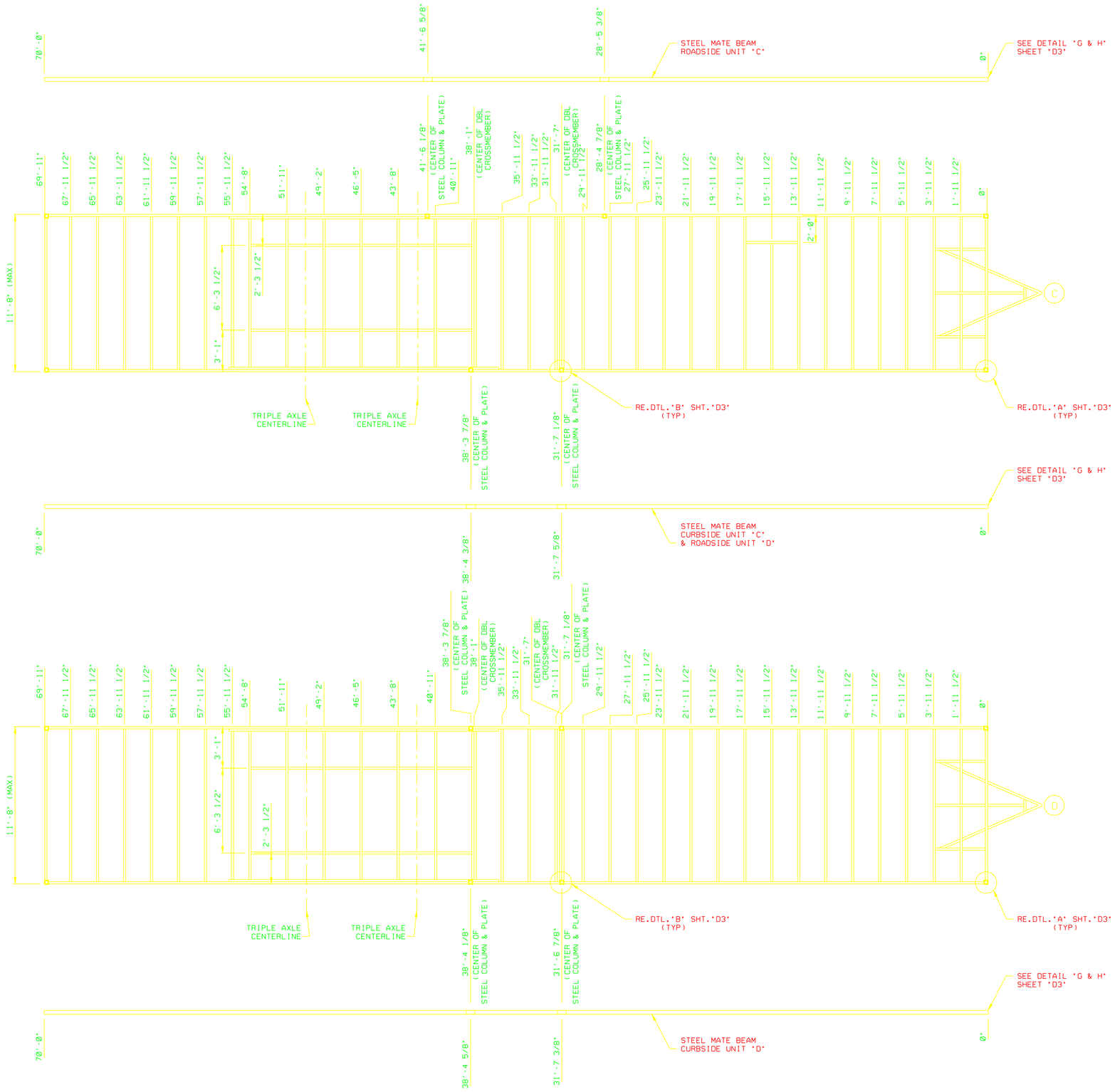

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: JW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D14

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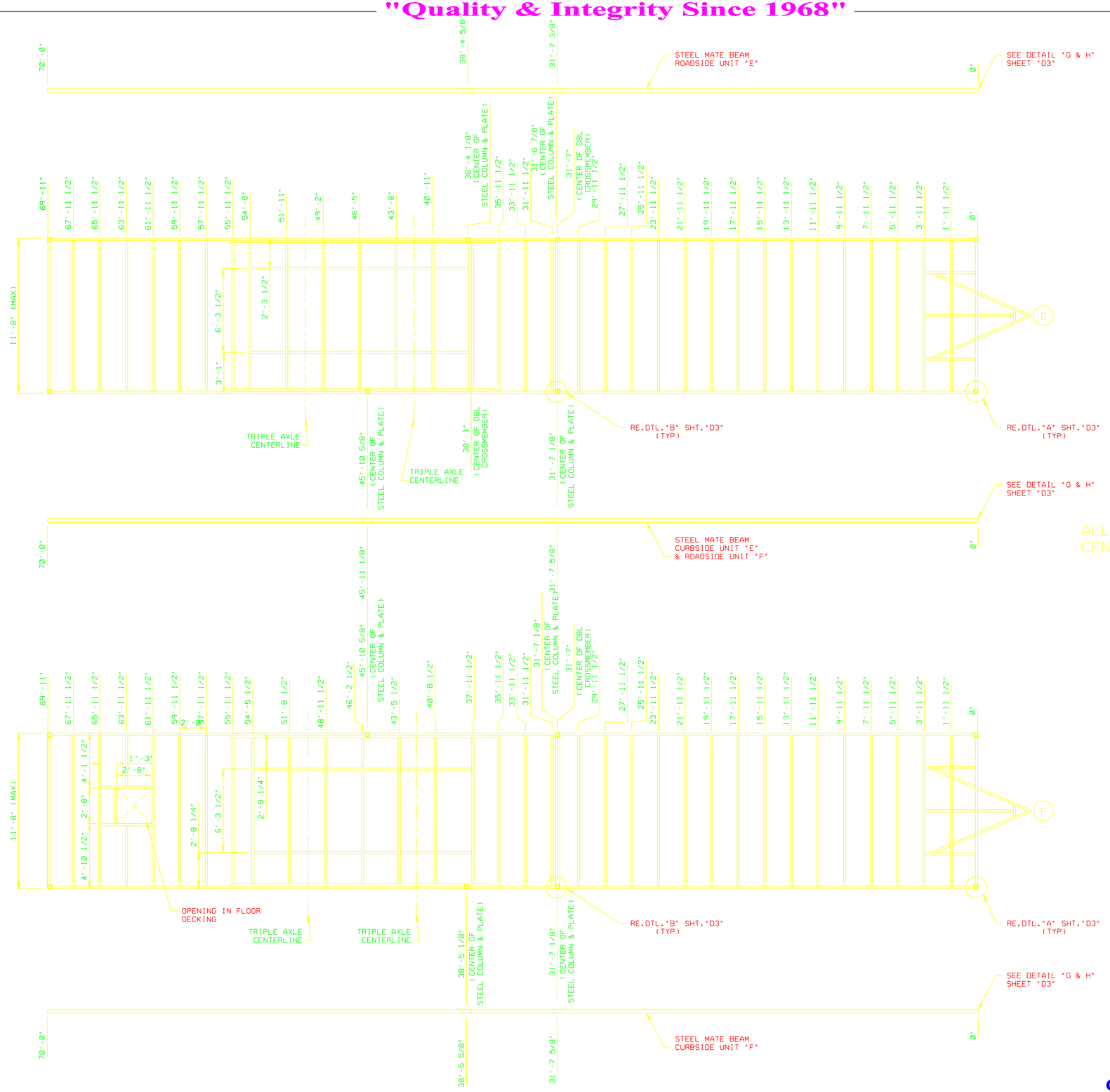

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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL:	(9)1274, (8)1474
DATE:	8/21/06
DRAWN BY:	IW/JR
DRAWING SCALE:	AS NOTED
QUOTE NO.:	
SERIAL NO.:	36133-49
DRAWING NUMBER:	D15

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

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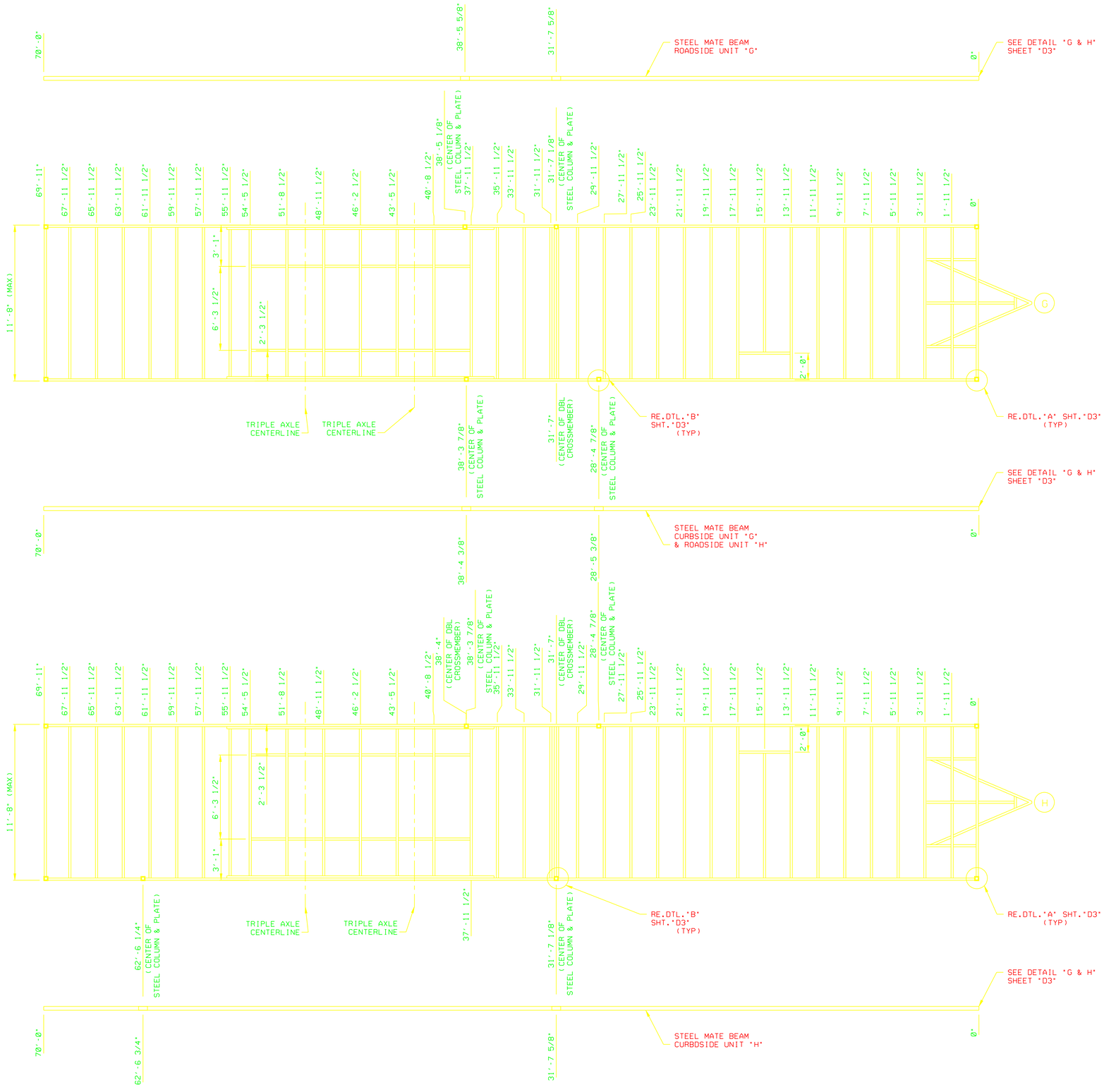

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PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D16

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DISTRICT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D17

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

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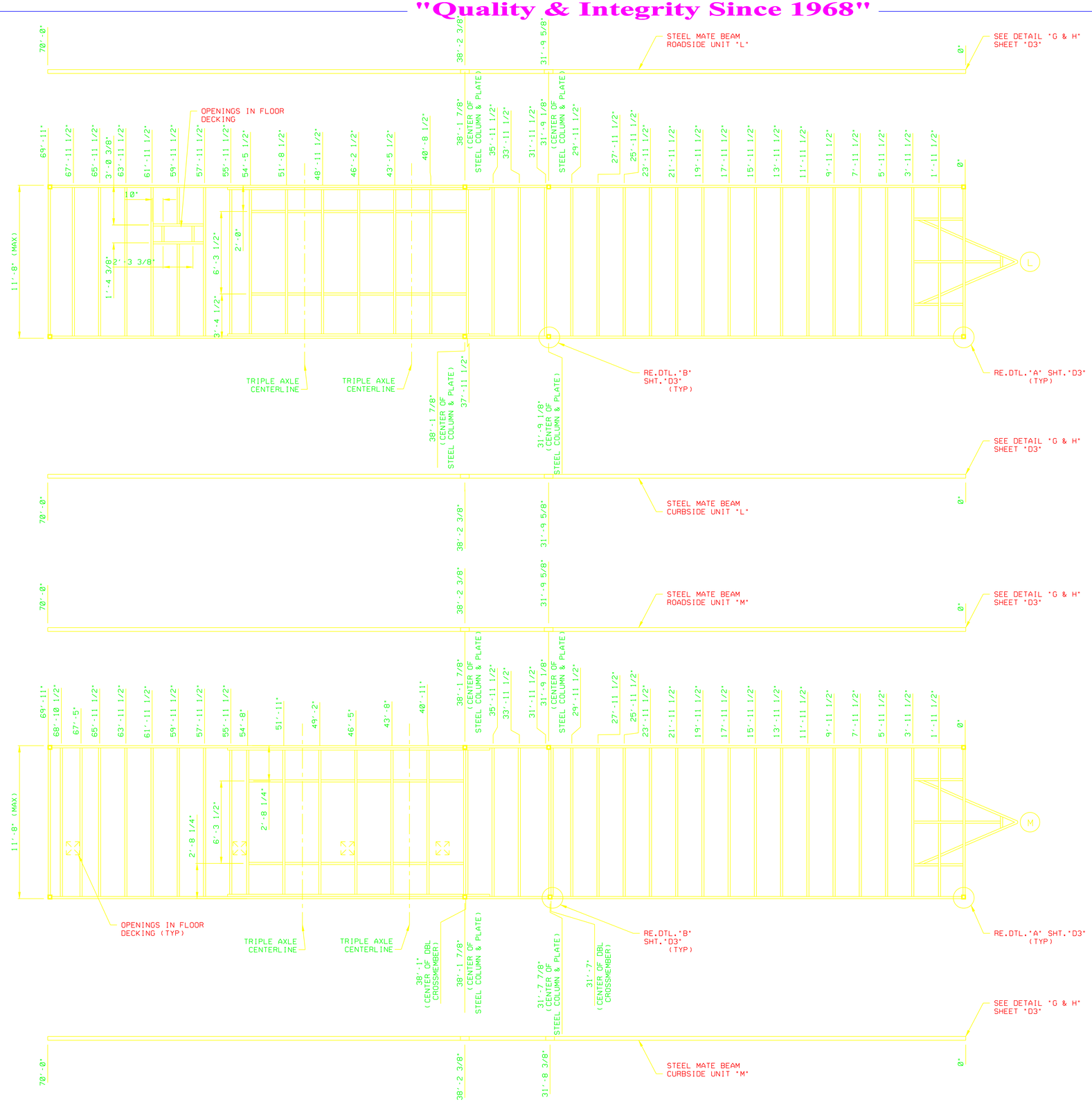

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 146' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D18

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: AS NOTED
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: D19

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

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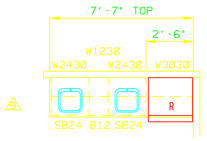
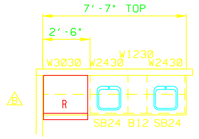


ADULT SINK CABINET LAYOUT
@ ROOM #126, 122 & 130
SCALE: 1/4"=1'-0"

A



ADULT SINK CABINET LAYOUT
@ ROOM #125, 121 & 129
SCALE: 1/4"=1'-0"

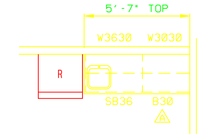
B

LAUNDRY ROOM CABINET LAYOUT
SCALE: 1/4"=1'-0"

C

ARTS & SCIENCE ROOM CABINET LAYOUT
SCALE: 1/4"=1'-0"

D

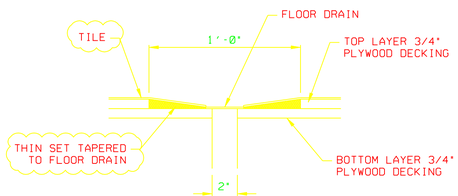


TRAINING/LOUNGE CABINET LAYOUT
SCALE: 1/4"=1'-0"

E

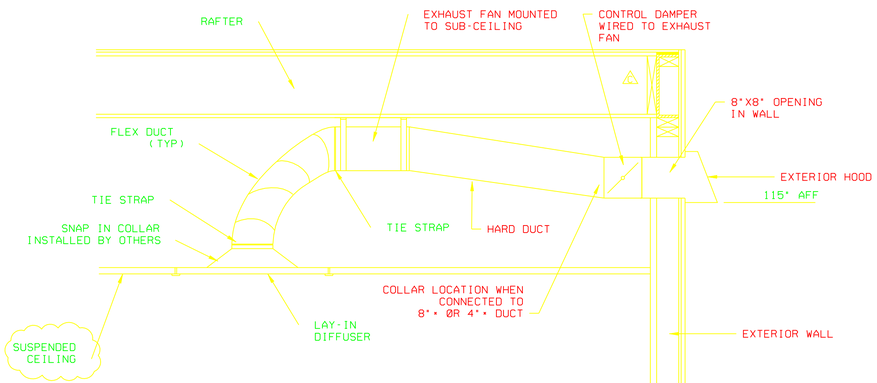
ALL COUNTERTOPS & CABINETS ARE SUPPLIED & INSTALLED ON SITE BY MURILLO

ALL KITCHEN EQUIPMENT SUPPLIED AND INSTALLED ON SITE BY MURILLO



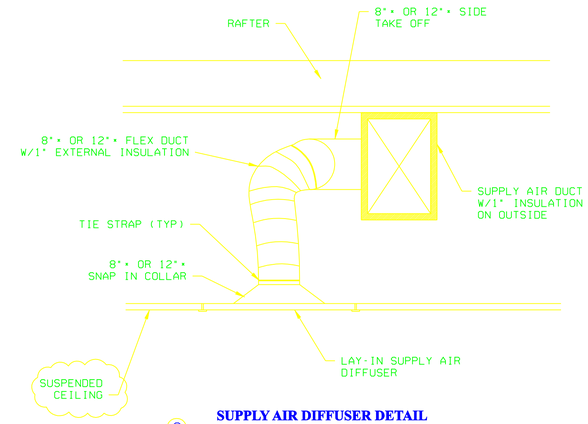
FLOOR DRAIN w/ TILE DETAIL
SCALE:2"=1'-0"

F



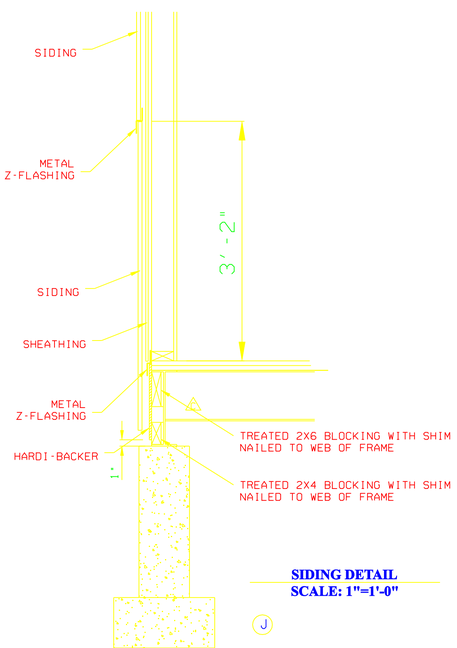
EXHAUST FAN DETAIL
SCALE: 1"=1'-0"

H



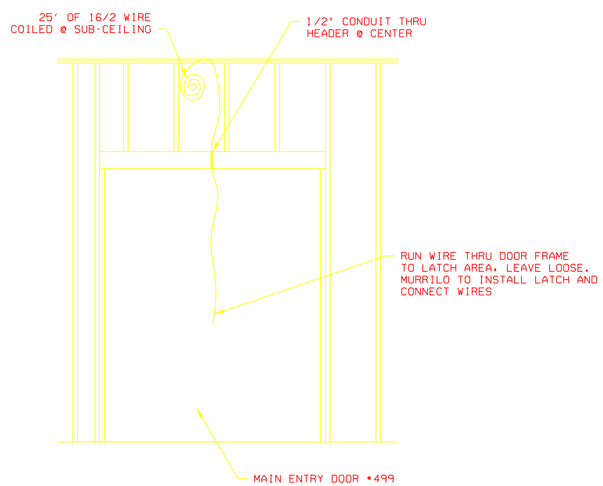
SUPPLY AIR DIFFUSER DETAIL
SCALE: 1"=1'-0"

G



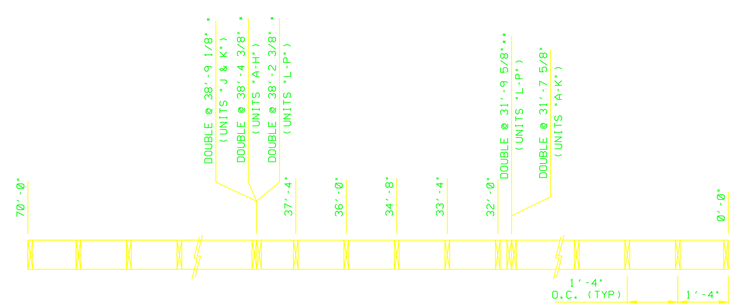
SIDING DETAIL
SCALE: 1"=1'-0"

J



DOOR BUZZER WIRE DETAIL
SCALE:1/2"=1'-0"

K



• UNITS F,J & P USE (6) 2X10 RAFTERS AT THIS LOCATION
• UNIT G USE (3) 2X10 RAFTERS AT THIS LOCATION
•• UNIT P USE (3) 2X10 RAFTERS AT THIS LOCATION

RAFTER LAYOUT
SCALE: 1/2"=1'-0"

L

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
A	CUSTOMER	11/30/06	JR
B	CUSTOMER	1/8/07	JR
C	VALUE ENGINEERING	9/27/07	IW

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MURILLO MODULAR

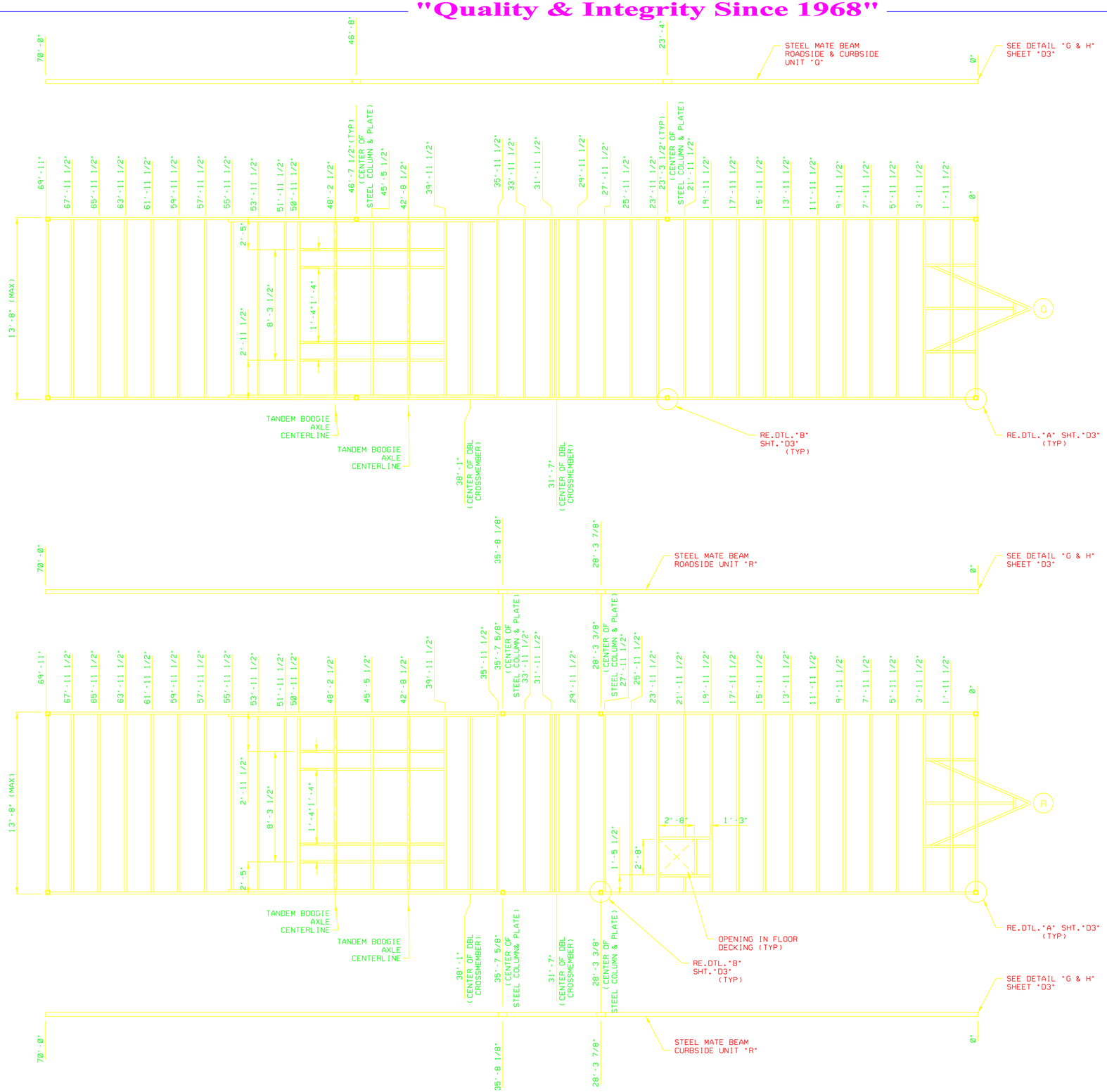
PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1472
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: AS NOTED
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: D2

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"



ALL DIMENSIONS ARE TO THE CENTER OF THE CROSSMEMBER

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDK SCHOOL 146' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: AS NOTED

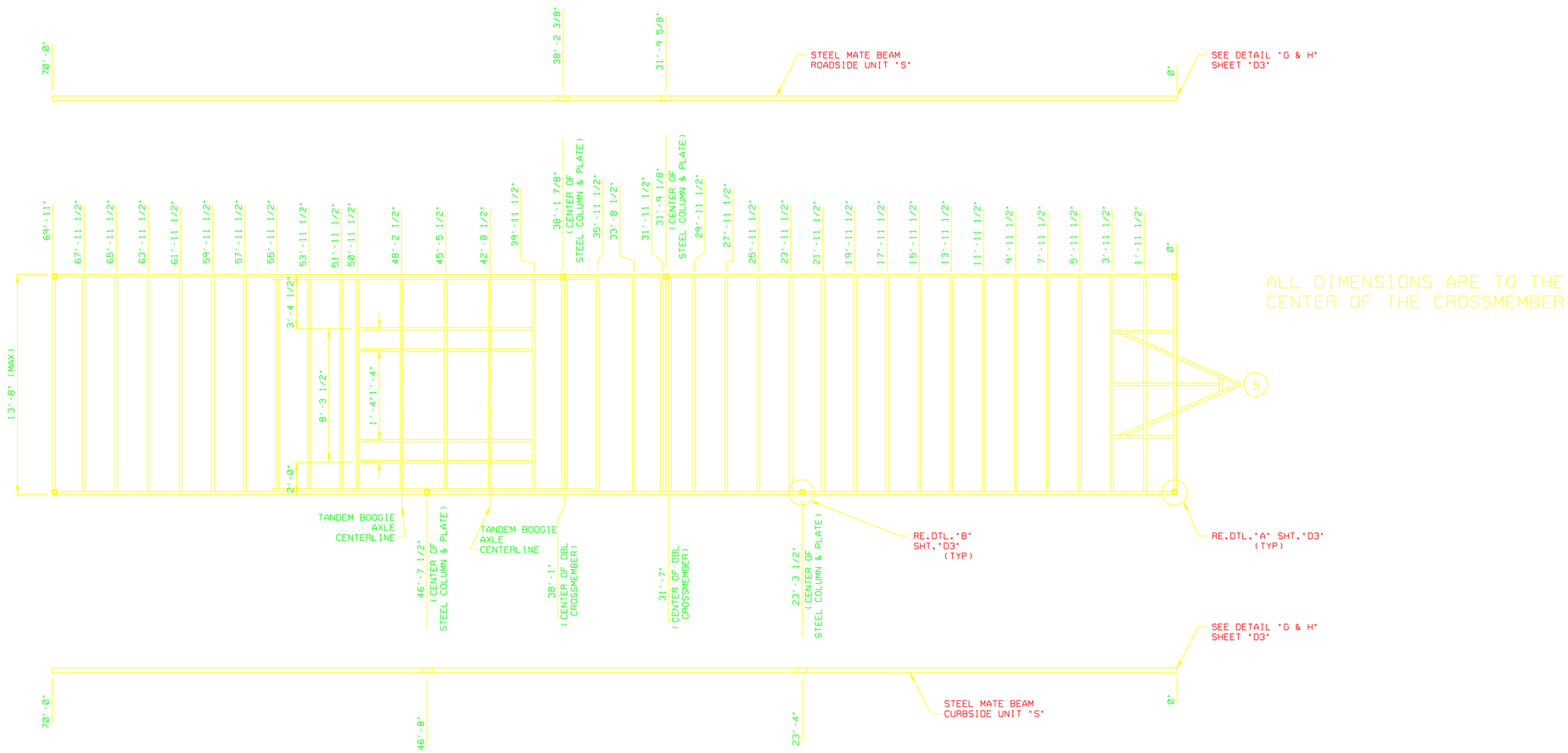
QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D20

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: JW/JR

DRAWING SCALE: AS NOTED

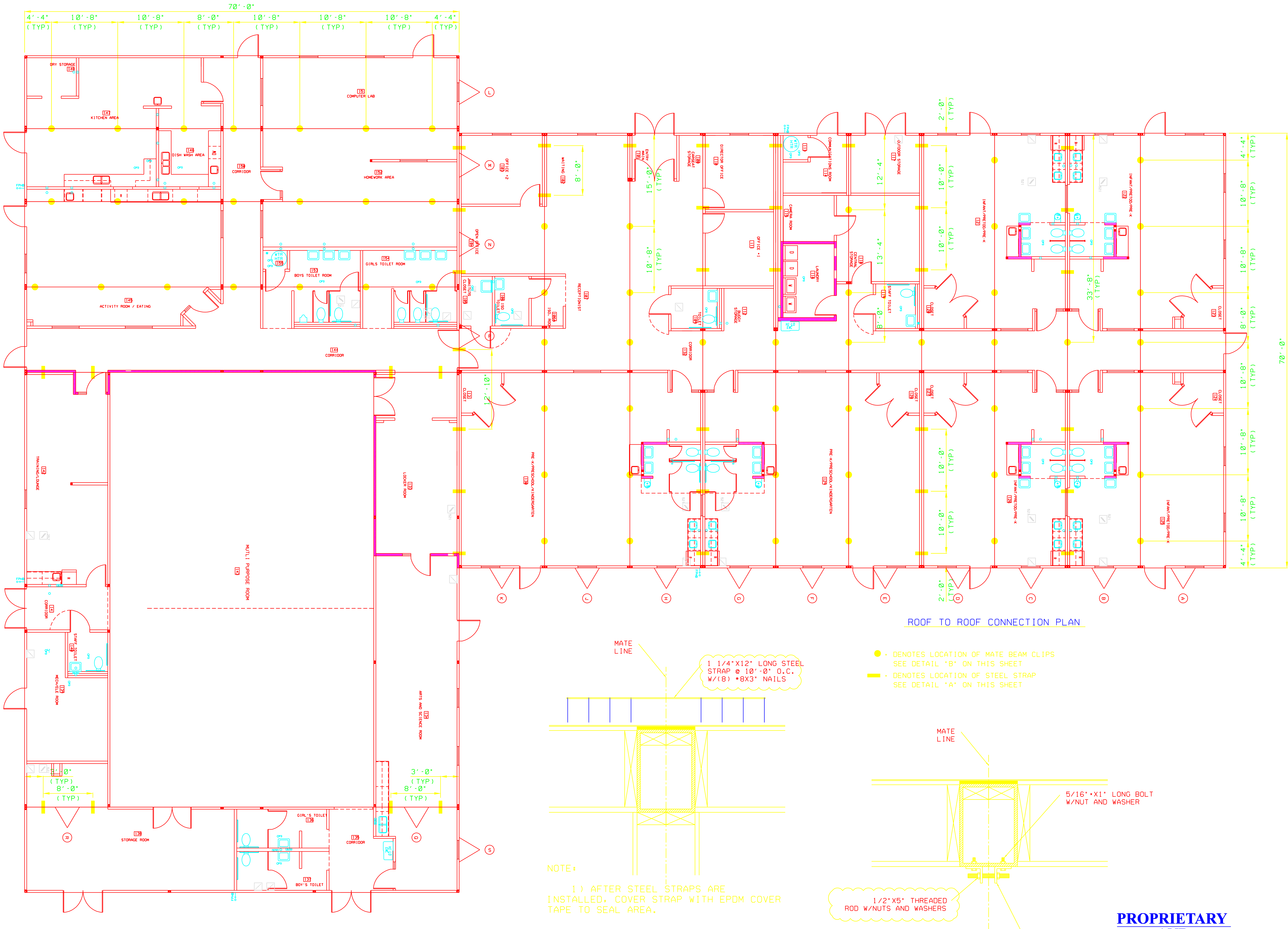
QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D21

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



ROOF CLOSE UP DETAIL
@ MATE LINE WALLS ONLY
SCALE:2"=1'-0"
(A)

ROOF CLOSE UP DETAIL
@ OPEN AREAS
SCALE:2"=1'-0"
(B)

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/8"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D22

NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507

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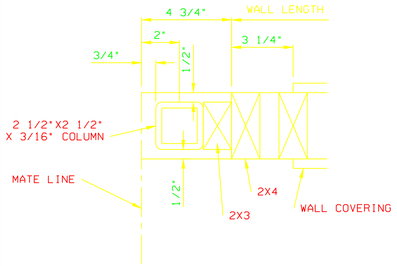
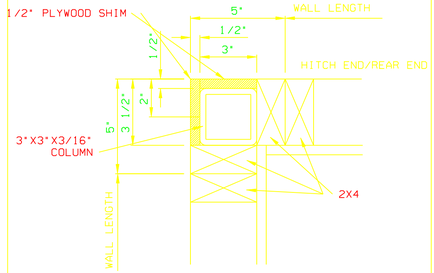
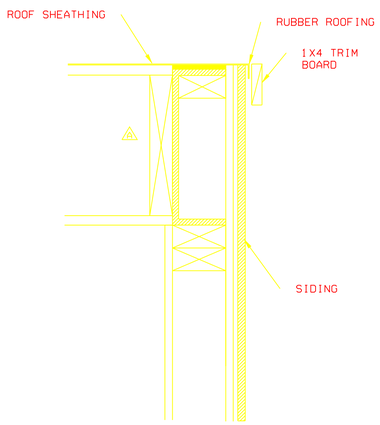


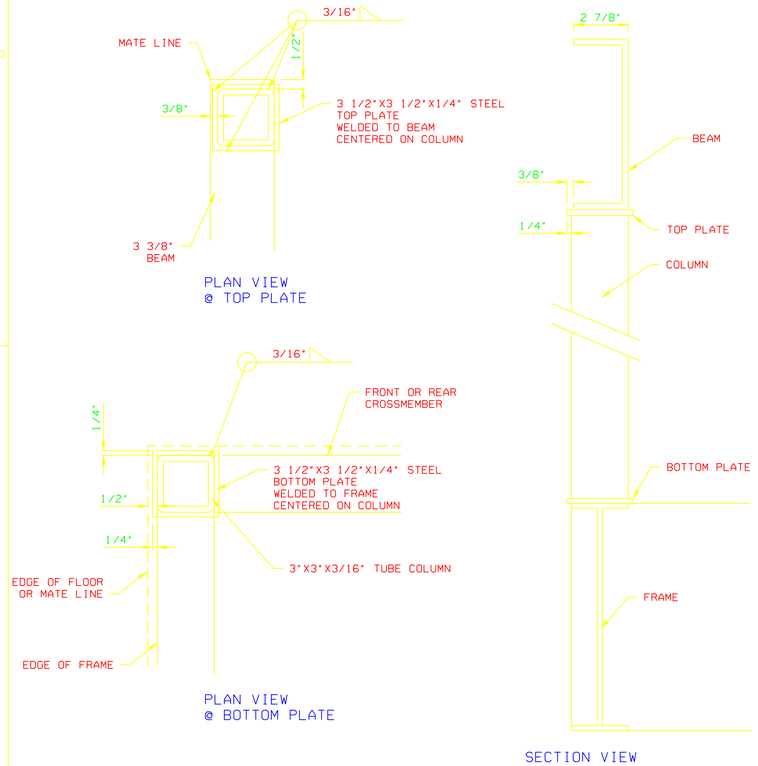
MATE LINE INTERIOR COLUMN DETAIL @ FLOOR
SCALE: 3"=1'-0"
D



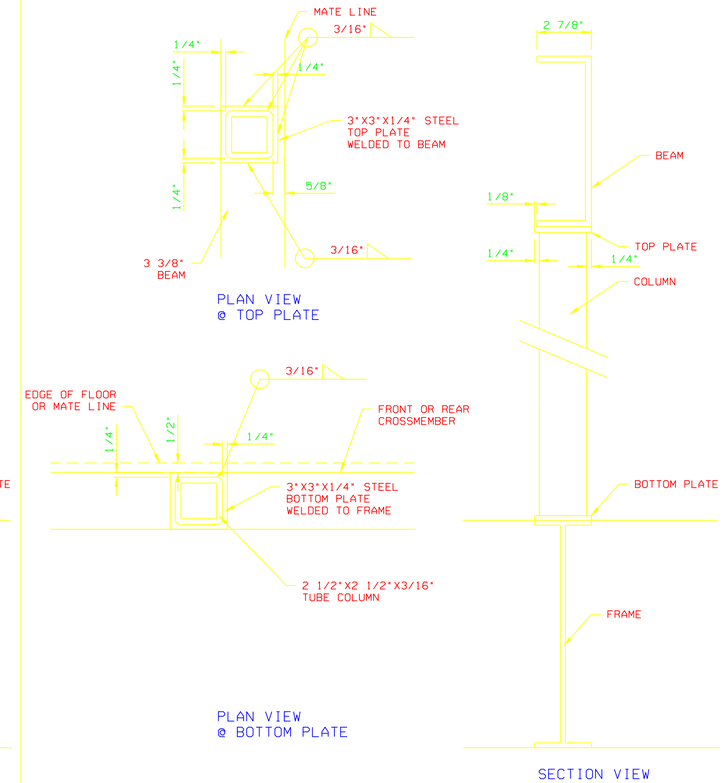
EXTERIOR WALL COLUMN DETAIL @ FLOOR
SCALE: 3"=1'-0"
E



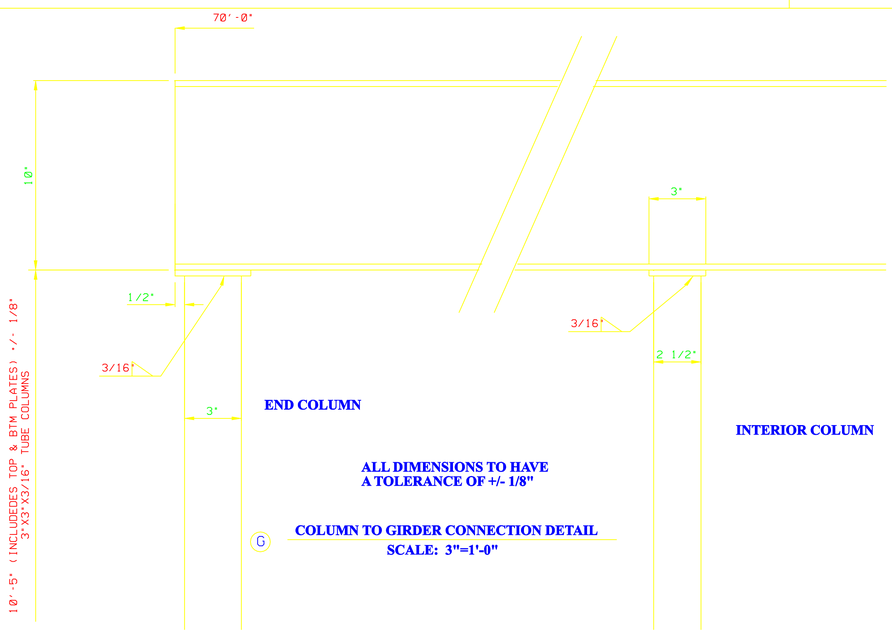
SIDING/RUBBER ROOF DETAIL
SCALE: N.T.S.
J



STEEL COLUMN TO FRAME CONNECTION AND STEEL COLUMN TO BEAM CONNECTION DETAIL @ CORNER COLUMNS
SCALE: 3"=1'-0"
A

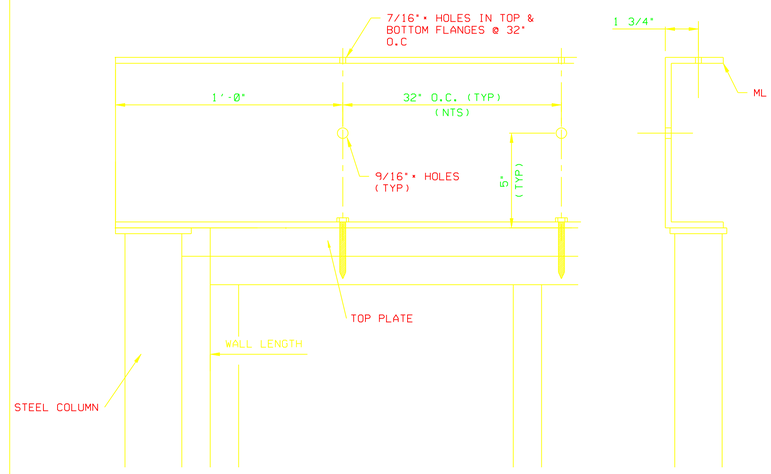


STEEL COLUMN TO FRAME CONNECTION AND STEEL COLUMN TO BEAM CONNECTION DETAIL @ INTERIOR COLUMNS
SCALE: 3"=1'-0"
B



ALL DIMENSIONS TO HAVE A TOLERANCE OF +/- 1/8"

COLUMN TO GIRDER CONNECTION DETAIL
SCALE: 3"=1'-0"
G



TOP PLATE NOTCH DETAIL
SCALE: 3"=1'-0"
H

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
1	VALUE ENGINEERING	9/27/07	IW

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CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

MURILLO MODULAR

PROJECT NAME: CDK SCHOOL 146' (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: AS NOTED
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: D3

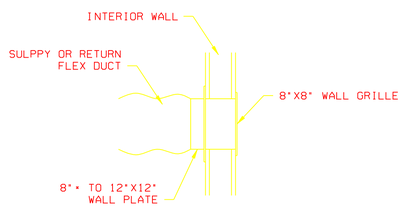
"Quality & Integrity Since 1968"

NOTE: ELEC GAS SWITCH ON THERMOSTAT MUST BE SET TO THE ELEC POSITION.

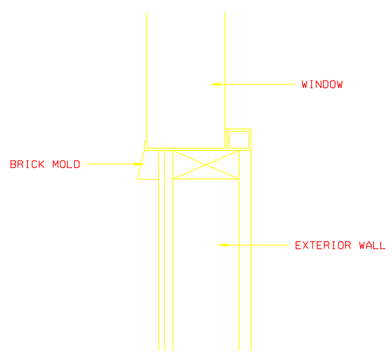
E THERMOSTAT WIRING DIAGRAM
SCALE: NTS

NOTE: ELEC GAS SWITCH ON THERMOSTAT MUST BE SET TO THE ELEC POSITION.

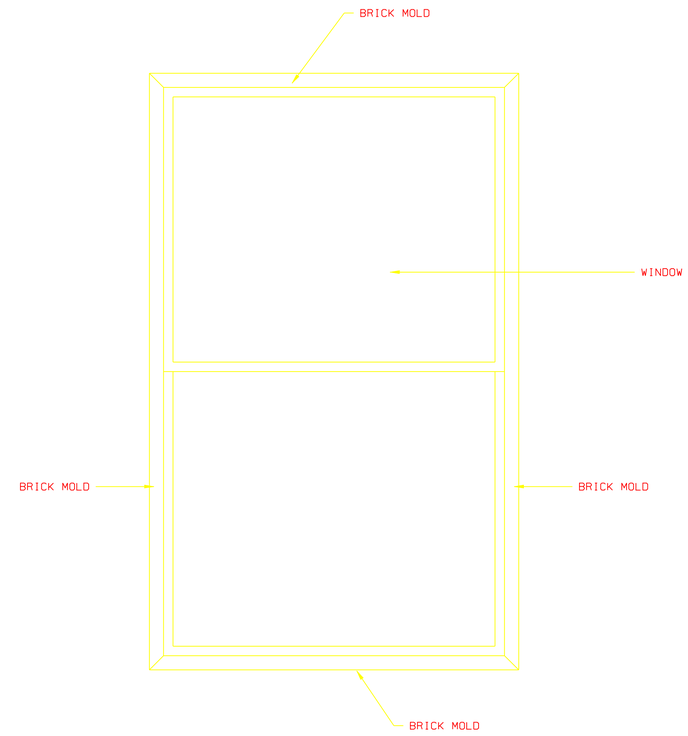
E1 THERMOSTAT WIRING DIAGRAM
WITH DUCT SMOKE DETECTOR
SCALE: NTS



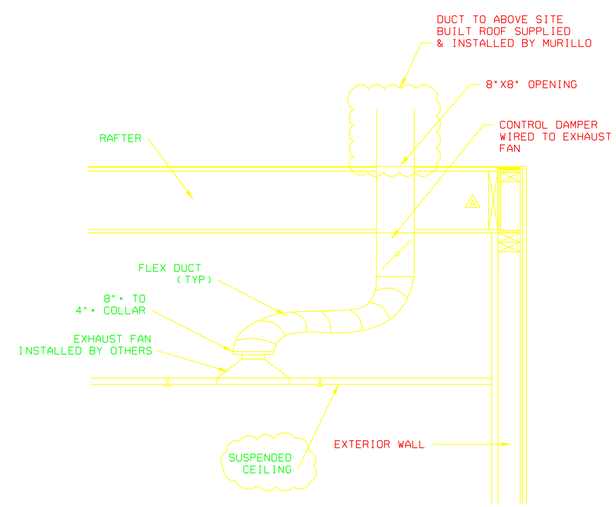
A THRU WALL GRILLE DETAIL
SCALE: 1"=1'-0"



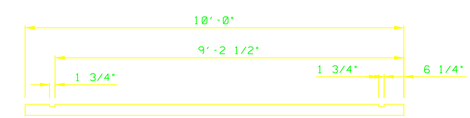
D WINDOW DETAIL
WITH OPTIONAL BRICK
SCALE: 3"=1'-0"



B WINDOW ELEVATION DETAIL
WITH OPTIONAL BRICK
SCALE: 3"=1'-0"



G **EXHAUST FAN DETAIL**
SCALE: 1"=1'-0"



F MULTI PURPOSE ROOM STUD DETAIL
SCALE: 1/2"=1'-0"

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
1	VALUE ENGINEERING	9/27/07	IW

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

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MURILLO MODULAR

PROJECT NAME: CDK SCHOOL T160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D4

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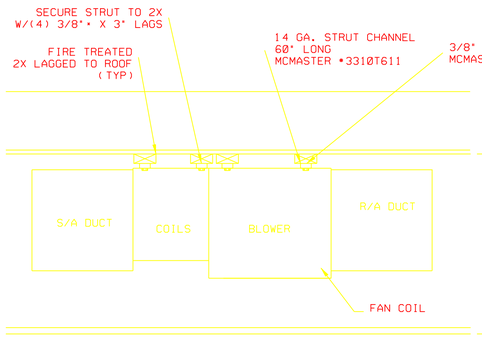
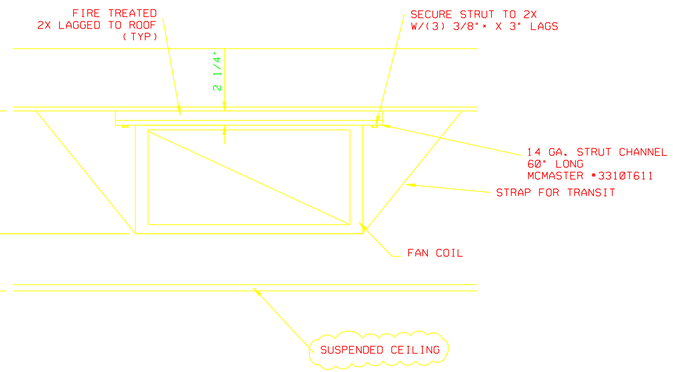
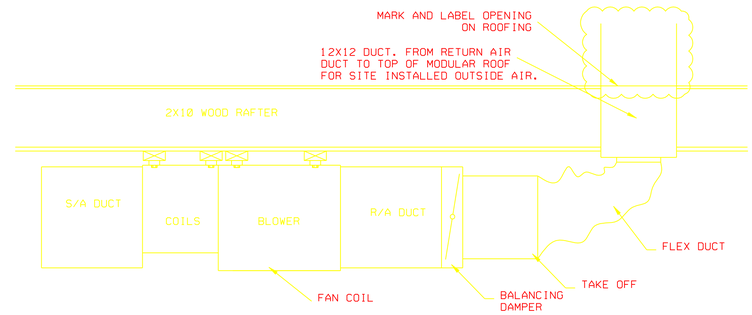


SIDE VIEW

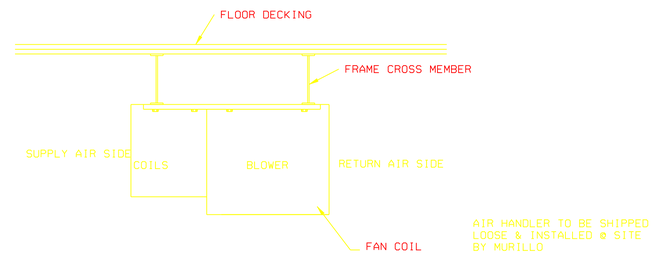


REAR VIEW

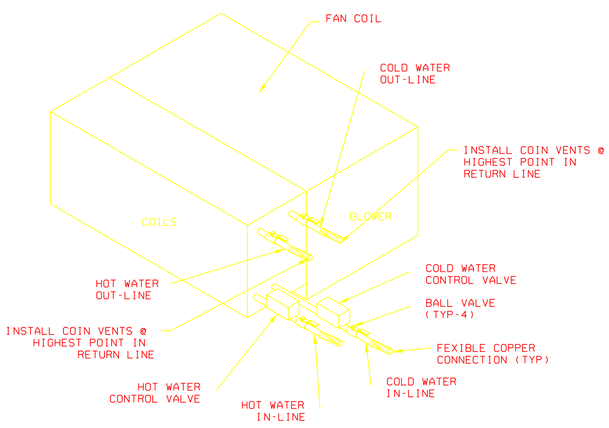
A AIR HANDLER MOUNTING DETAIL
SCALE:1"=1'-0"



B OUTSIDE AIR DETAIL
SCALE:1"=1'-0"

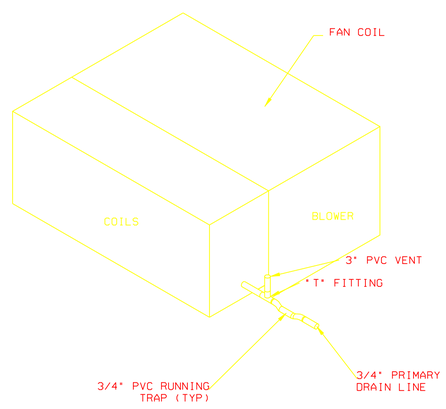


C CRAWL SPACE AIR HANDLER DETAIL
SCALE:1"=1'-0"



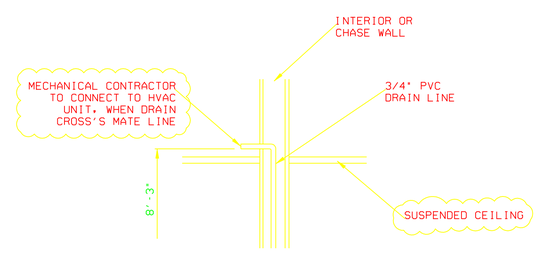
NOTE: 1) BALL AND CONTROL VALVES ARE SUPPLIED WITH THE AIR HANDLER.
2) WATER LINES TO BE TYPE "L" COPPER PIPE.
3) ALL SOLDER TO BE LEAD FREE.
4) CONTINUE WATER LINES TO BELOW FLOOR. SEE ARCH. PLANS FOR LOCATIONS.

D AIR HANDLER PLUMBING DETAIL
SCALE: NTS



NOTE:
1) DRAIN LINES TO BE PVC SCHEDULE 40.
2) CONTINUE DRAIN LINES TO BELOW FLOOR. CONNECTED TO DWV SYSTEM VIA AIR GAP W/TRAP PRIMER. SEE SHEET "P2".
3) SECONDARY DRAIN LINES TO BE RAN AND CONNECTED ON SITE BY MURILLO.

E AIR HANDLER DRAIN DETAIL
SCALE: NTS



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STATE SEALS:

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REV	DESCRIPTION	DATE	BY
A	CUSTOMER	11/30/06	JR

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

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MURILLO MODULAR

PROJECT NAME: CDK SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D5

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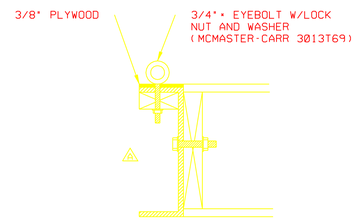
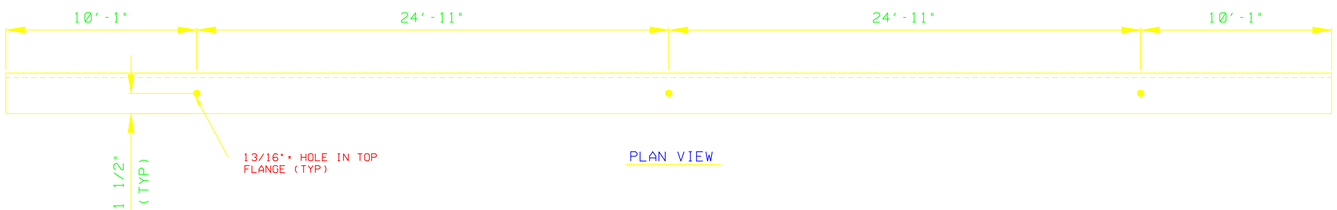
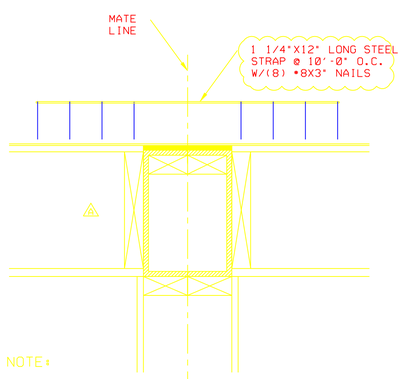




PLAN VIEW

ROOF LIFTING DETAIL
SCALE: NTS

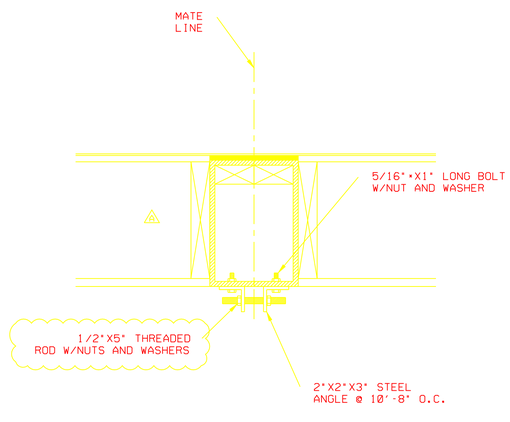
C OCCUPANCY SENSOR WIRING DIAGRAM
SCALE: NTS



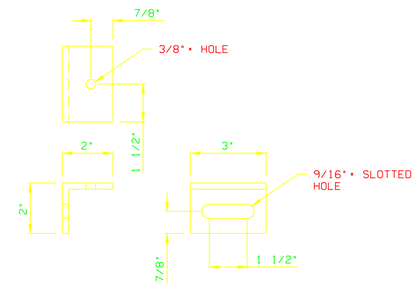
NOTE:

1) AFTER STEEL STRAPS ARE INSTALLED, COVER STRAP WITH EPDM COVER TAPE TO SEAL AREA.

A **ROOF CLOSE UP DETAIL @ MATE LINE WALLS ONLY**
SCALE:2"=1'-0"



B **ROOF CLOSE UP DETAIL @ OPEN AREAS**
SCALE:2"=1'-0"



MTL = 1/4" STEEL
TOL. = +/- 1/8"

CLIP DETAIL
SCALE: NTS

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REV	DESCRIPTION	DATE	BY
1	VALUE ENGINEERING	9/27/07	IW

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DISTRICT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D6

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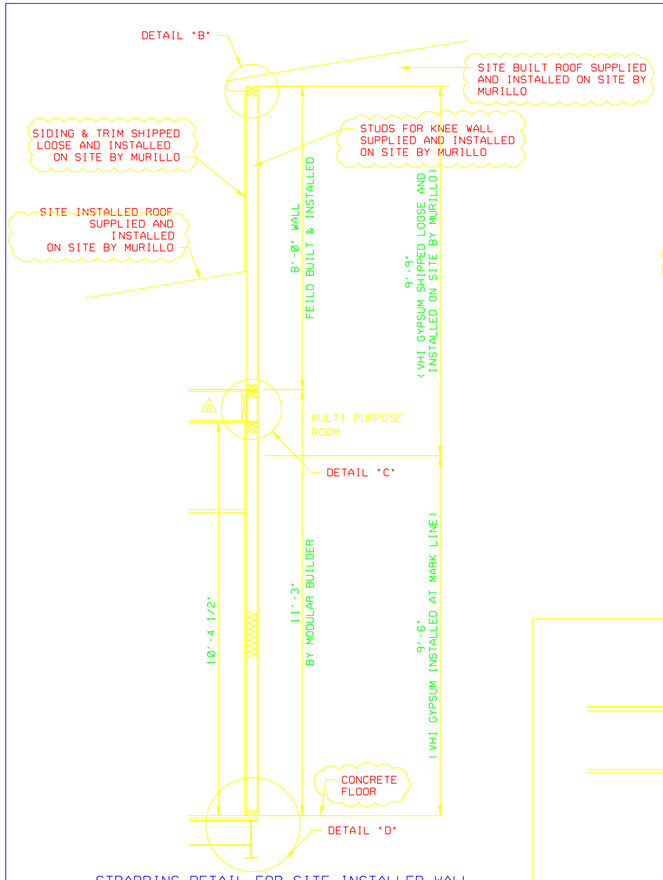
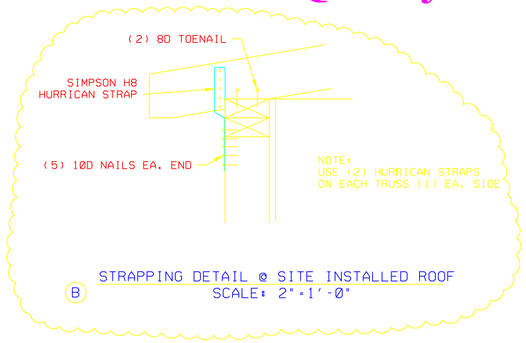
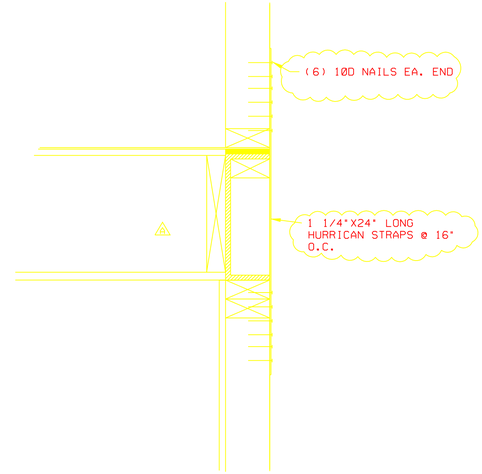


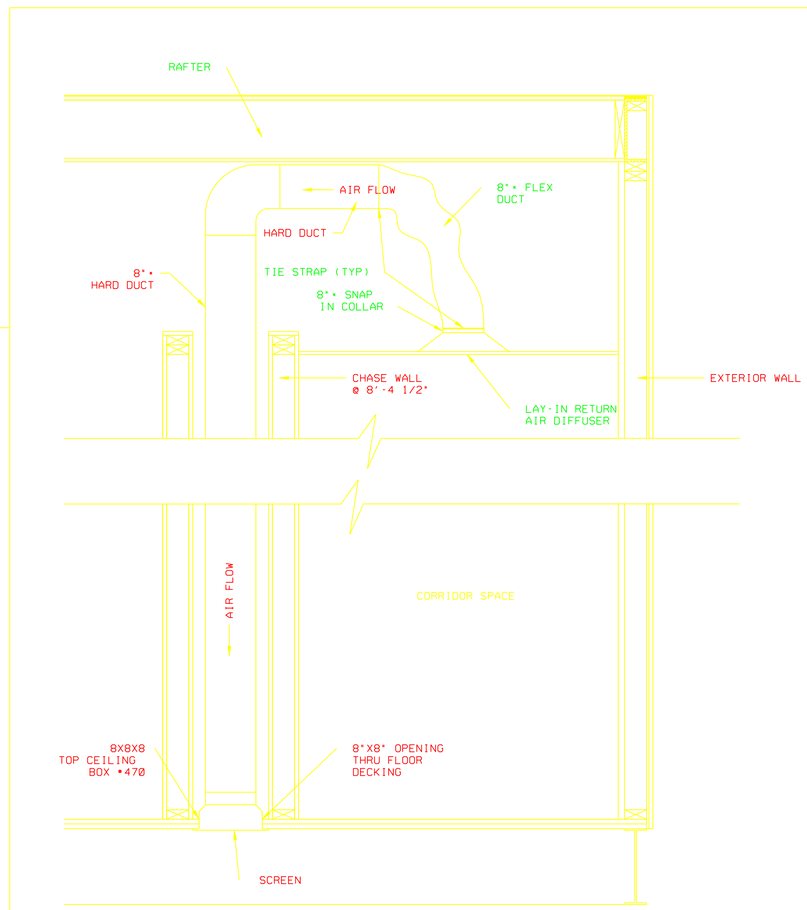
STRAPPING DETAIL FOR SITE INSTALLED WALL AROUND MULTI-PURPOSE ROOM
SCALE: 1/2"=1'-0"
(A)



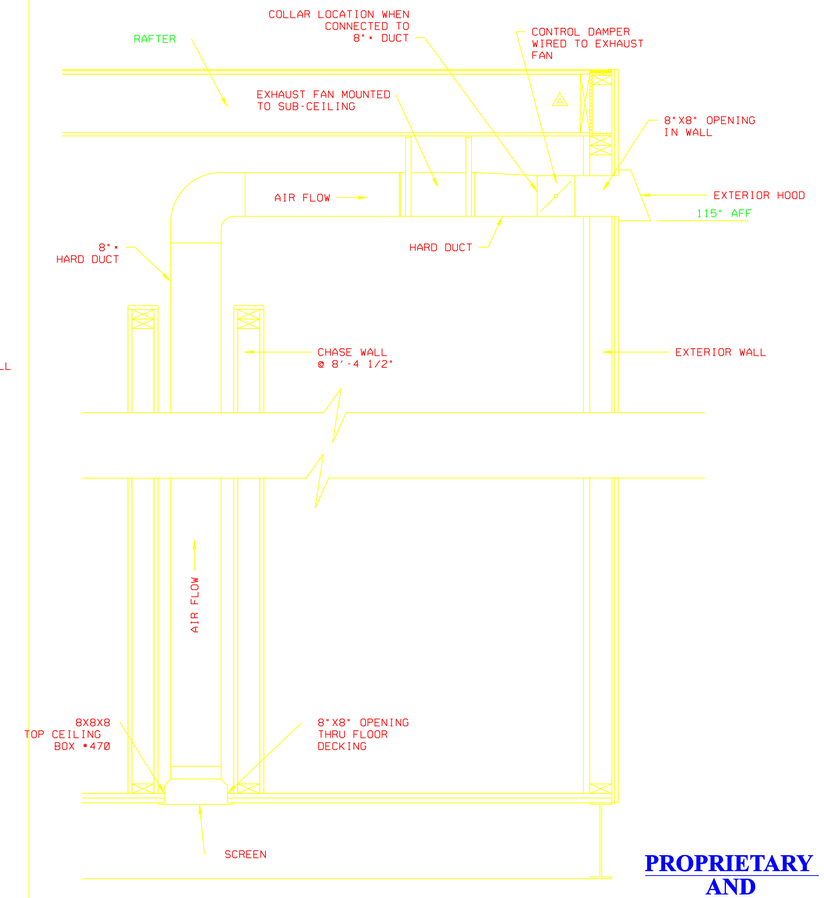
STRAPPING DETAIL @ SITE INSTALLED ROOF
SCALE: 2"=1'-0"
(B)



STRAPPING DETAIL @ SITE INSTALLED WALL
SCALE: 2"=1'-0"
(C)



CRAWL SPACE FAN DETAIL SUPPLY
SCALE: 1"=1'-0"
(D)



CRAWL SPACE FAN DETAIL EXHAUST
SCALE: 1"=1'-0"
(E)

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY
1	VALUE ENGINEERING	9/27/07	IW

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MURILLO MODULAR

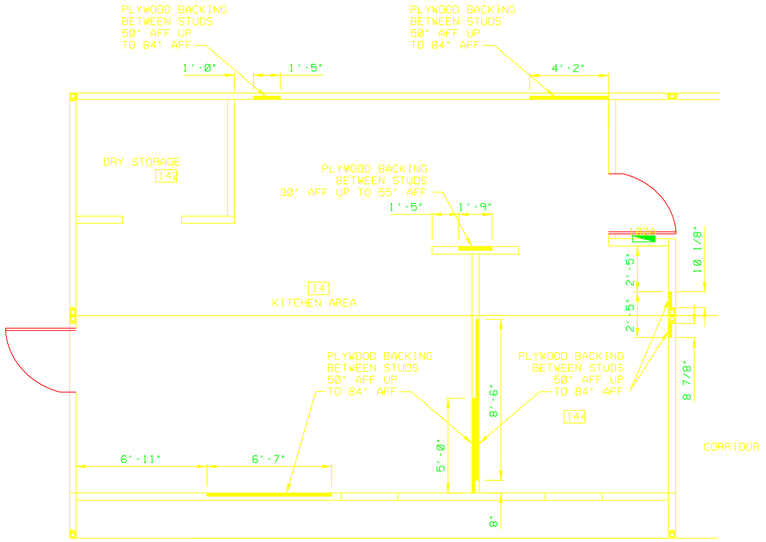
PROJECT NAME: CDK SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: AS NOTED
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: D7

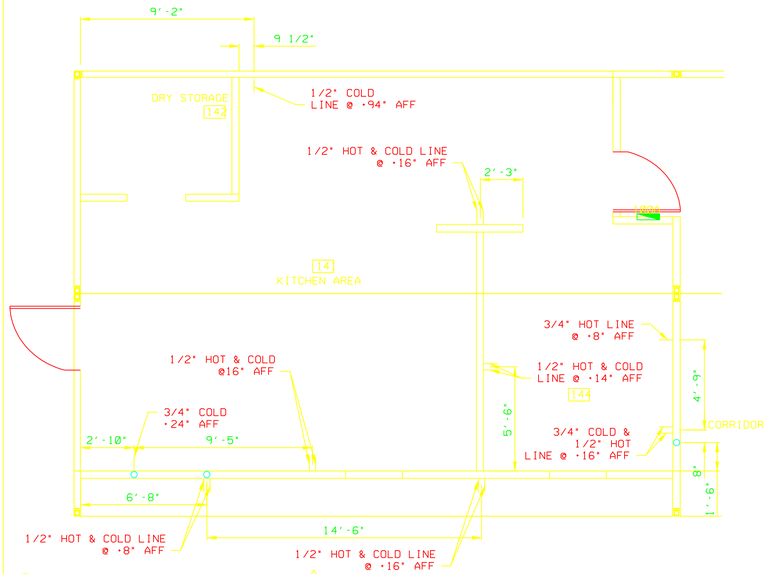
CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



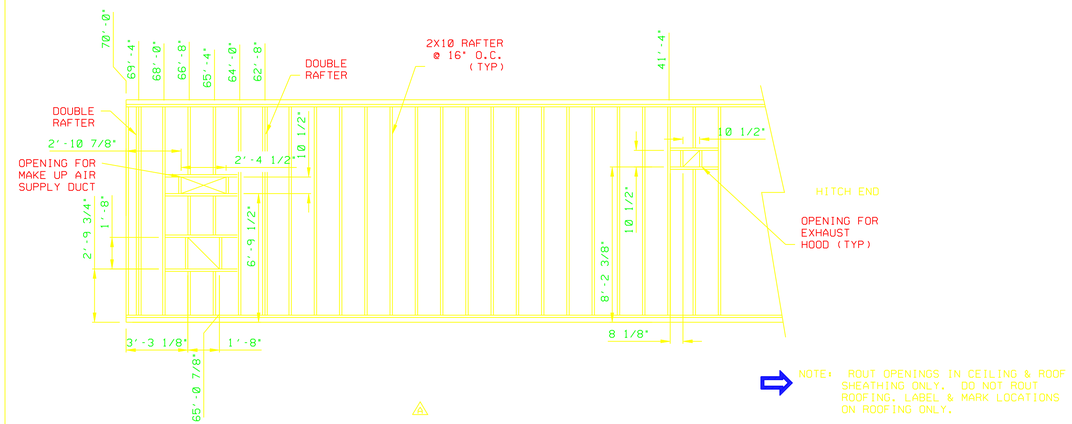
A

KITCHEN WALL BACKING DETAIL UNIT "L&M"
SCALE: 1/4" = 1'-0"



B

WATER SUPPLY STUB THRU WALL DETAIL UNIT "L&M"
SCALE: 1/4" = 1'-0"



D

OPENINGS FOR KITCHEN EXHAUST FANS IN ROOF UNIT "M" ONLY
SCALE: 1/4"=1'-0"

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
	SINK HEATER	7/20/07	IW
	CUSTOMER	4/12/07	IW

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MURILLO MODULAR

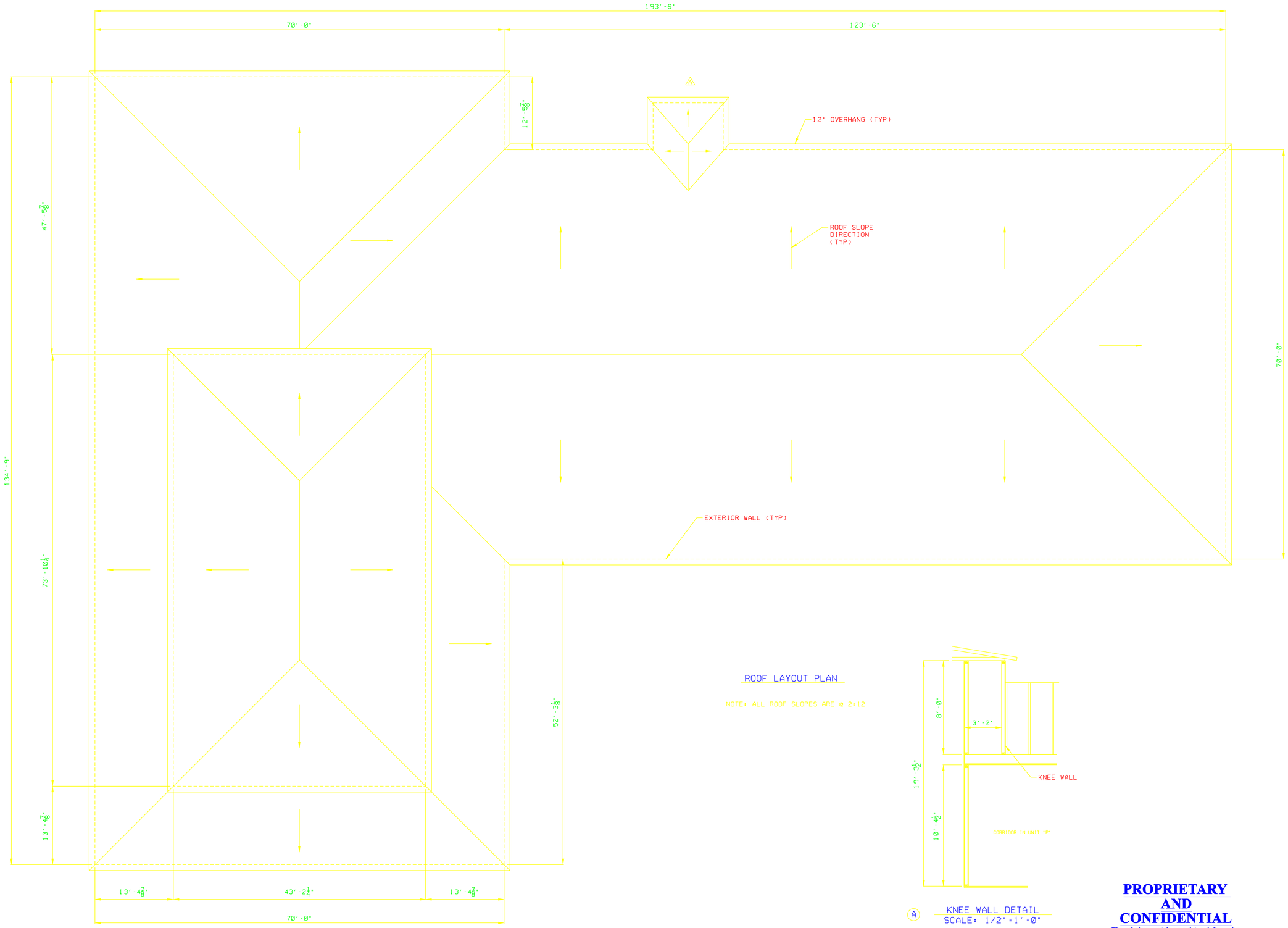
PROJECT NAME: CDK SCHOOL 160' (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: AS NOTED
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: D8

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
1	CUSTOMER	11/30/06	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/8"=1'-0"

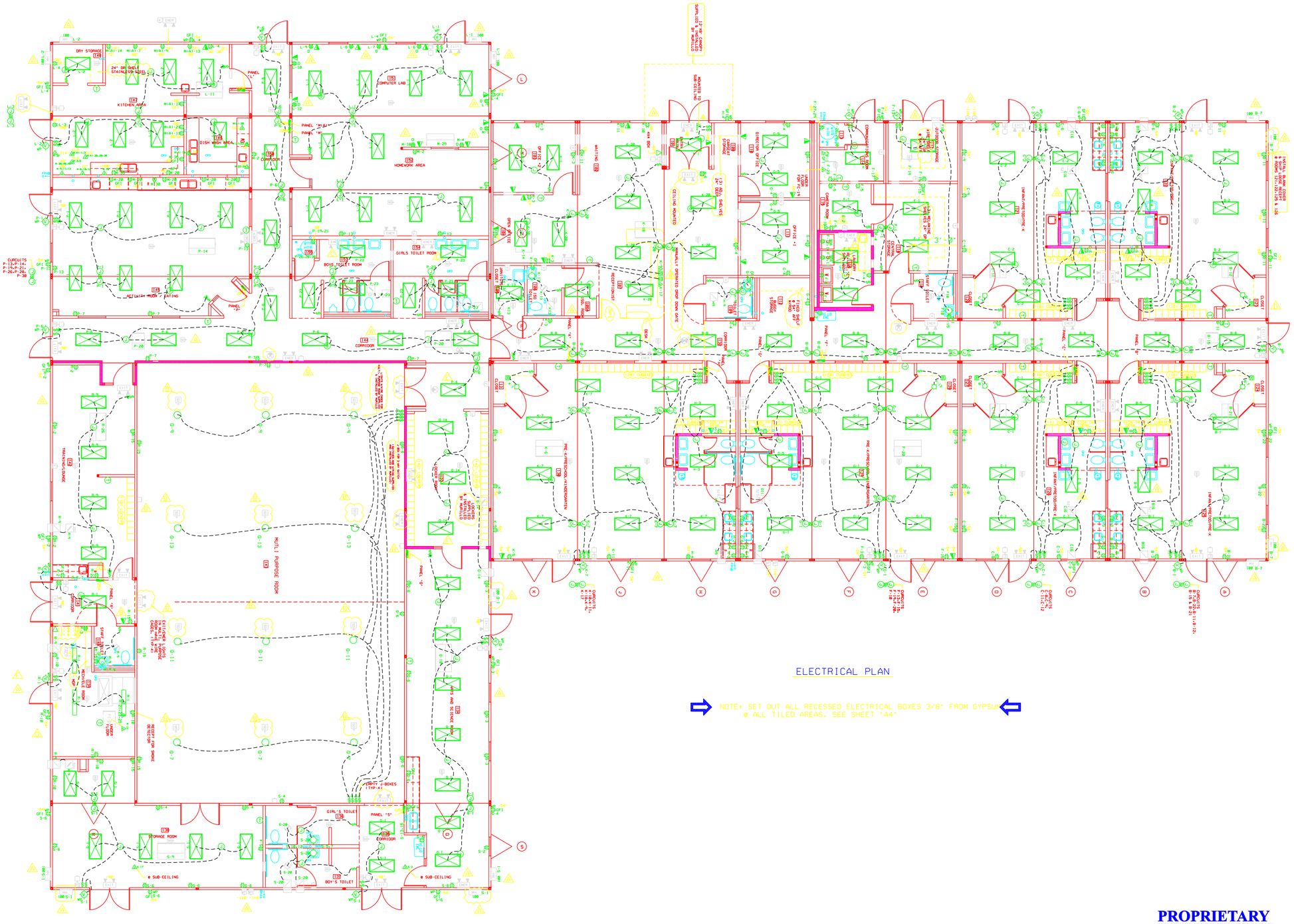
QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: D9

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
1	CUSTOMER	8/21/07	IW
2	MULTI PURPOSE DOOR CHANGE	5/28/07	IW
3	GRAML SPACE VENTILATION	3/24/07	IW
4	CUSTOMER	2/7/07	IW
5	CUSTOMER	1/8/07	JR
6	CUSTOMER	11/30/06	BR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/8"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E1

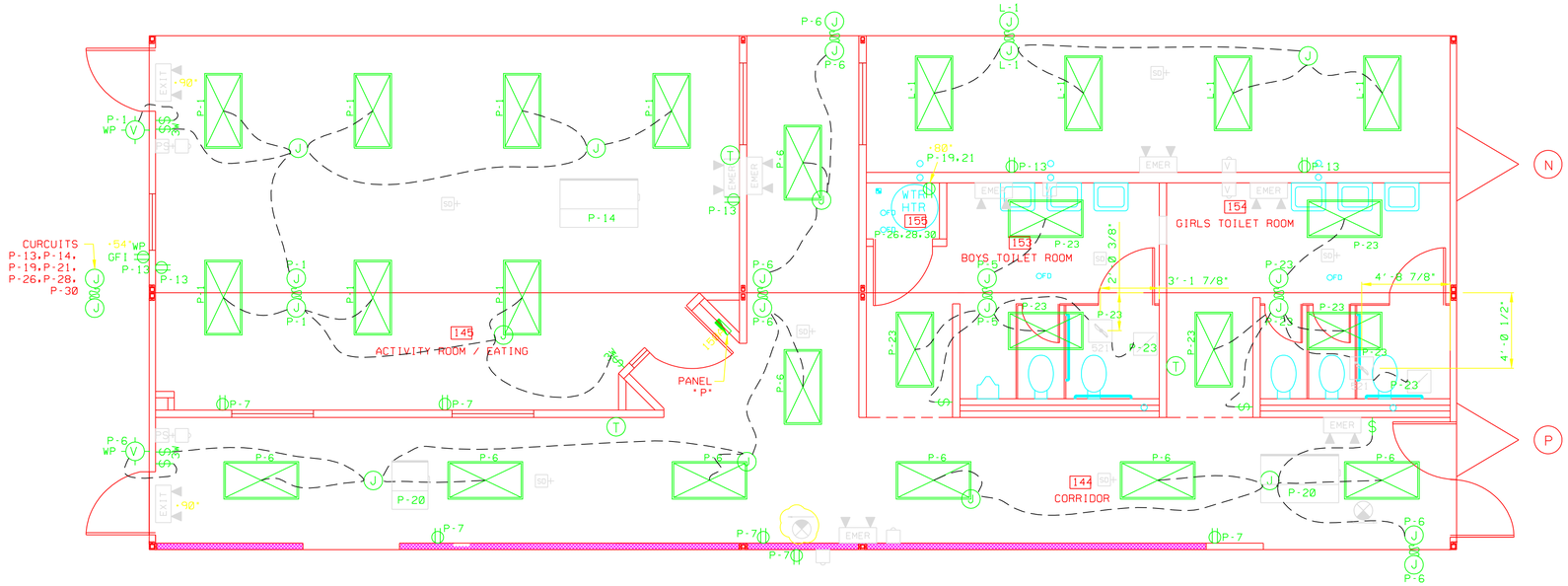
CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
V	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS



ELECTRICAL PLAN

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7' DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 90" AFF
5) ALL CURCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "146" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: E10

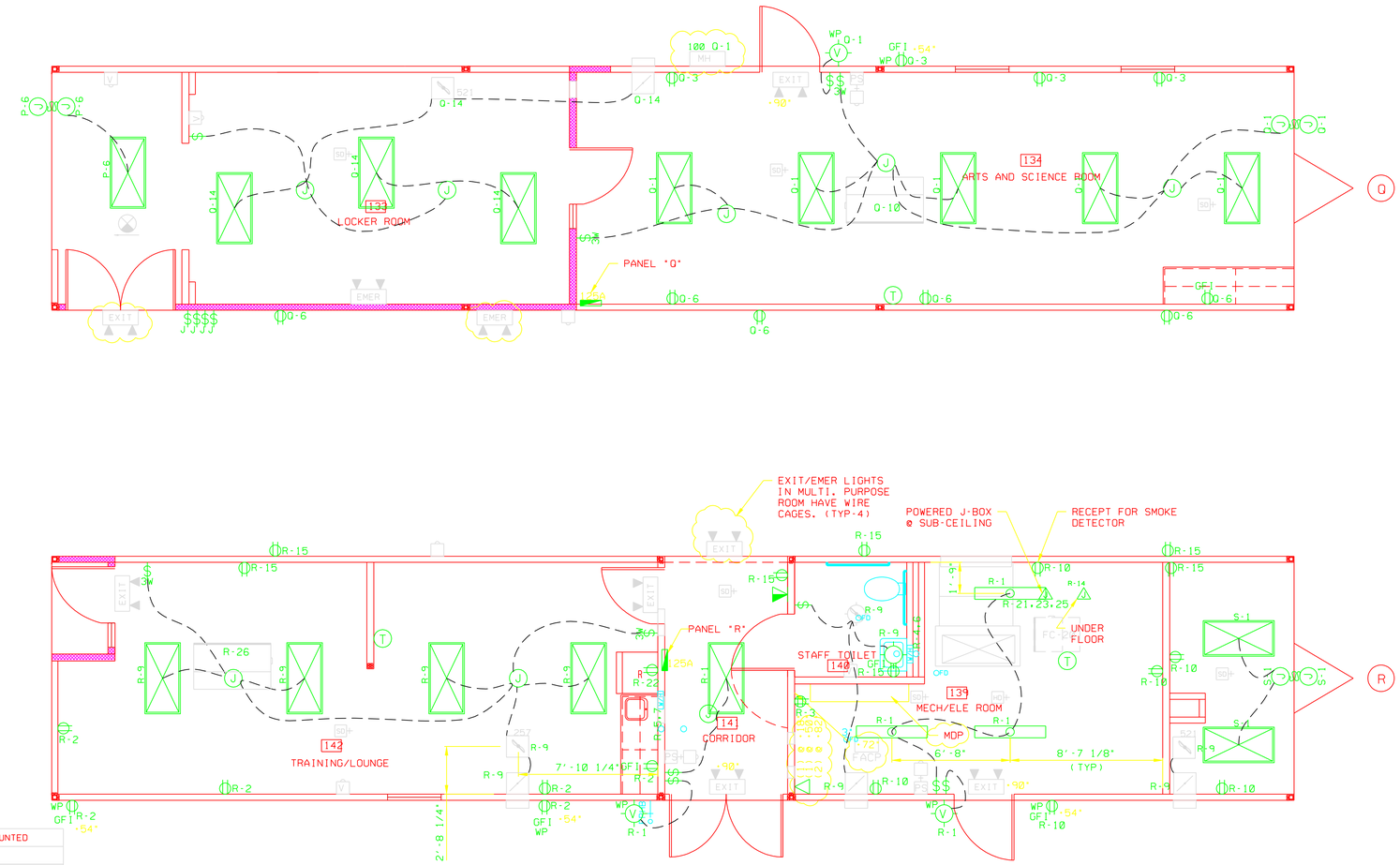
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R/G	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



ELECTRICAL PLAN

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7" DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 90" AFF
5) ALL CURCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 160' (DISTRICT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E11

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

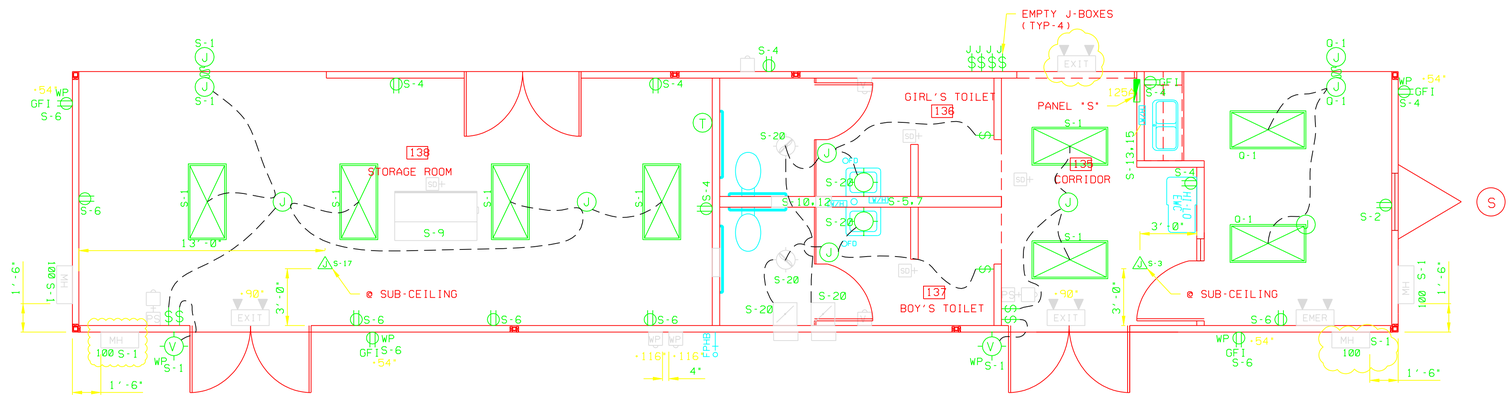
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY, 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP, SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



ELECTRICAL PLAN

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7" DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 90" AFF
5) ALL CURCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

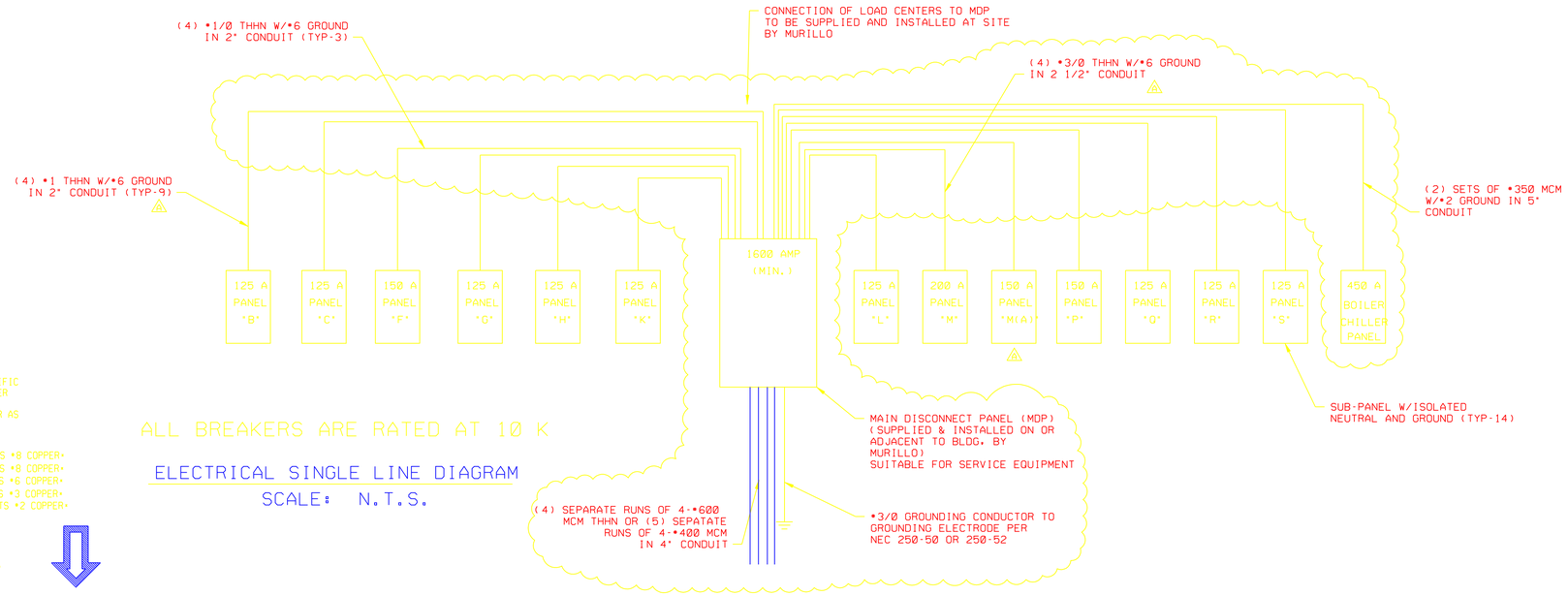
DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E12

"Quality & Integrity Since 1968"



NOTE:

THE ID NUMBER IS NOT INTENDED TO IDENTIFY A SPECIFIC CIRCUIT BREAKER OR LOCATION INSIDE THE LOAD CENTER BUT TO IDENTIFY LIKE CIRCUITS ONLY. CIRCUITS SHALL BE BALANCED BETWEEN PHASES AS NEAR AS POSSIBLE IN ACCORDANCE WITH N.E.C. SECTION 220.

WIRING SIZES

15 AMP CIRCUITS #12 COPPER**	45 AMP CIRCUITS #8 COPPER*
20 AMP CIRCUITS #12 COPPER**	50 AMP CIRCUITS #8 COPPER*
25 AMP CIRCUITS #10 COPPER**	60 AMP CIRCUITS #6 COPPER*
30 AMP CIRCUITS #10 COPPER**	90 AMP CIRCUITS #3 COPPER*
40 AMP CIRCUITS #8 COPPER* OR **	110 AMP CIRCUITS #2 COPPER*

* 75°C. MIN. TEMPERATURE RATING WITH EQUIPMENT TERMINATIONS LISTED AND IDENTIFIED FOR 75°C. TYPE THW OR THWN.

** TYPE NM CABLE (FROM 60° COLUMN TABLE 310-16).

ALL BREAKERS ARE RATED AT 10 K

ELECTRICAL SINGLE LINE DIAGRAM
SCALE: N.T.S.

NOTE: ALL CIRCUITS TO BE WIRED AS NOTED

PANELBOARD SCHEDULE: MDP

1600 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A	B	C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
PANEL B	3975			125		1				2		125	2480			PANEL C
PANEL B		3550		125		3				4		125		2800		PANEL C
PANEL B			3020	125		5				6		125			2780	PANEL C
PANEL F	1350			150		7				8		125	1470			PANEL G
PANEL F		1454		150		9				10		125		1620		PANEL G
PANEL F			1780	150		11				12		125			2090	PANEL G
PANEL H	1020			125		13				14		125	4790			PANEL K
PANEL H		1715		125		15				16		125		5280		PANEL K
PANEL H			1920	125		17				18		125			5026	PANEL K
PANEL L	7200			125		19				20		200	22980			PANEL M
PANEL L		5044		125		21				22		200		23353		PANEL M
PANEL L			6420	125		23				24		200			21495	PANEL M
PANEL M(A)	1280			150		25				26		150	11985			PANEL P
PANEL M(A)		1380		150		27				28		150		9270		PANEL P
PANEL M(A)			1295	150		29				30		150			10655	PANEL P
PANEL Q	5935			125		31				32		125	6855			PANEL R
PANEL Q		3446		125		33				34		125		1039		PANEL R
PANEL Q			3000	125		35				36		125			2570	PANEL R
PANEL S	1023			125		37				38		450	49560			CHILLER/BOILER
PANEL S		1087		125		39				40		450		49560		CHILLER/BOILER
PANEL S			1036	125		41				42		450			49560	CHILLER/BOILER
TOTAL	6491	6297	5548										100150	92998	90086	TOTAL

TOTAL CONNECTED LOAD: A-155030 B- 154261 C-154569 464050 - WATTS 1292- AMPS

PANELBOARD SCHEDULE: B

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A	B	C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 5×124×60 (#125)	850			20	12	1				2	12	20	850			LIGHTS 5×124×60 (#122)
RECEPTS/REFER 4×180×250 (#125)		970		20	12	3				4	12	20		310		LIGHTS 2×124 (#122)
LIGHTS 2×124 (#125)			310	20	12	5				6	12	20			970	RECEPTS/REFER 4×180×250 (#122)
LIGHTS 4×100×3×60 (EXT/CLOSET)	725			20	12	7				8	12	20	1550			LIGHTS 10×124 (CORRIDOR)
						9				10						EXTRA SPACE FOR SHUNT TRIP
RECEPTS 6×180 (#122)			1080	20	12	11				12	12	20			660	AIR HANDLER (FC-1) (#122)
						13				14						EXTRA SPACE FOR SHUNT TRIP
AIR HANDLER (FC-17) (CORRIDOR)		330		20	12	15				16	12	20		380		EXHAUST FANS
EXTRA SPACE FOR SHUNT TRIP						17				18						
						19				20						
AIR HANDLER (FC-5) (#125)		660		20	12	21				22	12	20		900		RECEPTS 5×180 (#125)
EXTRA SPACE FOR SHUNT TRIP						23				24						
TOTAL	1575	1960	1390										2400	1590	1630	TOTAL

TOTAL CONNECTED LOAD: A- 3975 B- 3550 C- 3020 10545 - WATTS 34 - AMPS

PANELBOARD SCHEDULE: C

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A	B	C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 5×124×60 (#126)	850			20	12	1				2	12	20	850			LIGHTS 5×124×60 (#121)
RECEPTS/REFER 5×180×250 (#126)		1150		20	12	3				4	12	20		310		LIGHTS 2×124 (#121)
LIGHTS 2×124 (#126)			310	20	12	5				6	12	20			1150	RECEPTS/REFER 5×180×250 (#121)
						7				8	12	20	780			LIGHT/RECEPTS 60×4×180 (#126)
LIGHT/RECEPTS 60×5×180 (#121)		960		20	12	9				10						EXTRA SPACE FOR SHUNT TRIP
AIR HANDLER (FC-6) (#121)			660	20	12	11				12	12	20			660	AIR HANDLER (FC-2) (#126)
EXTRA SPACE FOR SHUNT TRIP						13				14						EXTRA SPACE FOR SHUNT TRIP
						15				16	12	20		380		EXHAUST FANS
						17				18						
TOTAL	850	2110	970										1630	690	1810	TOTAL

TOTAL CONNECTED LOAD: A- 2480 B- 2800 C- 2780 8060 - WATTS 24 - AMPS

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
1	CRAWL SPACE VENTILATION	9/24/07	IW
2	SINK HEATER	7/20/07	IW
3	CUSTOMER	4/12/07	IW
4	CUSTOMER	1/8/07	JR
5	CUSTOMER	11/30/06	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E2

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"

PANELBOARD SCHEDULE: F

150 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A B C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 6×124×60 (*116)	1008			20	12	1		2	12	20	500			EWC
RECEPTS 3×180 (*129)		540		20	12	3		4	12	20		540		RECEPTS 3×180 (*118, EXT)
RECEPTS 4×180 (*115)			720	20	12	5		6	12	20			1660	WASHER 2×830 (*116)
HEAT TAPE	600			20	12	7		8						EXTRA SPACE FOR SHUNT TRIP
DRYER (*116)		2250		30	10	9		10	12	20		500		LIGHTS/EXHAUST FANS 225×180 (*119)
DRYER (*116)			2250	30	10	11		12	10	30			2250	DRYER (*116)
LIGHTS 124×75×60 (*117)	324			20	12	13		14	10	30	2250			DRYER (*116)
RECEPTS 7×180 (*119)		1260		20	12	15		16	12	20		1920		CAMERA (*115)
PHONE J-BOX (*114)			2880	30	10	17		18						EXTRA SPACE FOR SHUNT TRIP
AIR HANDLER (FC-7) (*117)	600			20	12	19		20	12	20	806			AIR HANDLER (FC-3) (*129)
EXTRA SPACE FOR SHUNT TRIP						21		22						EXTRA SPACE FOR SHUNT TRIP
AIR HANDLER (FC-19)			104	20	12	23		24	12	20			330	AIR HANDLER (FC-22) (*115)
EXTRA SPACE FOR SHUNT TRIP						25		26	3	70	7500			WATER HEATER (*113)
RECIRCULATING PUMP (*113)		110		15	12	27		28	3	70		7500		WATER HEATER (*113)
RECIRCULATING PUMP (*113)			110	15	12	29		30	3	70			7500	WATER HEATER (*113)
TOTAL	2529	4075	6064								11054	10468	11744	TOTAL

TOTAL CONNECTED LOAD: A- 13585 B- 14541 C- 17804 45930 - WATTS 148 - AMPS

PANELBOARD SCHEDULE: G

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A B C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS/EXIT 9×124×60 (*129)	1470			20	12	1		2						
						3		4	12	20		1620		RECEPTS 9×180 (*110 & 111)
LIGHTS 6×124 (*110 & 111)			930	20	12	5		6	12	20			970	RECEPTS/REFER 4×180×250 (*129)
						7		8						
						9		10						
EXHAUST FAN (*129)			190	20	12	11		12						
EXTRA SPACE FOR SHUNT TRIP						13		14						
TOTAL	1470	0	1120								0	1620	970	TOTAL

TOTAL CONNECTED LOAD: A- 1470 B- 1620 C- 2090 5180 - WATTS 18 - AMPS

PANELBOARD SCHEDULE: H

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A B C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 124×60 (*101)	230			20	12	1		2	12	20	790			RECEPTS/REFER 3×180×250 (*130)
LIGHTS 2×124×75 (*130)		404		20	12	3		4	12	20		540		RECEPTS 3×180 (CORRIDOR)
						5		6	12	20			1920	PVM RECEPT
						7		8						
LIGHTS/EXHAUST FAN 225×392 (*109)		771		20	12	9		10						
EXTRA SPACE FOR SHUNT TRIP						11		12						
TOTAL	230	1175	0								790	540	1920	TOTAL

TOTAL CONNECTED LOAD: A- 1020 B- 1715 C- 1920 4655 - WATTS 16 - AMPS

NOTE: ALL CIRCUITS TO BE WIRED AS NOTED

PANELBOARD SCHEDULE: K

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A B C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 2×124×75 (*103)	404			20	12	1		2						
RECEPTS 8×180 (*103 & 104)		1440		20	12	3		4						EXTRA SPACE FOR SHUNT TRIP
RECEPTS 4×180 (*130)			720	20	12	5		6	12	20			606	AIR HANDLER (FC-4) (*130)
LIGHTS 10×124×60 (*130)	1628			20	12	7		8						
DEDICATED (*107)		1920		20	12	9		10	12	20		1920		PVM RECEPT (*102)
RECEPTS 4×180 (*102)			720	20	12	11		12						EXTRA SPACE FOR SHUNT TRIP
LIGHTS/EXHAUST FANS 349×420 (*105,106)	1961			20	12	13		14	12	20	560			AIR HANDLER (FC-21) (*104)
EXTRA SPACE FOR SHUNT TRIP						15		16						EXTRA SPACE FOR SHUNT TRIP
DEDICATED (*107)			1920	20	12	17		18	12	20			560	AIR HANDLER (FC-8) (*107)
						19		20	12	20	1240			LIGHTS 8×124 (*102)
						21		22						
						23		24						
TOTAL	2990	3360	3560								1800	1920	1366	TOTAL

TOTAL CONNECTED LOAD: A- 4790 B- 5280 C- 5026 15096 - WATTS 44 - AMPS

PANELBOARD SCHEDULE: L

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A B C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 10×124×260 (EXT)	1675			20	12	1		2	12	20	1565			LIGHTS 8×124×260 (*147,148,EXT)
AIR CURTAIN (*147)		124		20	12	3		4	12	20		1080		RECEPTS 6×180 (*147,148)
DEDICATED RECEPT (*151)			1920	20	12	5		6	12	20			1920	DEDICATED RECEPT (*151)
DEDICATED RECEPT (*151)	1920			20	12	7		8	12	20	1920			DEDICATED RECEPT (*151)
DEDICATED RECEPT (*151)		1920		20	12	9		10	12	20		1920		DEDICATED RECEPT (*151)
AIR HANDLER (FC-11) (*147)			660	20	12	11		12	12	20			1920	DEDICATED RECEPT (*151)
EXTRA SPACE FOR SHUNT TRIP						13		14						
TOTAL	3595	2044	2580								3485	3000	3840	TOTAL

TOTAL CONNECTED LOAD: A- 7280 B- 5044 C- 6420 18744 - WATTS 61 - AMPS

PANELBOARD SCHEDULE: M

200 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A B C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
DEDICATED RECEPT (*151)	1920			20	12	1		2	12	20	540			RECEPTS 3×180 (CORRIDOR,*152)
EXHAUST FAN (*147)		364		20	12	3		4	12	20		1920		DEDICATED RECEPT (*151)
EXHAUST FAN (*147)			364	20	12	5		6						EXTRA SPACE FOR SHUNT TRIP
EXTRA SPACE FOR SHUNT TRIP						7		8	4	70	6492			RANGE (*147)
COMBO OVEN (*147)		2820		30	8	9		10	4	70		6000		RANGE (*147)
COMBO OVEN (*147)			2820	30	8	11		12	4	70			4500	RANGE (*147)
COMBO OVEN (*147)	2820			30	8	13		14						
EXTRA SPACE FOR SHUNT TRIP						15		16	12	20		1920		FIRE SUPPRESSION (*147)
						17		18	12	20			1920	DEDICATED RECEPT (*151)
						19		20	12	20	1080			GFI RECEPTS 6×180 (*145,147)
DISHWASHER (*146)		6708		70	4	21		22	12	20		801		GARBAGE DISPOSAL (*146)
DISHWASHER (*146)			6708	70	4	23		24	12	20			801	GARBAGE DISPOSAL (*146)
DISHWASHER (*146)	6708			70	4	25		26						
						27		28						
AIR HANDLER (FC-9) (*151)			505	20	12	29		30	12	20			396	REFRIGERATOR (*145)
EXTRA SPACE FOR SHUNT TRIP						31		32	12	20	600			RANGE HOOD (*147)
						33		34						
RECEPTS (*147)			360	20	12	35		36						EXTRA SPACE FOR SHUNT TRIP
						37		38	8	30	2820			COMBO OVEN (*147)
						39		40	8	30		2820		COMBO OVEN (*147)
						41		42	8	30			2820	COMBO OVEN (*147)
TOTAL	11448	9892	11052								11532	11346	10437	TOTAL

TOTAL CONNECTED LOAD: A- 22980 B- 23353 C- 21495 67828 - WATTS 195 - AMPS

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
	CUSTOMER	4/12/07	IW
	CUSTOMER	11/30/06	JR

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E3

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CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR., EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD, ROXBORO, NC 27574

"Quality & Integrity Since 1968"

PANELBOARD SCHEDULE: M(A)

150 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A	B	C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
EXHAUST FAN (*147)	416			20	12	1				2						
EXHAUST FAN (*147)		416		20	12	3				4						
EXTRA SPACE FOR SHUNT TRIP						5				6						
DOUBLE REFRIGERATOR (*147)	1356			20	12	7				8						
DOUBLE FREEZER (*147)		1789		20	12	9				10	8	40		3016		SINK HEATER (*147)
REFRIGERATOR (*147)			1920	20	12	11				12	8	40			3016	SINK HEATER (*147)
SINGLE FREEZER (*147)	1789			20	12	13				14	12	15	1440			ICE MAKER (*147)
						15				16						
SINGLE REFRIGERATOR (*147)			1356	20	12	17				18						EXTRA SPACE FOR SHUNT TRIP
						19				20	12	20	492			EXHAUST (*146)
REFRIGERATOR (*147)		1920		20	12	21				22						
						23				24						EXTRA SPACE FOR SHUNT TRIP
						25				26	4	80	7395			EXHAUST/HEATER (*147)
						27				28	4	80		6667		EXHAUST/HEATER (*147)
						29				30	4	80			6667	EXHAUST/HEATER (*147)
TOTAL	3560	4124	3276										9327	9683	9683	TOTAL

TOTAL CONNECTED LOAD: A- 12887 B- 13807 C- 12959 39653 - WATTS 115 - AMPS

PANELBOARD SCHEDULE: R

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A	B	C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 3*124*2*60 (CORRIDOR,EXT)	615			20	12	1				2	12	20	1260			RECEPTS/REFER 7*180 (*142,EXT)
SPRINKLER COMPRESSOR (*139)		1920		20	12	3				4	8	40		3500		WATER HEATER (*140)
WATER HEATER (*142)			3500	40	8	5				6	8	40			3500	WATER HEATER (*140)
WATER HEATER (*142)	3500			40	8	7				8						
LIGHTS/EXT FAN 721*734 (*139,140,142)		1819		20	12	9				10	12	20		1080		RECEPTS 6*180 (*139,139)
EXTRA SPACE FOR SHUNT TRIP						11				12						EXTRA SPACE FOR SHUNT TRIP
						13				14	12	20	104			AIR HANDLER (FC-20) (BELOW FLOOR)
RECEPTS 7*180 (*140,142,MULTI PUR		1260		20	12	15				16						
						17				18						
						19				20						
AIR HANDLER (FC-16) (*139)		570		20	12	21				22	12	20		250		REFER (*142)
AIR HANDLER (FC-16) (*139)			570	20	12	23				24						EXTRA SPACE FOR SHUNT TRIP
AIR HANDLER (FC-16) (*139)	570			20	12	25				26	12	20	806			AIR HANDLER (FC-13) (*142)
EXTRA SPACE FOR SHUNT TRIP						27				28						
						29				30						
TOTAL	4685	5569	4070										2170	4830	3500	TOTAL

TOTAL CONNECTED LOAD: A- 6855 B- 10399 C- 7570 24824 - WATTS 87 - AMPS

PANELBOARD SCHEDULE: P

150 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A	B	C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 7*120*60 (*145)	1160			20	12	1				2						
				20	12	3				4						
						5				6	12	20			1855	LIGHTS 11*124*2*60 (CORRIDOR)
RECEPTS 6*180 (*145)	1080			20	12	7				8						
						9				10						
						11				12						EXTRA SPACE FOR SHUNT TRIP
EXT LIGHT/RECEPTS 60*6*180 (*145,152	1140			20	12	13				14	12	20	660			AIR HANDLER (FC-12) (*145)
AIR HANDLER (FC-10) (CORRIDOR)		660		20	12	15				16						
EXTRA SPACE FOR SHUNT TRIP						17				18						EXTRA SPACE FOR SHUNT TRIP
RECIRCULATING PUMP (*155)	110			15	12	19				20	12	20	330			AIR HANDLER (FC-18) (CORRIDOR)
RECIRCULATING PUMP (*155)		110		15	12	21				22						
LIGHTS/EXHAUST FAN 6*124*304 (*153,54)			1310	20	12	23				24						
EXTRA SPACE FOR SHUNT TRIP						25				26	4	70	7500			WATER HEATER (*155)
						27				28	4	70		7500		WATER HEATER (*155)
						29				30	4	70			1855	WATER HEATER (*155)
TOTAL	3490	770	1310										8490	7500	9355	TOTAL

TOTAL CONNECTED LOAD: A- 11980 B- 8270 C- 10665 30915 - WATTS 100 - AMPS

PANELBOARD SCHEDULE: S

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A	B	C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 8*124*520 (*138,EXT)	1890			20	12	1				2	12	20	180			RECEPTS 1*180 (*134)
POWERED J-BOX (EXT LIGHTS)		1920		20	12	3				4	12	20		1180		RECEPTS/EWC 5*180*260 (*134,EXT)
WATER HEATER (*136)			3500	40	8	5				6	12	20			1440	RECEPTS 8*180 (*134,138,EXT)
WATER HEATER (*136)	3500			40	8	7				8						
AIR HANDLER (FC-14) (*138)		806		20	12	9				10	8	40		3500		WATER HEATER (*137)
EXTRA SPACE FOR SHUNT TRIP						11				12	8	40			3500	WATER HEATER (*137)
WATER HEATER (*134)	3500			40	8	13				14						
WATER HEATER (*134)		3500		40	8	15				16						
POWERED J-BOX (EXT, LIGHTS) (*13			1920	20	12	17				18						EXTRA SPACE FOR SHUNT TRIP
						19				20	12	20	1163			LIGHTS EXHAUST FAN 480*450 (*136,137)
						21				22						
						23				24						
TOTAL	8890	6226	5420										1343	4650	4940	TOTAL

TOTAL CONNECTED LOAD: A- 10233 B- 10876 C- 10360 31469 - WATTS 91 - AMPS

PANELBOARD SCHEDULE: Q

125 AMP, 208 Y / 120 V., 3-PHASE, 4-WIRE

LOAD SERVED	LOAD (WATTS) A	B	C	BRKR TRIP	WIRE SIZE	CKT NO.	A	B	C	CKT NO.	WIRE SIZE	BRKR TRIP	LOAD (WATTS) A	B	C	LOAD SERVED
LIGHTS 8*124*160 (*134)	1440			20	12	1				2						
RECEPTS 4*180 (*134,EXT)		720		20	12	3				4						
						5				6	12	20			1080	RECEPTS 6*180 (*134,MULTI PUR.)
LIGHTS (MULTI PURPOSE)	1920			20	12	7				8						EXTRA SPACE FOR SHUNT TRIP
LIGHTS (MULTI PURPOSE)		1920		20	12	9				10	12	20		806		AIR HANDLER (FC-12) (*134)
LIGHTS (MULTI PURPOSE)			1920	20	12	11				12						EXTRA SPACE FOR SHUNT TRIP
LIGHTS (MULTI PURPOSE)	1920			20	12	13				14	12	20	655			LIGHTS/FAN 3*124*152 (*133)
						15				16						
						17				18						
TOTAL	5280	2640	1920										655	806	1080	TOTAL

TOTAL CONNECTED LOAD: A- 5935 B- 3446 C- 3000 12381 - WATTS 50 - AMPS

NOTE: ALL CIRCUITS TO BE WIRED AS NOTED

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
4	CRAWL SPACE VENTILATION	9/24/07	IW
3	SINK HEATER	7/20/07	IW
2	CUSTOMER	4/12/07	IW
1	CUSTOMER	1/8/07	JR
0	CUSTOMER	11/30/06	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1472

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E4

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

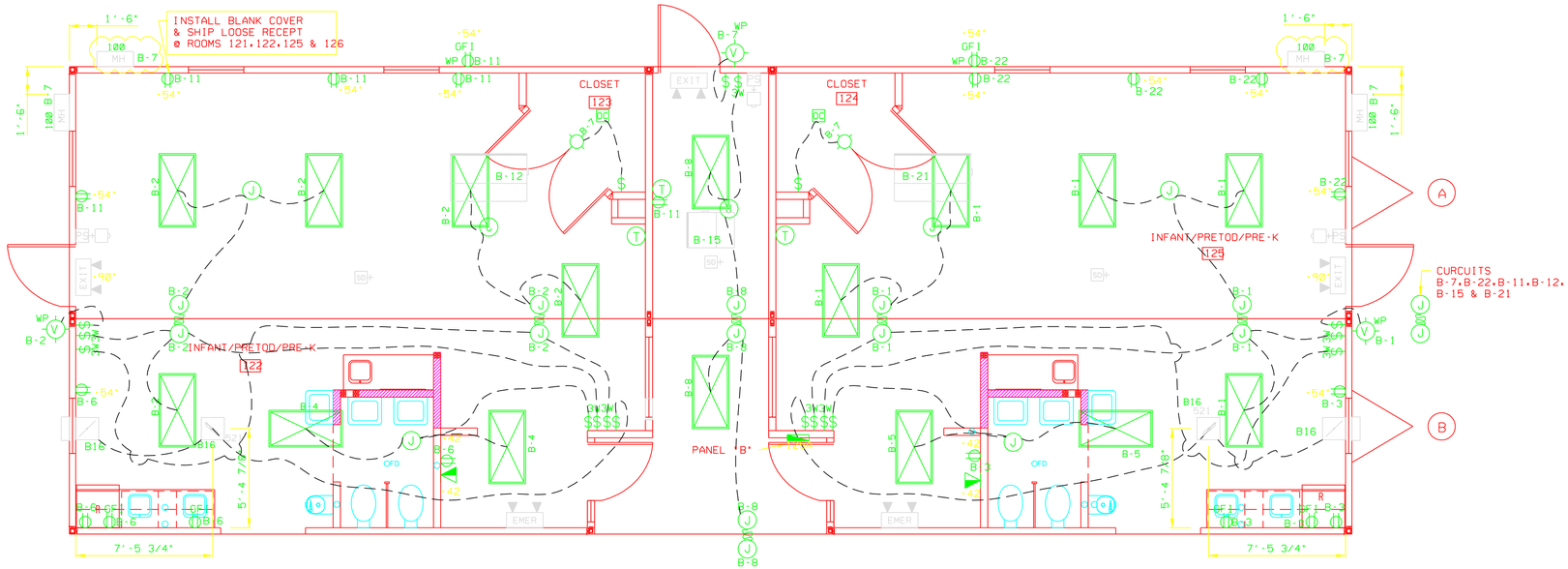
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
V	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RGS	RETURN AIR GRILLE @ UNIT
SD	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



ELECTRICAL PLAN

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7" DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 90" AFF
5) ALL CURCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: LW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E5

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

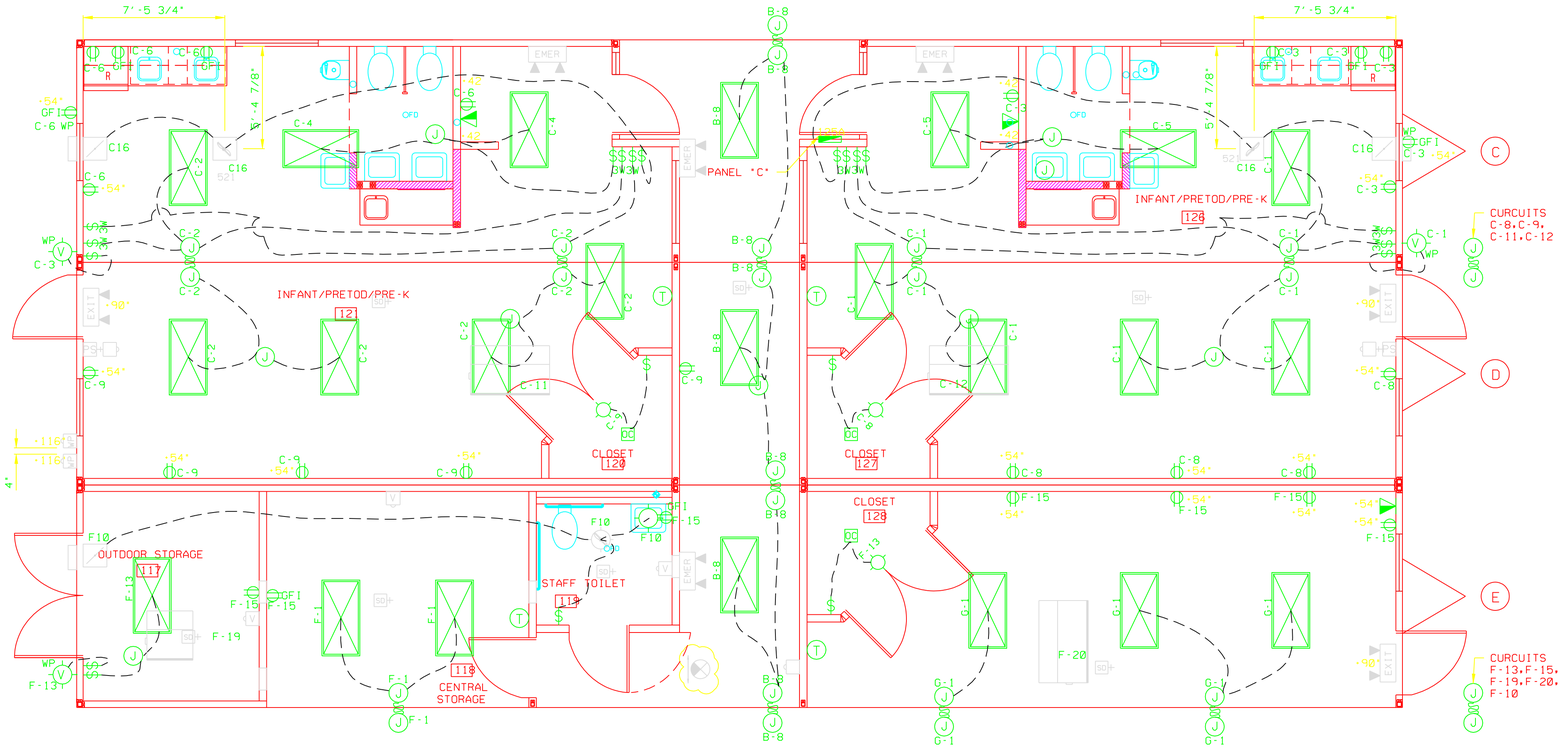
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
V	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
GFP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
MP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R/G	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



ELECTRICAL PLAN

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7" DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 90" AFF
5) ALL CURCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E6

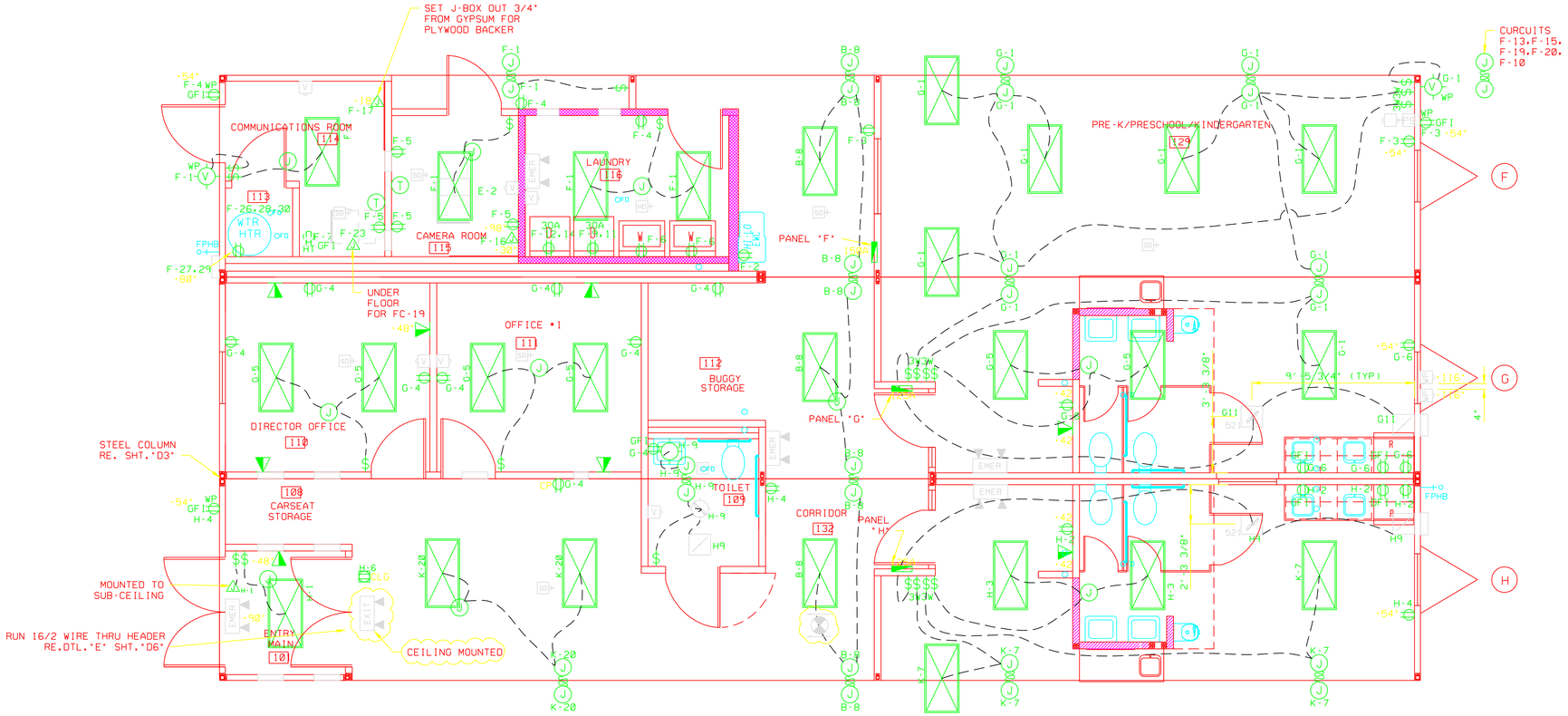
CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS



ELECTRICAL PLAN

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7" DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 98" AFF
5) ALL CURCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: LW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: E7

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

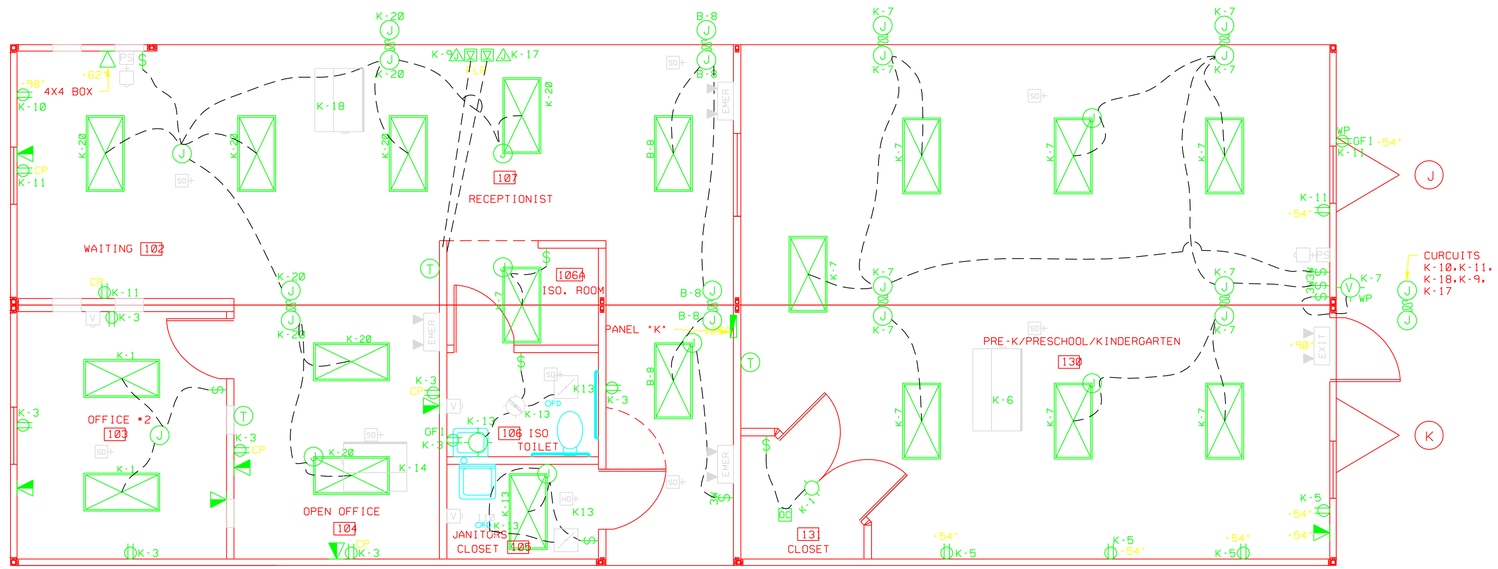
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
V	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GF I WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GF I HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



ELECTRICAL PLAN

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7" DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 98" AFF
5) ALL CURCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

© 2002 MARK LINE INDUSTRIES

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: E8

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

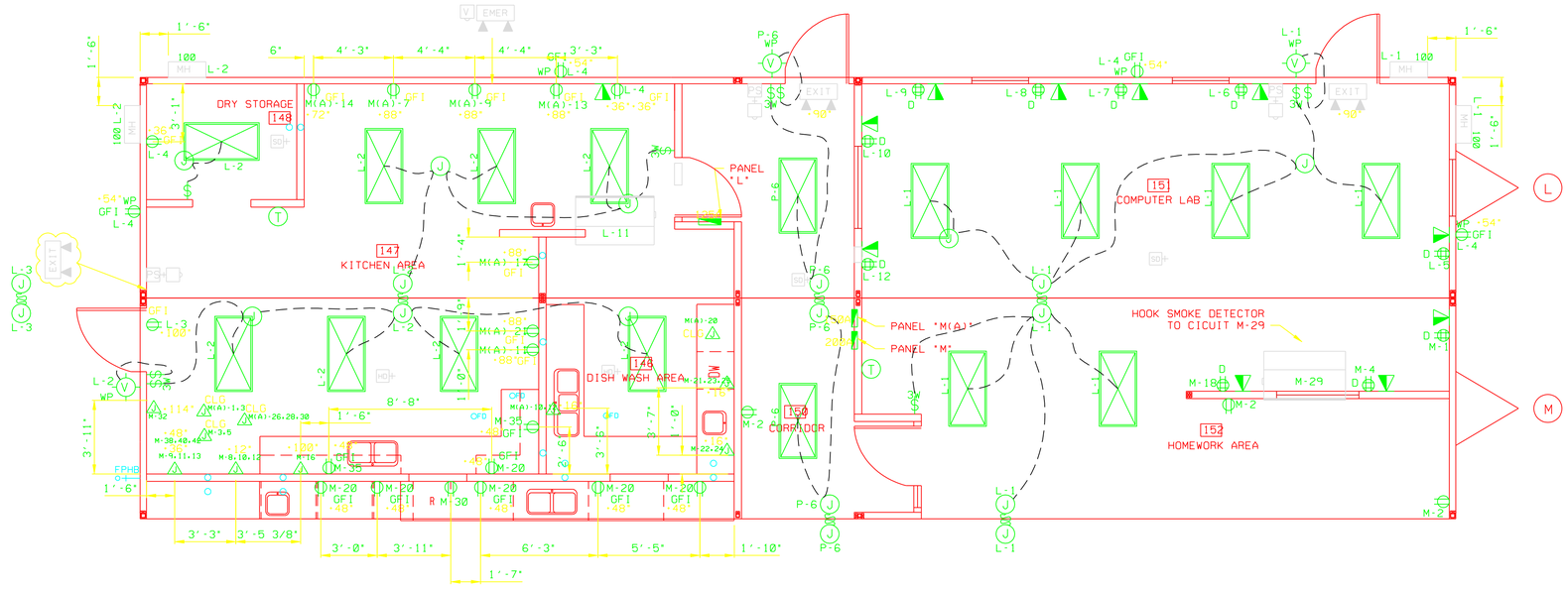
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V.. 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
V	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V.. 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V.. 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V.. 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A.. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V.. 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V.. 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V.. 20 A.. DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V.. 20 A.. DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V.. 20 A.. DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V.. 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



ELECTRICAL PLAN

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7" DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 92" AFF
5) ALL CURCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

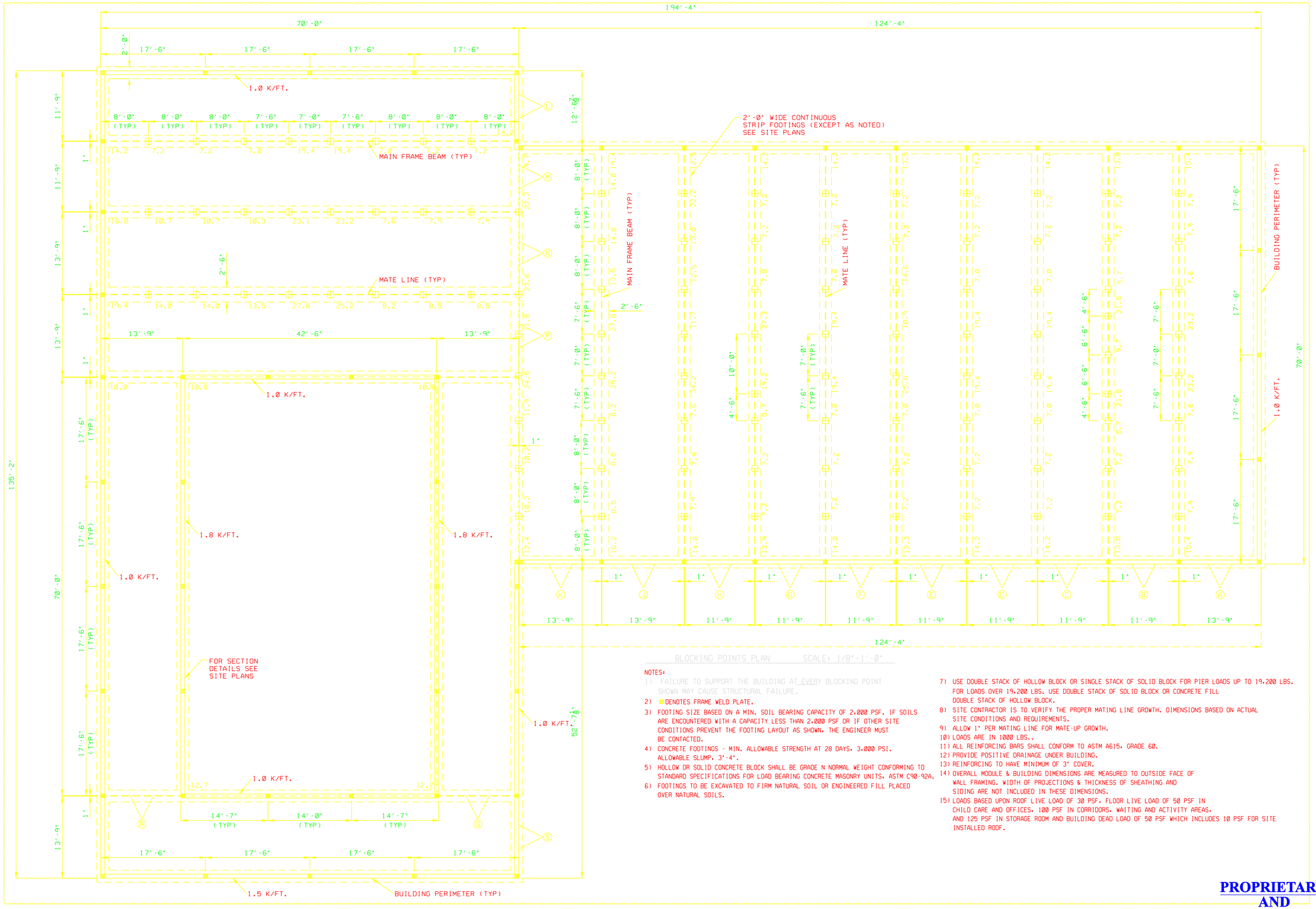
PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: E9

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



BLOCKING POINTS PLAN SCALE: 1/8"=1'-0"

NOTES:

1) FAILURE TO SUPPORT THE BUILDING AT EVERY BLOCKING POINT SHOWN MAY CAUSE STRUCTURAL FAILURE.
2) DENOTES FRAME WELD PLATE.
3) FOOTING SIZE BASED ON A MIN. SOIL BEARING CAPACITY OF 2,000 PSF. IF SOILS ARE ENCOUNTERED WITH A CAPACITY LESS THAN 2,000 PSF OR IF OTHER SITE CONDITIONS PREVENT THE FOOTING LAYOUT AS SHOWN, THE ENGINEER MUST BE CONTACTED.
4) CONCRETE FOOTINGS - MIN. ALLOWABLE STRENGTH AT 28 DAYS, 3,000 PSI. ALLOWABLE SLUMP, 3"-4".
5) HOLLOW OR SOLID CONCRETE BLOCK SHALL BE GRADE N NORMAL WEIGHT CONFORMING TO STANDARD SPECIFICATIONS FOR LOAD BEARING CONCRETE MASONRY UNITS, ASTM C90-92A.
6) FOOTINGS TO BE EXCAVATED TO FIRM NATURAL SOIL OR ENGINEERED FILL PLACED OVER NATURAL SOILS.
7) USE DOUBLE STACK OF HOLLOW BLOCK OR SINGLE STACK OF SOLID BLOCK FOR PIER LOADS UP TO 19,200 LBS. FOR LOADS OVER 19,200 LBS. USE DOUBLE STACK OF SOLID BLOCK OR CONCRETE FILL DOUBLE STACK OF HOLLOW BLOCK.
8) SITE CONTRACTOR IS TO VERIFY THE PROPER MATING LINE GROWTH. DIMENSIONS BASED ON ACTUAL SITE CONDITIONS AND REQUIREMENTS.
9) ALLOW 1" PER MATING LINE FOR MATE-UP GROWTH.
10) LOADS ARE IN 1000 LBS..
11) ALL REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60.
12) PROVIDE POSITIVE DRAINAGE UNDER BUILDING.
13) REINFORCING TO HAVE MINIMUM OF 3" COVER.
14) OVERALL MODULE & BUILDING DIMENSIONS ARE MEASURED TO OUTSIDE FACE OF WALL FRAMING. WIDTH OF PROJECTIONS & THICKNESS OF SHEATHING AND SIDING ARE NOT INCLUDED IN THESE DIMENSIONS.
15) LOADS BASED UPON ROOF LIVE LOAD OF 30 PSF. FLOOR LIVE LOAD OF 50 PSF IN CHILD CARE AND OFFICES. 100 PSF IN CORRIDORS, WAITING AND ACTIVITY AREAS, AND 125 PSF IN STORAGE ROOM AND BUILDING DEAD LOAD OF 50 PSF WHICH INCLUDES 10 PSF FOR SITE INSTALLED ROOF.

SQUARE

FOOTING LOADS	
SIZE	CAPACITY
16"	4,500 *
18"	5,800 *
21"	8,200 *
24"	10,800 *
27"	13,900 *
30"	17,200 *
33"	21,000 *
36"	25,100 *
40"	31,000 *
48"	45,000 *

ROUND

FOOTING LOADS	
SIZE	CAPACITY
16" DIA.	4,200 *
18" DIA.	5,300 *
21" DIA.	7,200 *
24" DIA.	9,400 *
27" DIA.	11,900 *
30" DIA.	14,700 *
36" DIA.	21,000 *
40" DIA.	26,000 *

STATE SEALS:

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REV	DESCRIPTION	DATE	BY

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CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: F1

PROPRIETARY AND CONFIDENTIAL

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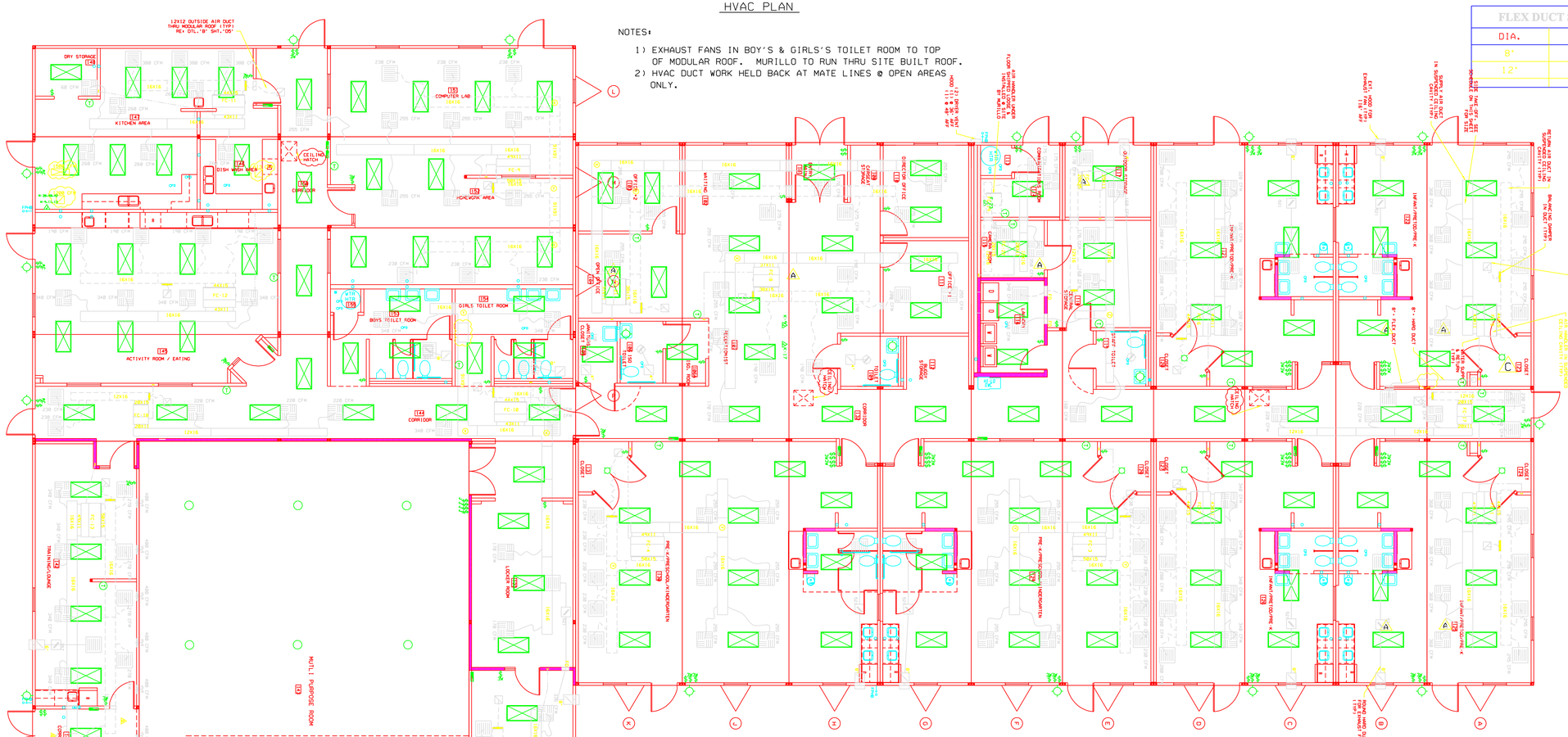
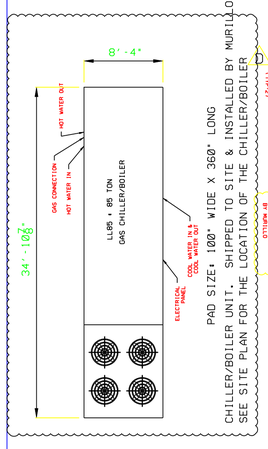
"Quality & Integrity Since 1968"

HVAC PLAN

NOTES:

1) EXHAUST FANS IN BOY'S & GIRLS'S TOILET ROOM TO TOP OF MODULAR ROOF. MURILLO TO RUN THRU SITE BUILT ROOF.
2) HVAC DUCT WORK HELD BACK AT MATE LINES @ OPEN AREAS ONLY.





PAD SIZE: 100" WIDE X 360" LONG
CHILLER/BOILER UNIT. SHIPPED TO SITE & INSTALLED BY MURILLO
SEE SITE PLAN FOR THE LOCATION OF THE CHILLER/BOILER

MOUNTED IN CRAWL SPACE SHIPPED LOOSE & INSTALLED ON SITE BY OTHERS

FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550

FAN COIL SCHEDULE

FC #	MODEL	SUPPLY CFM	OA. CFM	AIR CHANGES / HOUR	HEATING FLOW RATE (GPM)	HEATING CAPACITY	COOLING FLOW RATE (GPM)	COOLING CAPACITY	COIL CONNECTION	FAN SPEED	NOTES
160-FC-1	HH-R-018	1440	240	15	6.8	68708	8.5	42667	LEFT HAND	HI	
160-FC-2	HH-R-018	1360	240	15	6.8	68708	8.5	42667	RIGHT HAND	HI	
160-FC-3	HH-R-022	1530	390	11	7.8	78618	10.5	52476	LEFT HAND	HI	
160-FC-4	HH-R-022	1530	440	11	7.8	78618	10.5	52476	RIGHT HAND	HI	
160-FC-5	HH-R-018	1440	260	15	6.8	68708	8.5	42667	RIGHT HAND	HI	
160-FC-6	HH-R-018	1280	240	15	6.8	68708	8.5	42667	LEFT HAND	HI	
160-FC-7	HH-R-010	810	100	11	4.2	42472	6.4	31839	LEFT HAND	HI	
160-FC-8	HH-R-015	1190	200	10	5.9	58192	6.4	32164	RIGHT HAND	HI	
160-FC-9	HH-R-022	1785	400	14	8.2	82243	11.3	56347	RIGHT HAND	HI	DUCT SMOKE DETECTOR IN R/A DUCT
160-FC-10	HH-R-018	1360	650	12	6.8	68708	8.5	42667	RIGHT HAND	HI	
160-FC-11	HH-R-018	1360	220	18	6.8	68708	8.5	42667	LEFT HAND	HI	
160-FC-12	HH-R-018	1360	600	15	6.8	68708	8.5	42667	RIGHT HAND	HI	
160-FC-13	HH-R-022	1530	270	16	7.8	78618	10.5	52472	LEFT HAND	HI	
160-FC-14	HH-R-022	1360	100	16	7.4	73863	9.6	48006	RIGHT HAND	MEDIUM	
160-FC-15	HH-R-022	1680	360	16	8.2	81930	11.2	55987	RIGHT HAND	HI	
160-FC-16	AV-40	4000	1800	6	19.7	198217	30.7	153618			HEAVY DUTY RETURN AIR GRILLE 72" AFF TO BOTTOM. DUCT SMOKE DETECTOR IN R/A DUCT
160-FC-17	HH-R-008	660	200	17	3.3	33302	4.7	23344	RIGHT HAND	HI	
160-FC-18	HH-R-008	660	200	17	3.3	33302	4.7	23344	RIGHT HAND	HI	
160-FC-19	LH-R-003	300	0	—	5.8	28853	—	—	RIGHT HAND	HI	UNIT MOUNTED THERMOSTAT (2) HEAT COILS
160-FC-20	LH-R-003	300	0	—	5.8	28853	—	—	RIGHT HAND	HI	UNIT MOUNTED THERMOSTAT (2) HEAT COILS
160-FC-21	HH-R-015	1190	100	15	5.9	58792	6.4	32164	RIGHT HAND	HI	
160-FC-22	HH-R-008	525	0	30	3.4	34376	4.9	24387	LEFT HAND	HI	

CRAWL SPACE HEATING & VENTILATION SCHEDULE

CRAWL SPACE AREA	15,103	SQUARE FEET
CRAWL SPACE HEIGHT	24	INCHES
CRAWL SPACE VOLUME	30,206	CUBLIC FEET
VENTILATION RATE	1.00	CFM/50 SQ.FT
VENTILATION REQUIRED	302	CFM
VENTILATION PROVIDED	480	CFM
HEAT PROVIDED	57,712	BTU/H

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY
F		9/15/08	DC
E	REVISED CFM'S AND FAN/COIL SCHEDULE	1/9/08	JR
D	CRAWL SPACE VENITALTION	10/31/07	IW
C	CUSTOMER	9/24/07	IW
B	CUSTOMER	1/8/07	JR
A	CUSTOMER	11/30/06	JR
	AS BUILT		

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/8"=1'-0"

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"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
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WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
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3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
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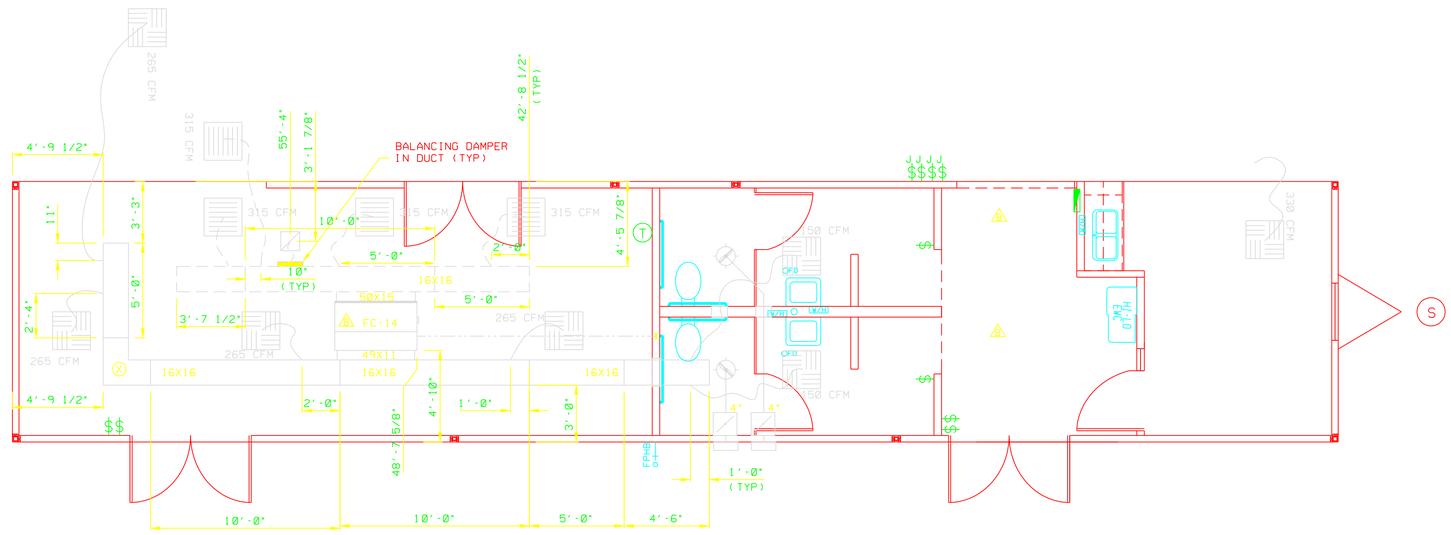
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

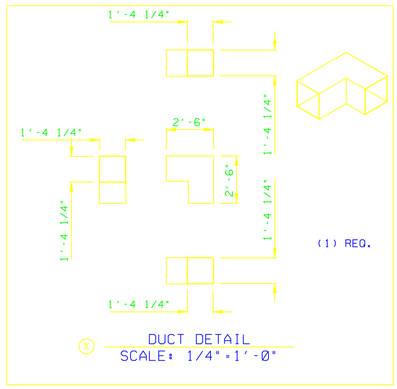
SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



HVAC PLAN

NOTES:
1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO



DUCT DETAIL
SCALE: 1/4"=1'-0"

FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

© 2002 MARK LINE INDUSTRIES

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

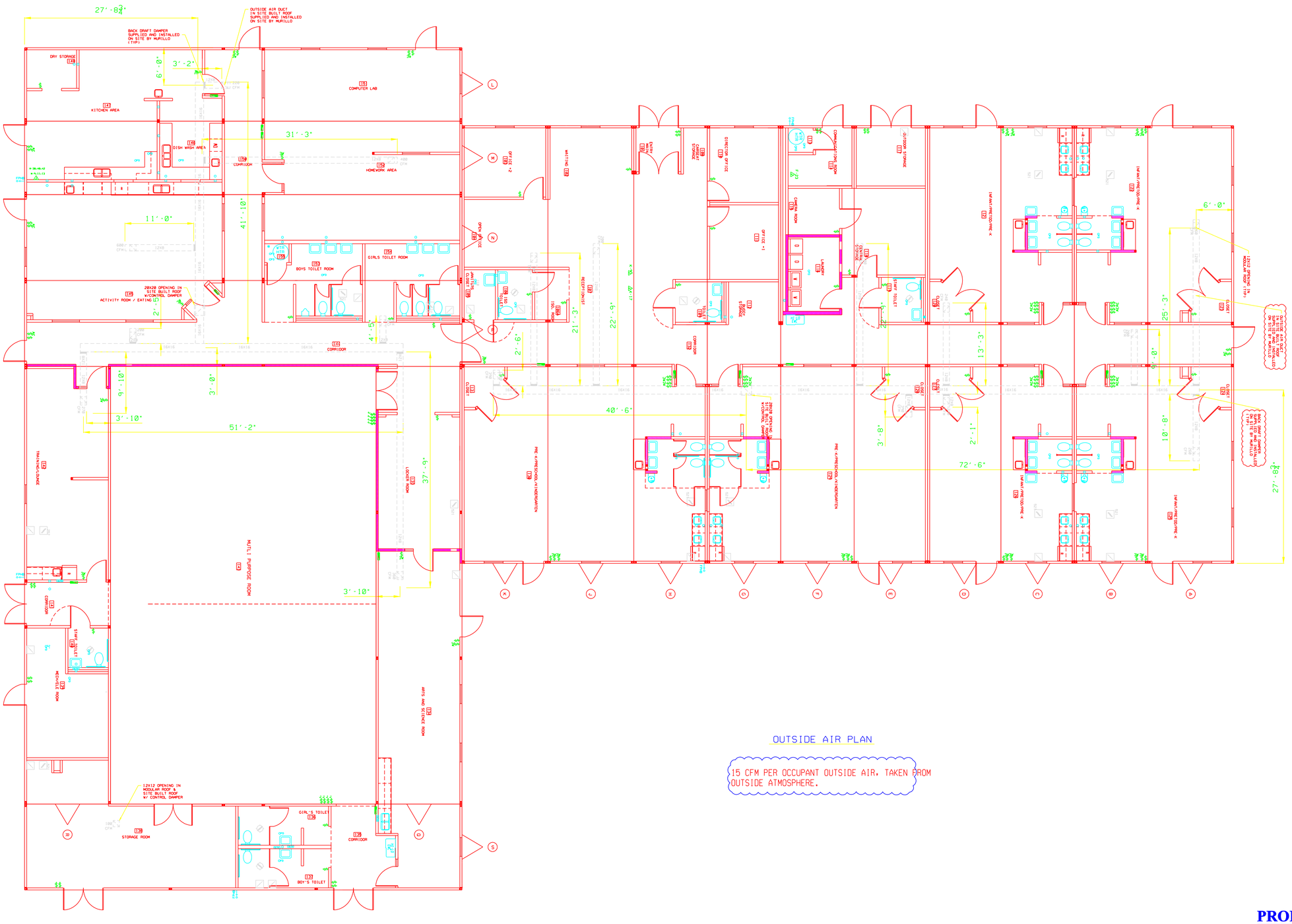
QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: H10

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



OUTSIDE AIR PLAN

15 CFM PER OCCUPANT OUTSIDE AIR, TAKEN FROM OUTSIDE ATMOSPHERE.

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY

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CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/8"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: H2

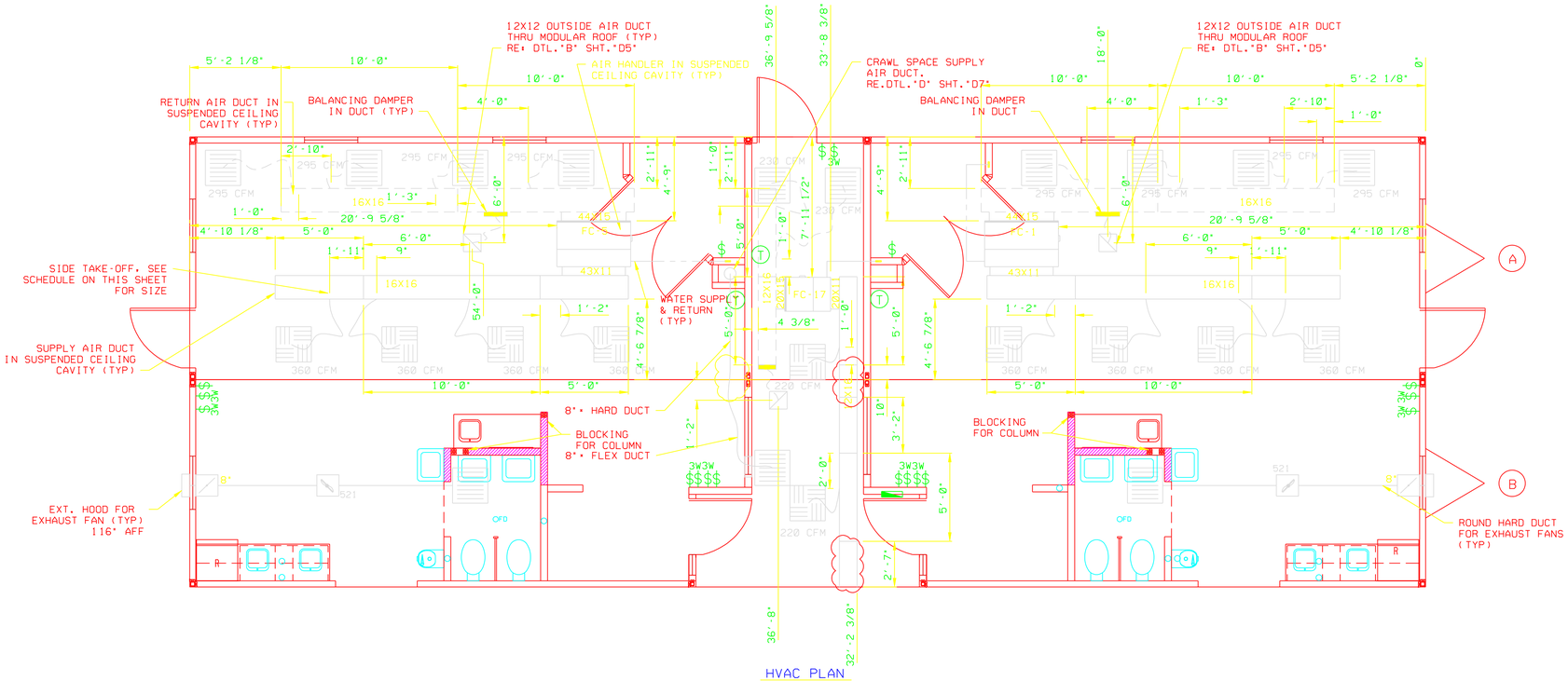
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
V	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
GFP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
SD	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



HVAC PLAN

NOTES:
1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO

FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

© 2002 MARK LINE INDUSTRIES

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: LW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: H3

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

STATE SEALS:

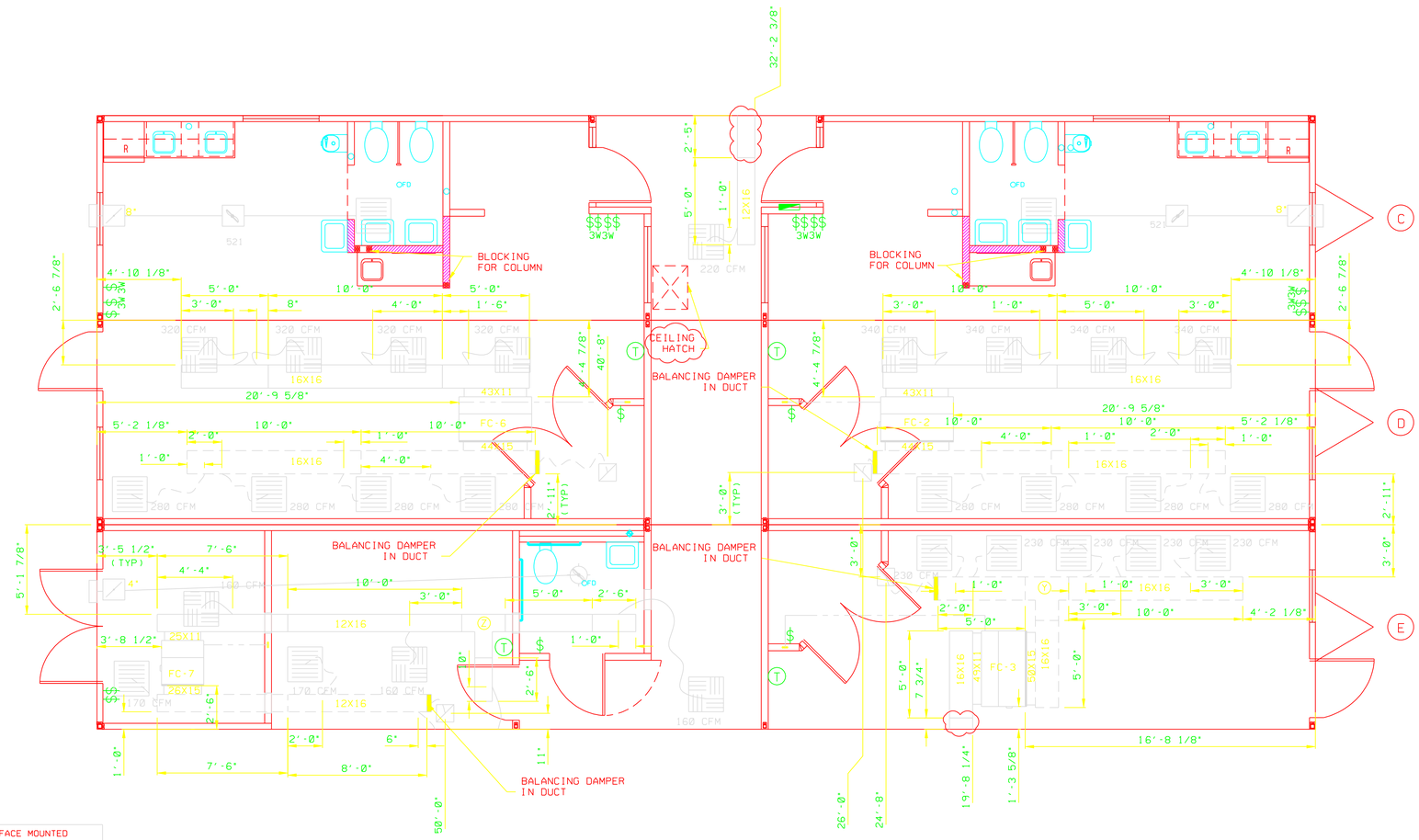
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

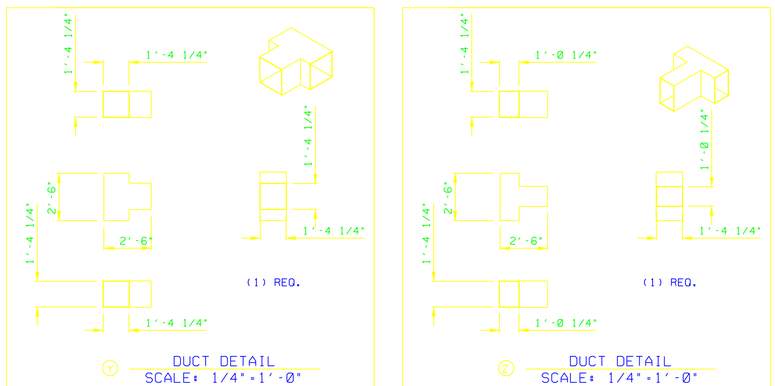
DRAWING LEGEND



HVAC PLAN

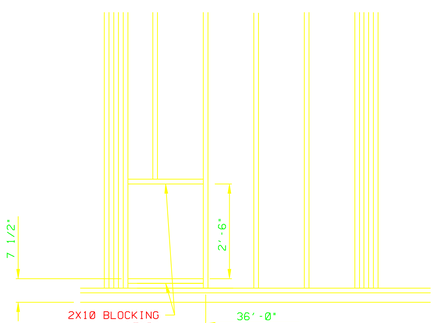
NOTES:
1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO

FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550



Y DUCT DETAIL
SCALE: 1/4"=1'-0"

Z DUCT DETAIL
SCALE: 1/4"=1'-0"



A CEILING HATCH FRAMING DETAIL
UNIT "C"
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: H4

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

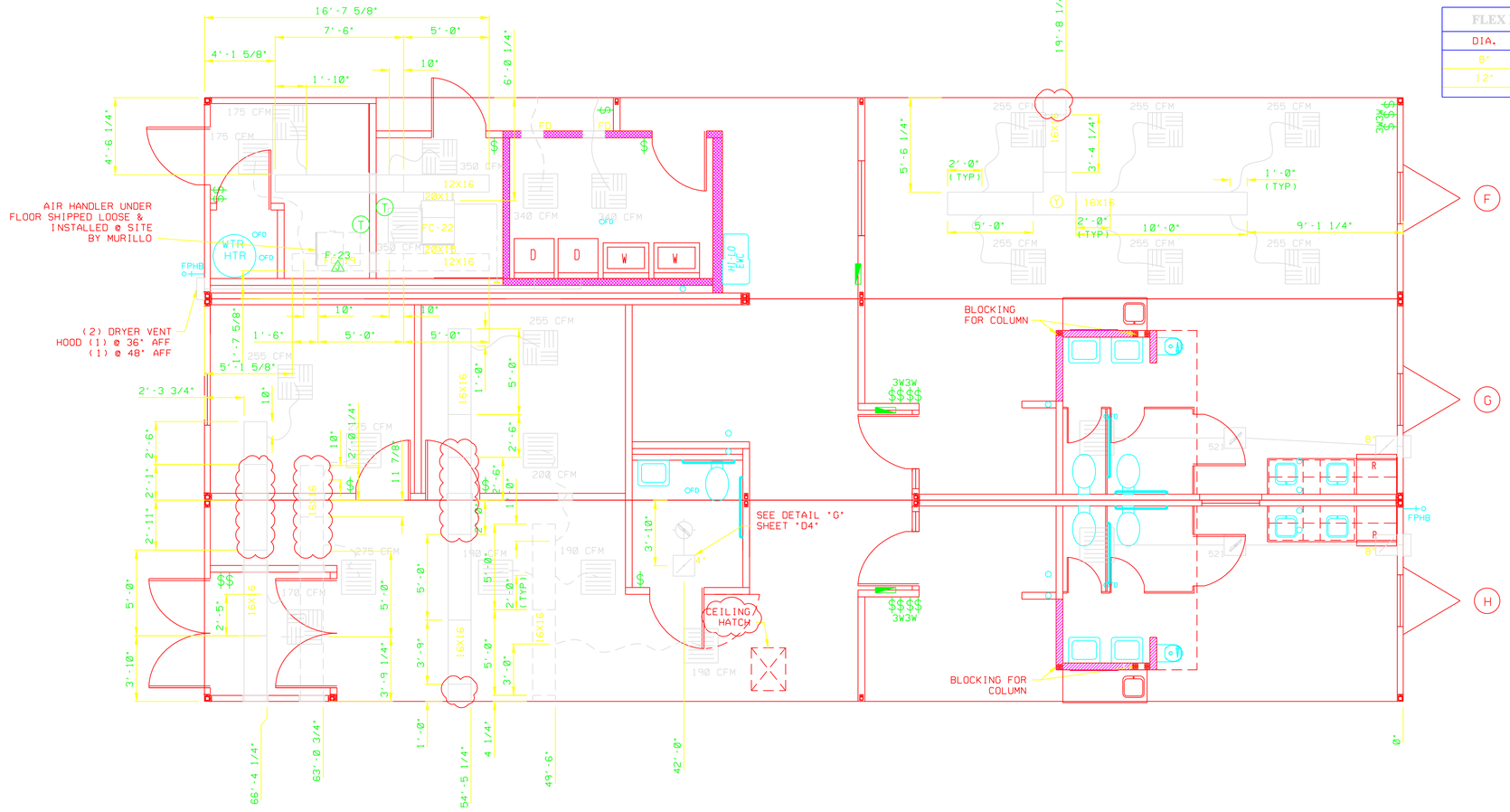
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RGC	RETURN AIR GRILLE @ UNIT
SA	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

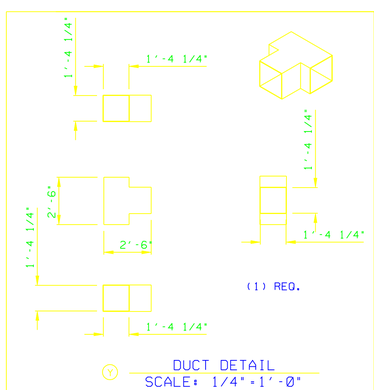
DRAWING LEGEND



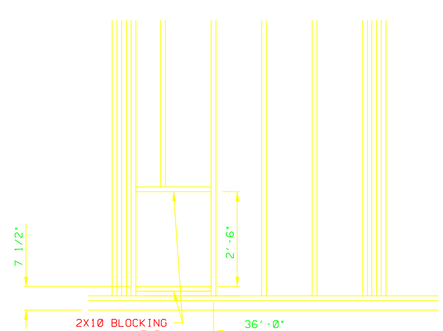
HVAC PLAN

NOTES:
1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO

FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550



DUCT DETAIL
SCALE: 1/4"=1'-0"



CEILING HATCH FRAMING DETAIL
UNIT "H"
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDMC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: H5

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"

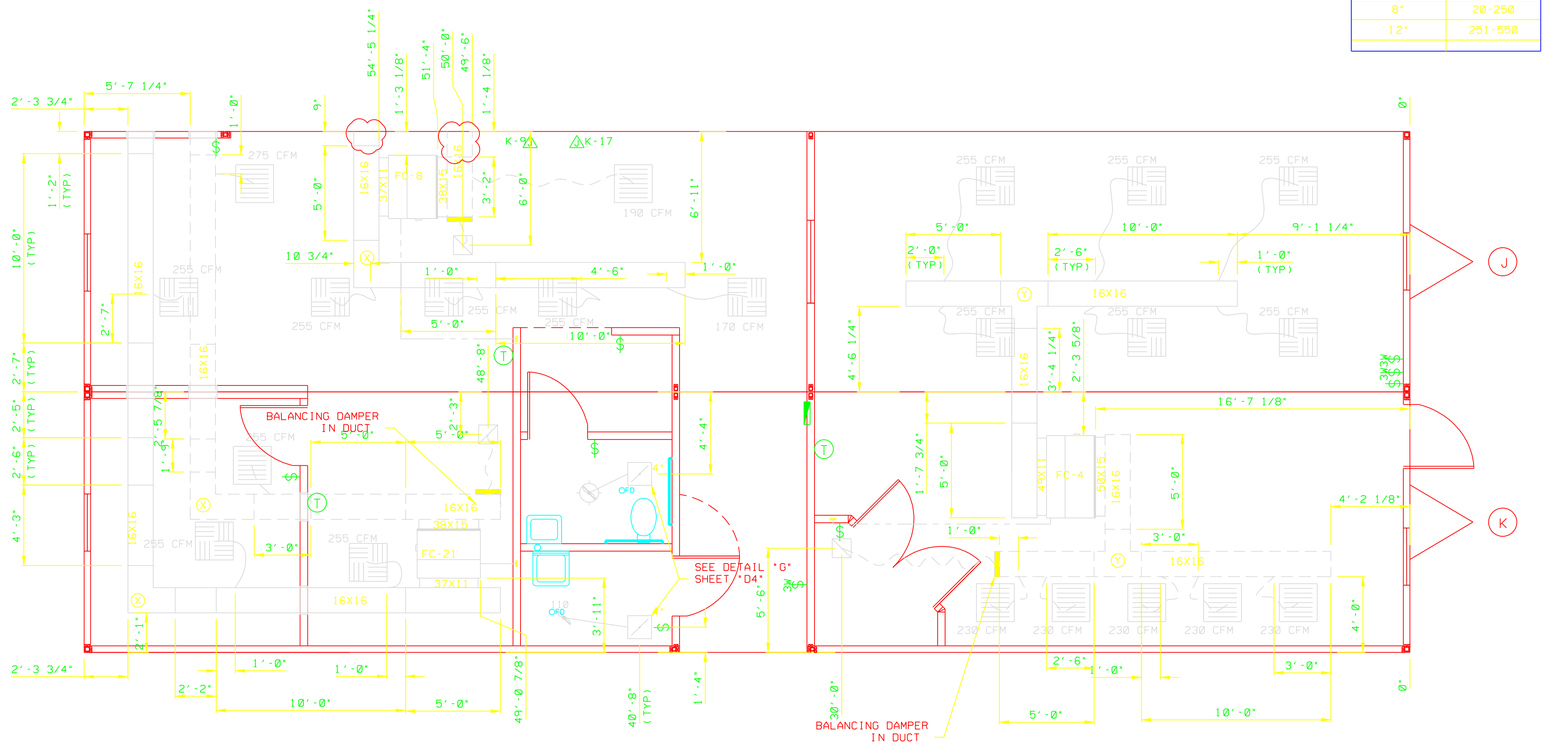
SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
SA	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

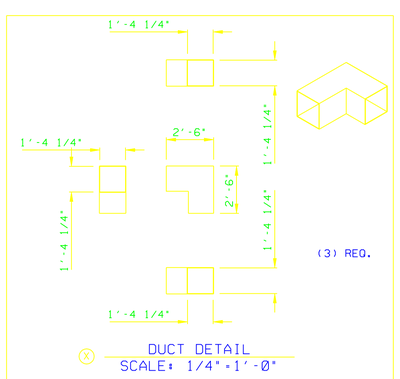
DRAWING LEGEND

FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550

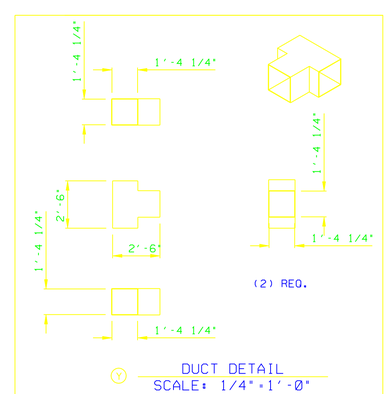


HVAC PLAN

NOTES:
1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO



DUCT DETAIL
SCALE: 1/4"=1'-0"



DUCT DETAIL
SCALE: 1/4"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

© 2002 MARK LINE INDUSTRIES

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: H6

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

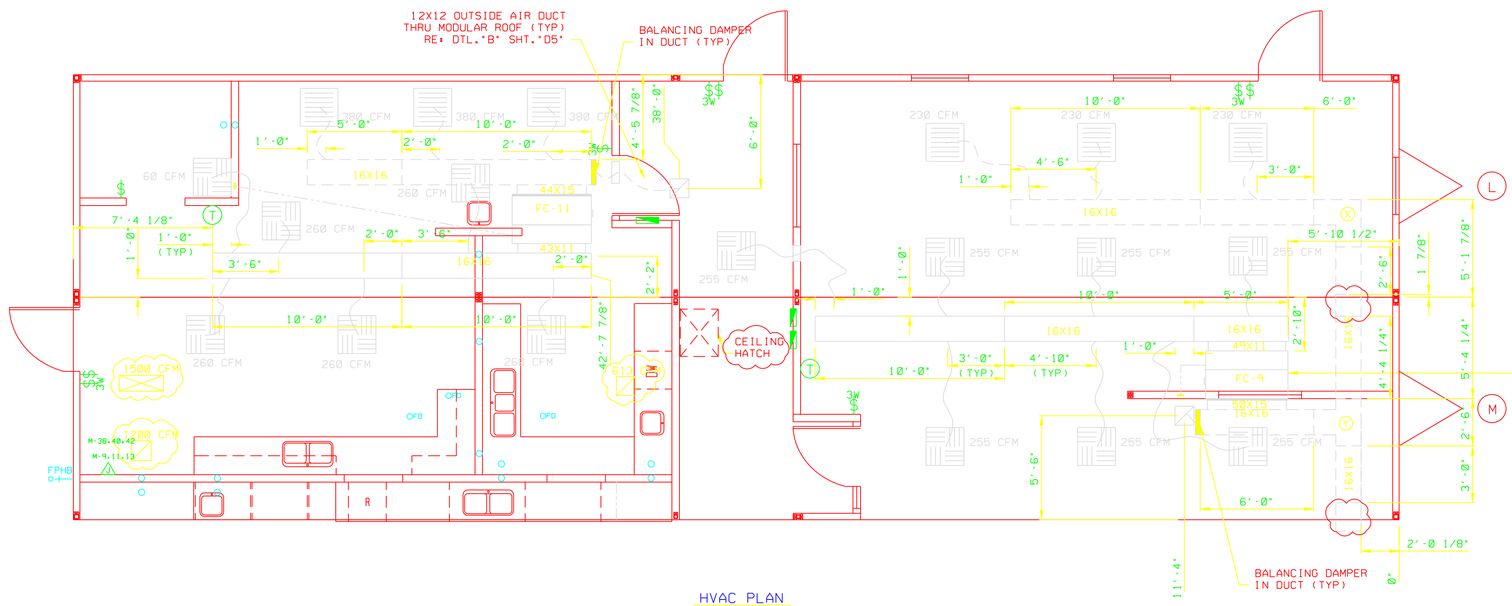
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

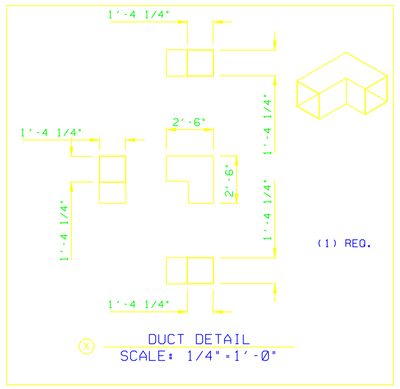
DRAWING LEGEND



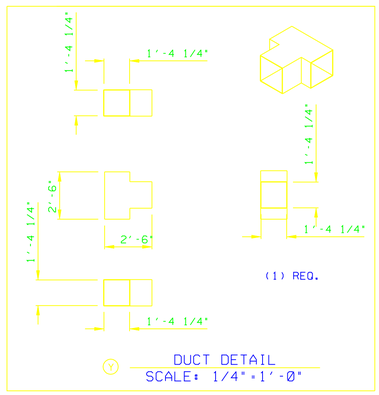
HVAC PLAN

NOTES:
1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO

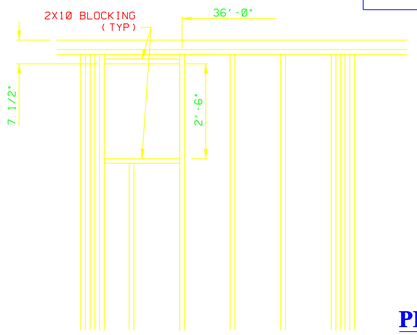
FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550



DUCT DETAIL
SCALE: 1/4"=1'-0"



DUCT DETAIL
SCALE: 1/4"=1'-0"



CEILING HATCH FRAMING DETAIL
UNIT "C"
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: H7

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"

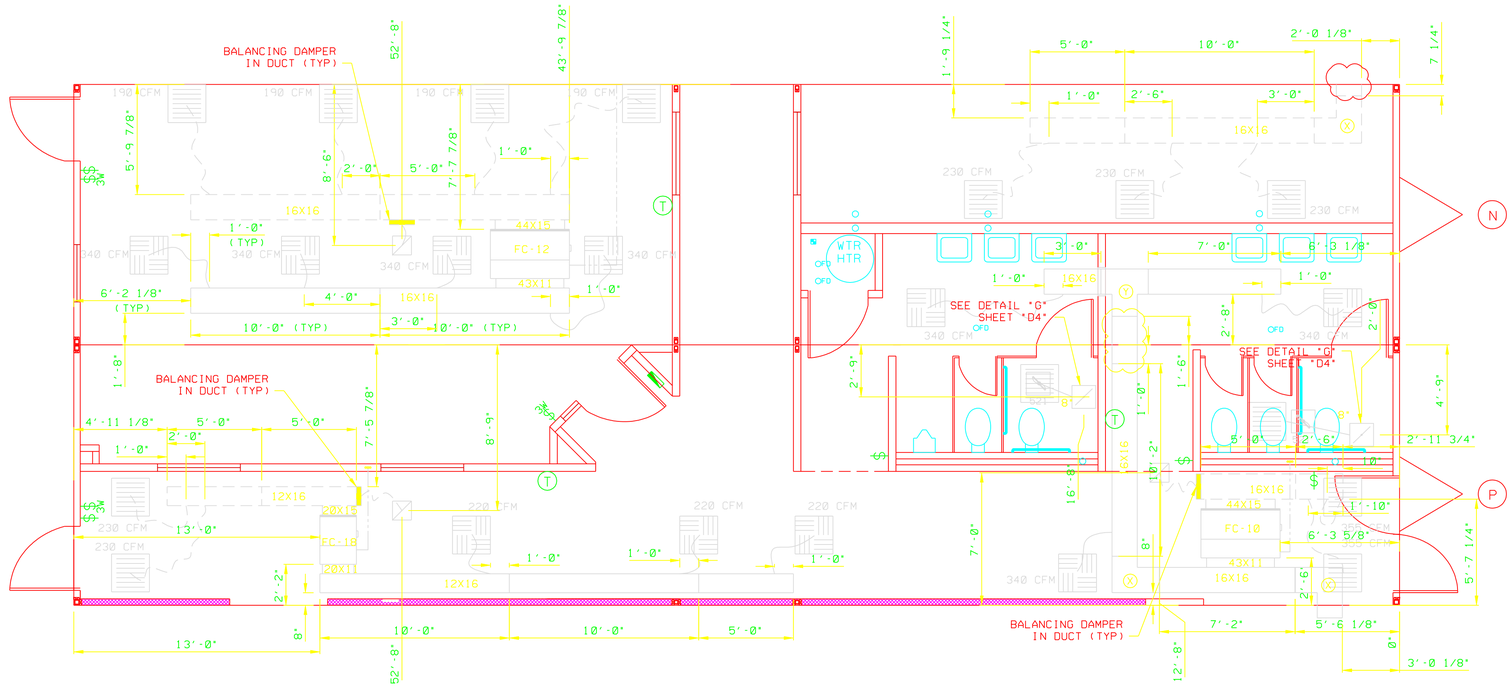
SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PS	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R/G	RETURN AIR GRILLE @ UNIT
S/G	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

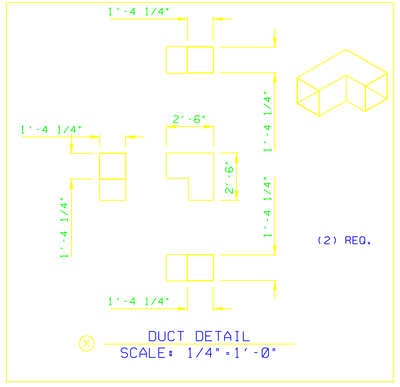
DRAWING LEGEND

FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550

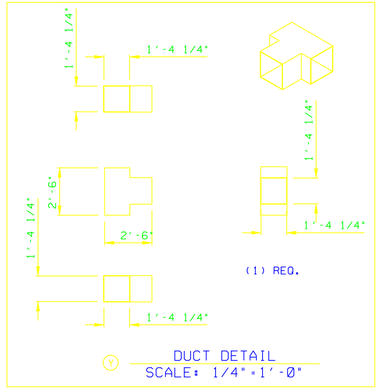


HVAC PLAN

NOTES:
1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO



DUCT DETAIL
SCALE: 1/4"=1'-0"



DUCT DETAIL
SCALE: 1/4"=1'-0"

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: LW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: H8

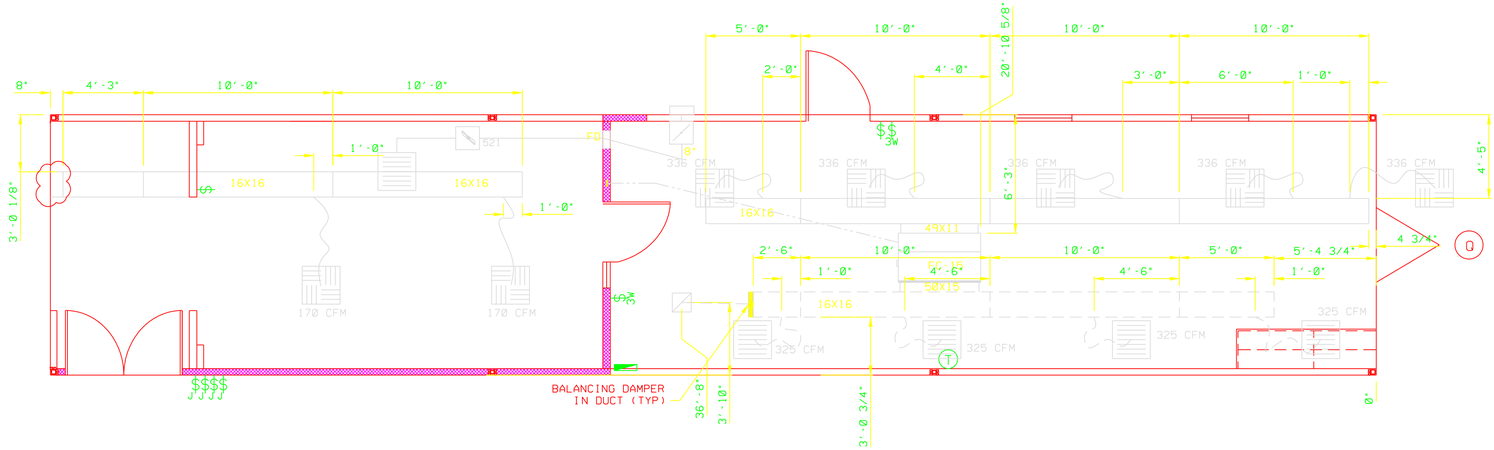
CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

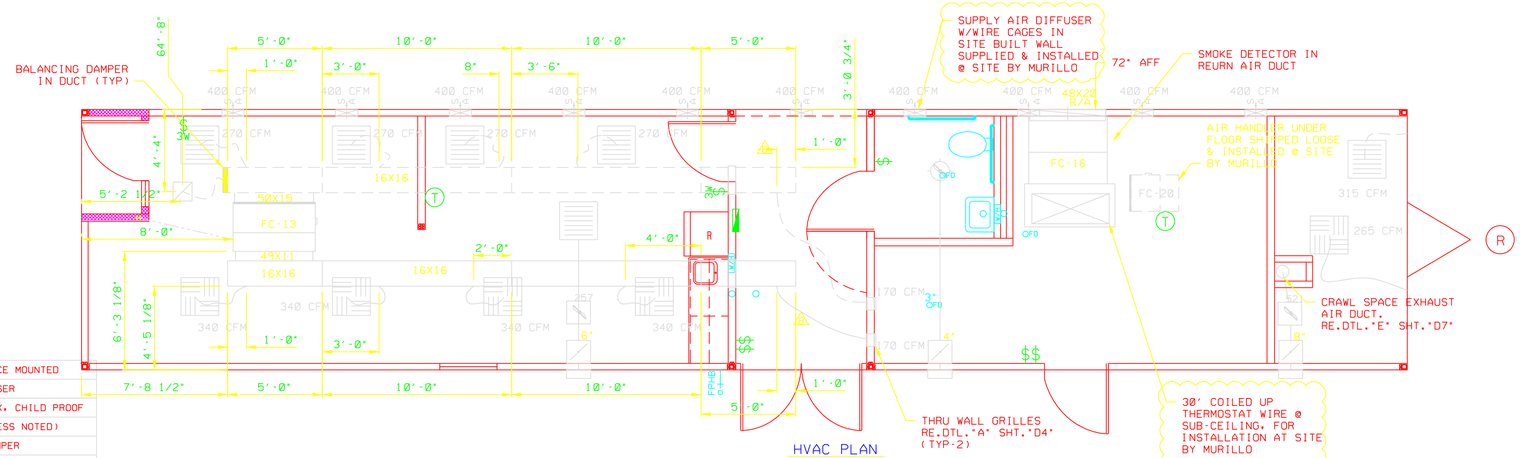
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GF I WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GF I	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GF I HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R	RETURN AIR GRILLE @ UNIT
S	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS





HVAC PLAN

NOTES:
1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO

FLEX DUCT SIZES	
DIA.	CFM
8"	20-250
12"	251-550

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: LW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: H9

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND

MARK	DESCRIPTION
FD3	FIRE DAMPER R.O. 11 1/4" X 11 1/4", 3" DN (VERIFY)
FD2	FIRE DAMPER R.O. 15 1/2" X 16 1/2", 3" DN (VERIFY)
EP	FINISHED OPENING R.O. 37" X 37", 33 1/4" AFF
808	7280 INT STEEL DOOR. (20 MIN). W/STEEL JAMB DOUBLE EGRESS R.O. 74" X 81"
699	7280 INT STEEL DOOR W/STEEL JAMB R.O. 74" X 81"
444	7280 INT STEEL DOOR. (45 MIN). W/STEEL JAMB R.O. 74" X 81"
555	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB R.O. 38" X 81"
777	3680 INT L.O. S.C. DOOR. (45 MIN). STEEL JAMB W/SIDE LITE R.O. 54 1/2" X 82 1/4"
999	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB W/SIDE LITE R.O. 52" X 81"
FO	FINISHED OPENING R.O. 37 1/4" X 80 5/8"
FEC	RECESSED FIRE EXTINGUISHER CABINET R.O. 18 1/2" X 25" 36" AFF
CS	3660 VERTICAL SLIDE WINDOW. ALUM. FRAME R.O. 36" X 60", VERIFY 24" AFF VERIFY
KMA	MATE LINE OPENING R.O. 55 1/2" X 37 1/2" 48 1/2" AFF
KM	4830 VIEW WINDOW. STEEL JAMB R.O. 52 1/2" X 34 1/2" 50" AFF
499	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
607	7280 INT LEGACY OAK SOLID CORE DOOR W/STEEL JAMB R.O. 74" X 81"
601A	MATE LINE OPENING R.O.: 46"X85"
601	3680 INT L.O. S.C. DOOR. (20 MIN). STEEL JAMB R.O. 38" X 81"
401	7284 STOREFRONT DOOR R.O. 76 1/4"X86 1/8" (HOLD)
303	7280 EXT. STEEL DOOR W/STEEL JAMB (CTR. MULLION) R.O. 76 3/4"X82 5/8"
300	3680 EXTERIOR STEEL DOOR W/STEEL JAMB R.O. 40 1/2"X82 5/8"

OPENING SCHEDULE

MARK	DESCRIPTION
M1	FRAMED OPENING R.O. 12" X 12" 1 1/2" DOWN
KNA	MATE LINE OPENING R.O. 43 1/2" X 37 1/2" 48 1/2" AFF
KN	3630 VIEW WINDOW. STEEL JAMB R.O. 40 1/2" X 34 1/2" 50" AFF
H5	DUCT OPENING R.O. 8" X 8" 1 1/2" DOWN
H4	GRILLE OPENING R.O. 48" X 20" 72" AFF
H3	DUCT OPENING R.O. 18" X 18" 1 1/2" DOWN
H2	DUCT OPENING R.O. 12" X 12" 1 1/2" DOWN
H1	DUCT OPENING R.O. 14" X 18" 1 1/2" DOWN

OPENING SCHEDULE

ARCHITECTURE NOTES

NOTES:

1) ADDITIONAL BLOCKING IS REQUIRED IN WALLS AT LAVS, BUBBLERS, DRINKING FOUNTAIN, GRAB BARS, & MODESTY PARTITIONS
2) EXTERIOR WALLS ARE 4 1/8" THK. (UNLESS NOTED)
3) INTERIOR WALLS ARE 4 3/4" THK. (UNLESS NOTED)
4) MATE LINE WALLS ARE 4 1/8" THK. (UNLESS NOTED)
5) HATCHED WALLS INDICATES WALLS THAT ARE 4'-6" TALL
6) CROSS HATCHED WALLS INDICATES WALLS THAT ARE 1-HOUR RATED, RE: DTL."E" SHT."D1"
7) CORRIDOR WALLS ARE LOAD BEARING, COMPRESSION STRIP REQUIRED @ FLOOR & CEILING
8) HEADER OVER DOORS & WINDOWS IN EXTERIOR WALLS TO BE DOUBLE #2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM
9) REFRIGERATOR, CLOTHES WASHER, DRYER & DISHWASHER BY NAF
10) ALL STAINLESS STEEL SHELVING BY NAFI
11) HEADER OVER INTERIOR WINDOWS TO BE DOUBLE #2 SPF 2X8'S W/ 1/2" PLYWOOD SHIM

ELECTRICAL NOTES

NOTES:

1) EXIT AND EMERGENCY LIGHTS WIRED TO LOCAL LIGHT CIRCUIT UNSWITCHED.
2) BATTERY PACKS TO BE CONNECTED BY MURILLO.
3) SUSPENDED CEILING SUPPLIED AND INSTALLED BY MURILLO TROFER LIGHTS TO BE HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
4) 7" DRUM LIGHT INSTALLED ON WALL ABOVE DOOR 90" AFF
5) ALL CIRCUITS TO BE WIRED AS NOTED
6) SET OUT ALL RECESSED ELECTRICAL BOXES 3/8" FROM GYPSUM @ ALL TILED AREAS. SEE SHEET "A4"
7) CONDUIT STUBS IN SUSPENDED CEILING CAVITY @ 8'-6" AFF

HVAC NOTES

NOTES:

1) LAY-IN DIFFUSERS HOOKED UP AND STRAPED TO SUB-CEILING AND INSTALLED INTO GRID AT SITE BY MURILLO.
2) CEILING FAN/LIGHT COMBO SHIPPED LOOSE & INSTALLED AT SITE BY MURILLO

THE FOLLOWING ITEMS ARE SUPPLIED & INSTALLED ON SITE BY MURILLO

1) ALL CLOSET SHELVING.
2) CUBBIES
3) LOCKERS
4)
5) SIGN-IN DESKS
6) CHANGING STATIONS
7) ALL COUNTERTOPS - SOLID SURFACE
8) ALL CABINETS
9) FLOOR HATCH - MARKLINE TO PROVIDE ROUGH OPENING ONLY
10) CEILING HATCH - MARKLINE TO PROVIDE ROUGH OPENING ONLY
11) ALL FLOOR COVERINGS
12) WALL FINISHINGS
13) ALL KITCHEN EQUIPMENT, MARK LINE TO PLUMB FOR FIXTURES ONLY
14) SUSPENDED CEILING
15) SPRINKLER SYSTEM PER NFPA 13
16) MANUALLY OPERATED DROP DOWN GATE, OPEN GRILL TYPE
17) GATE AT RECEPTIONIST DESK

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
	CUSTOMER	1/23/07	IW
	CUSTOMER	1/29/07	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "146" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: L1

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

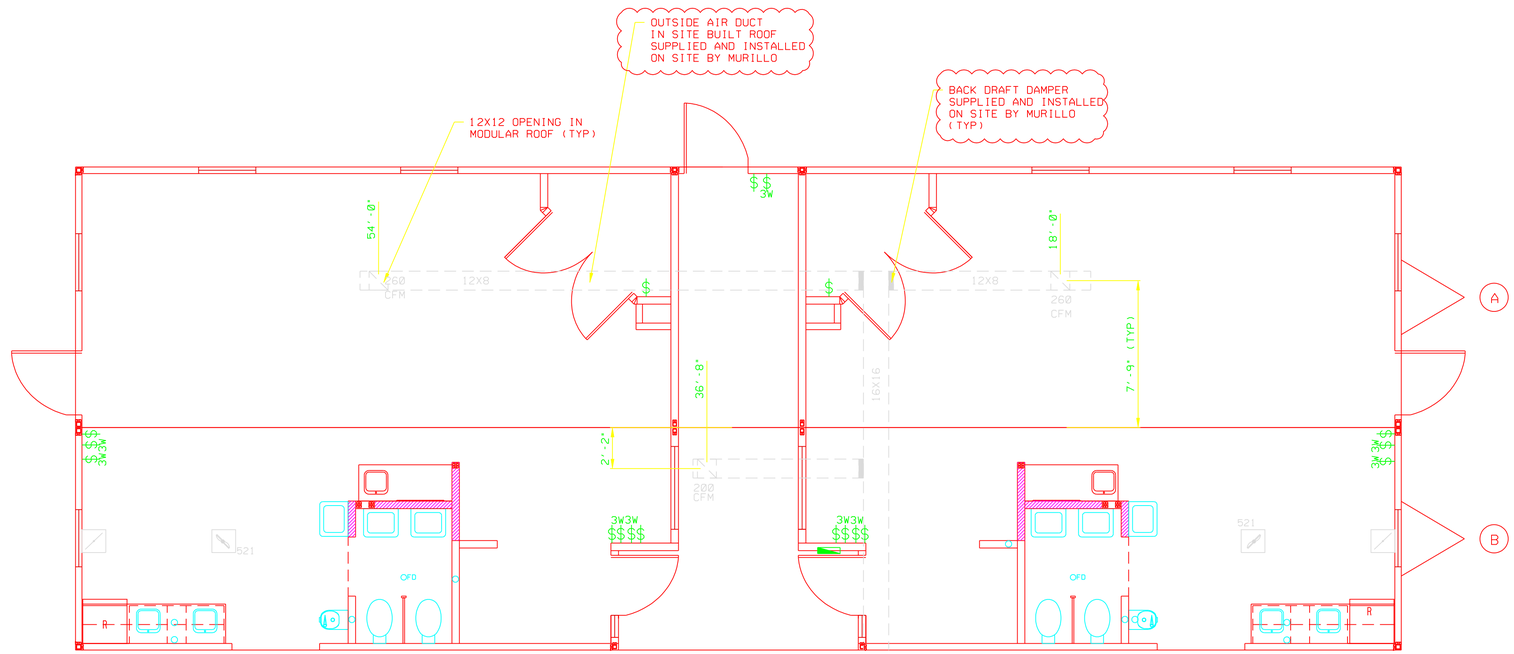
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V.. 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FIRE ALARM	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V.. 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V.. 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V.. 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A.. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V.. 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V.. 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V.. 20 A.. DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V.. 20 A.. DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V.. 20 A.. DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
SD	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V.. 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



OUTSIDE AIR PLAN

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DISTRICT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274. (8)1474

DATE: 8/21/06

DRAWN BY: LW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: OA1

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
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GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
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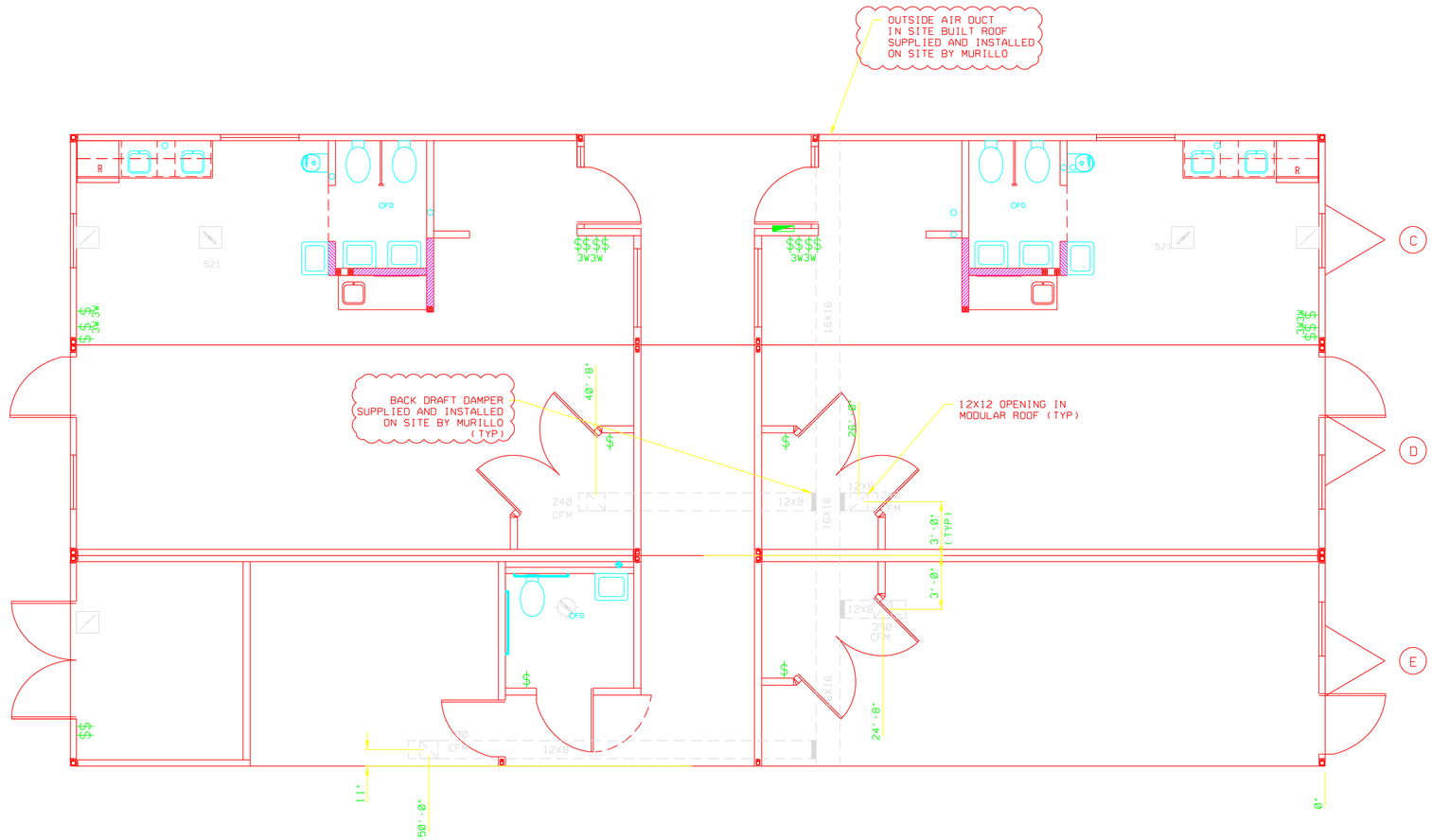
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
SA	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



OUTSIDE AIR PLAN

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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (19)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: OA2

— CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

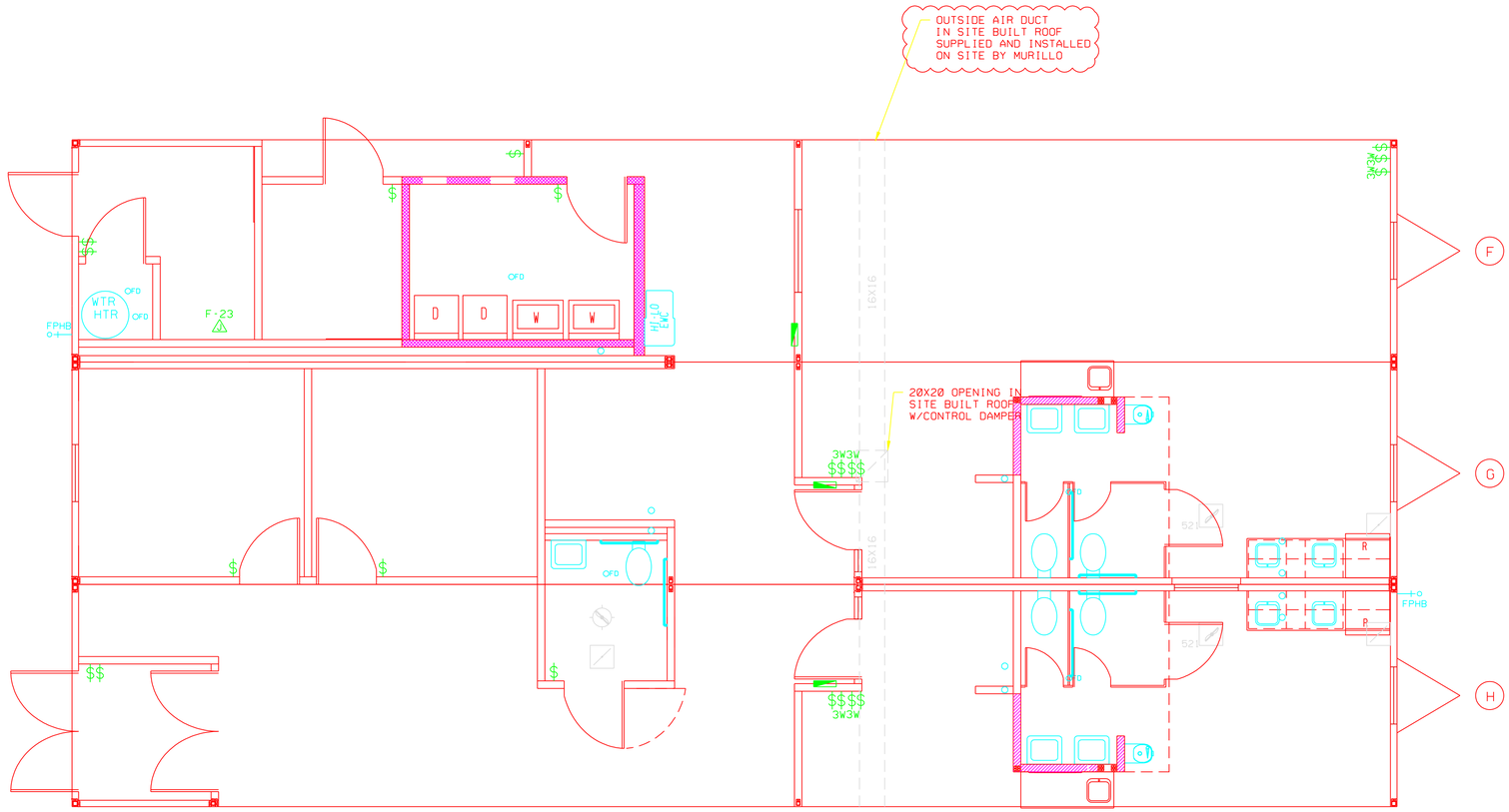
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FIRE ALARM	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
SA	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



OUTSIDE AIR PLAN

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "60" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: OA3

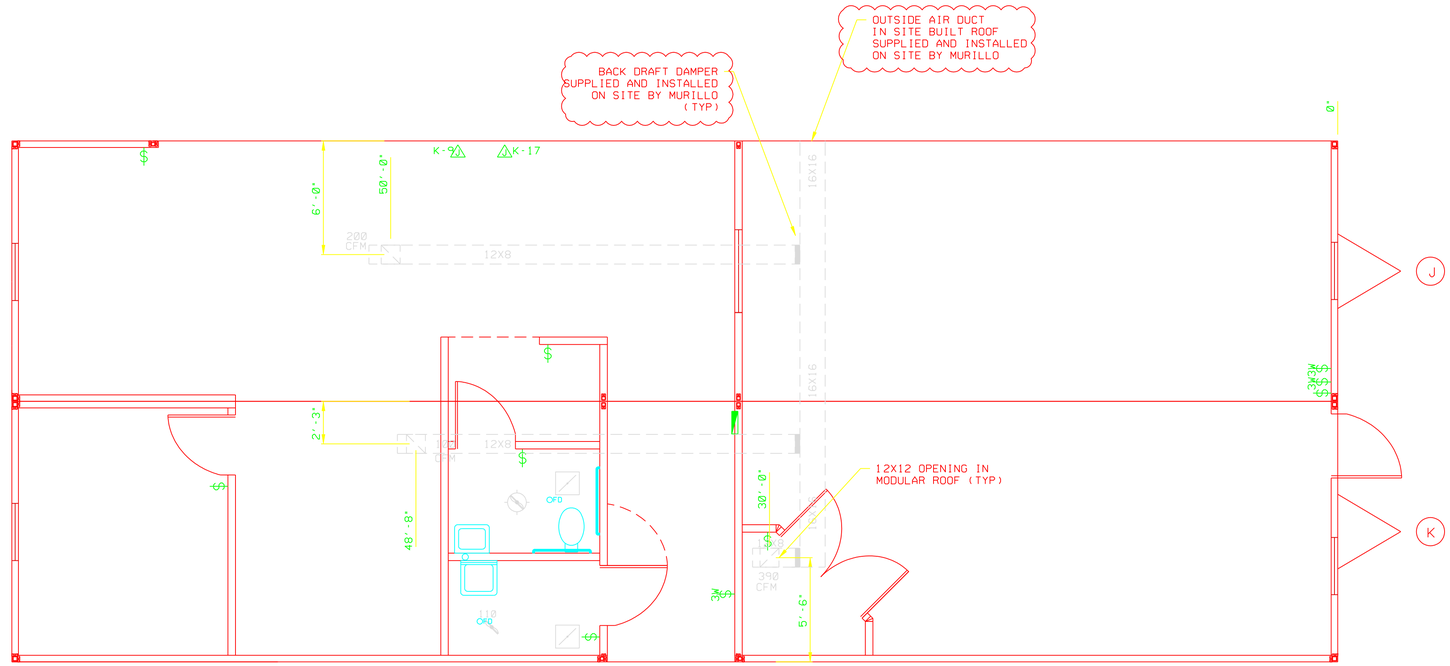
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
V	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY, 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



OUTSIDE AIR PLAN

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: OA4

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

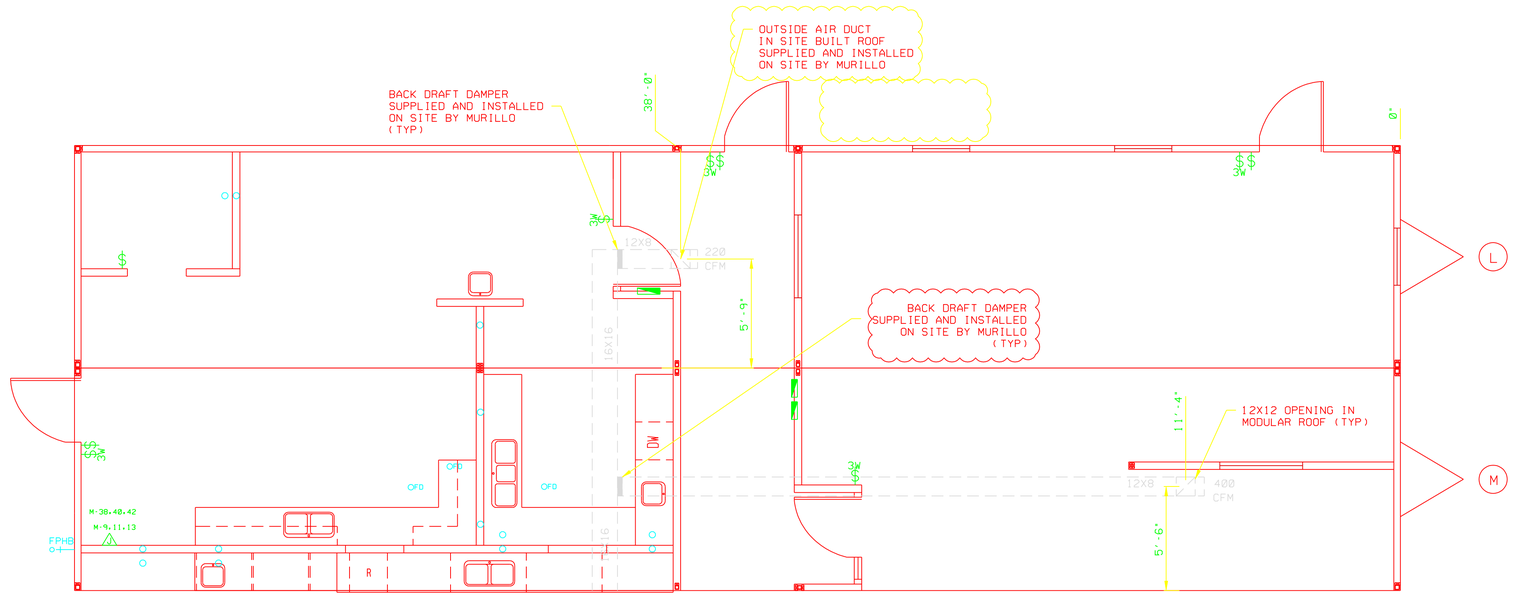
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FPCP	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



OUTSIDE AIR PLAN

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

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REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: OA5

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

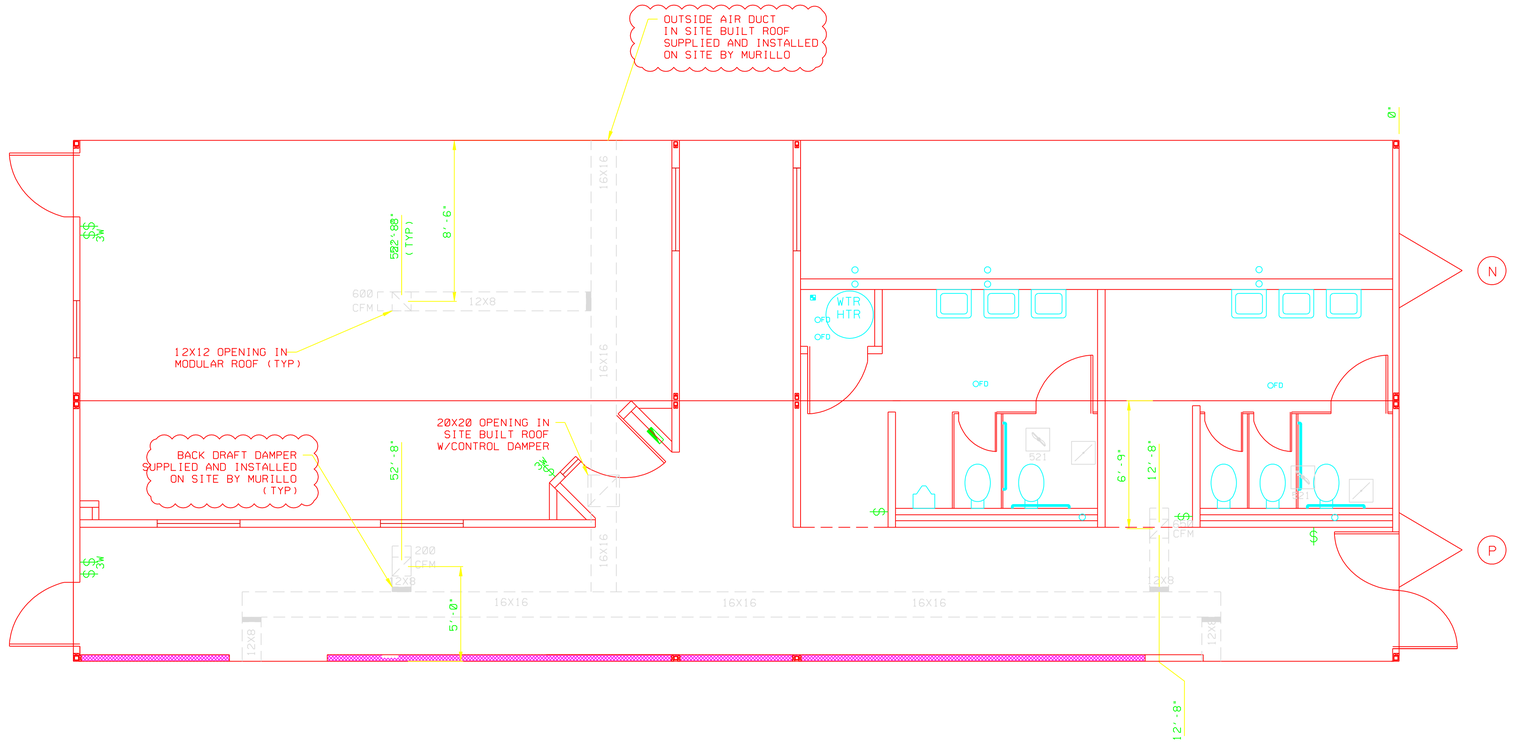
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



OUTSIDE AIR PLAN

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: OA6

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT:

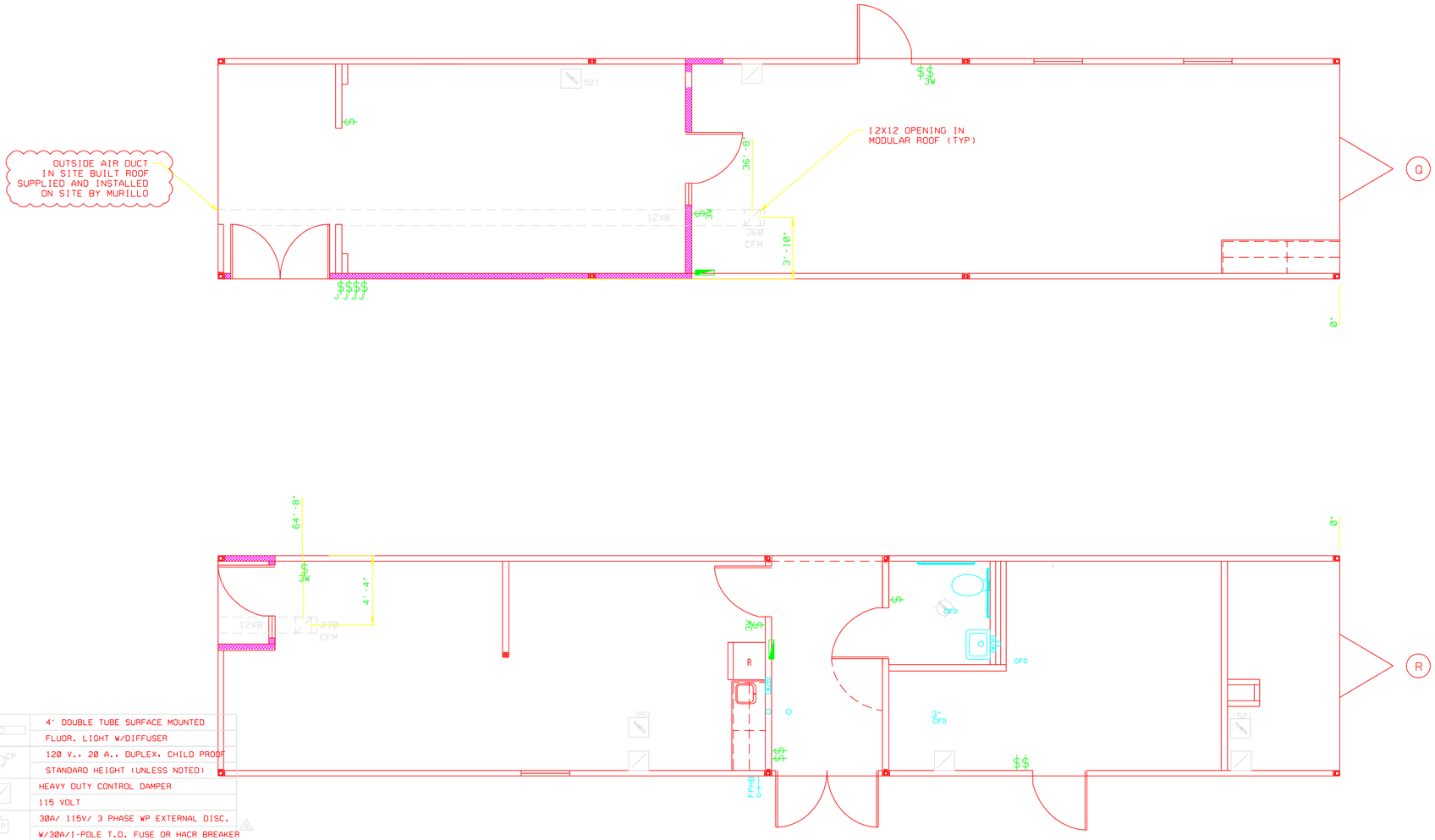
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R	RETURN AIR GRILLE @ UNIT
S	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



OUTSIDE AIR PLAN

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: OA7

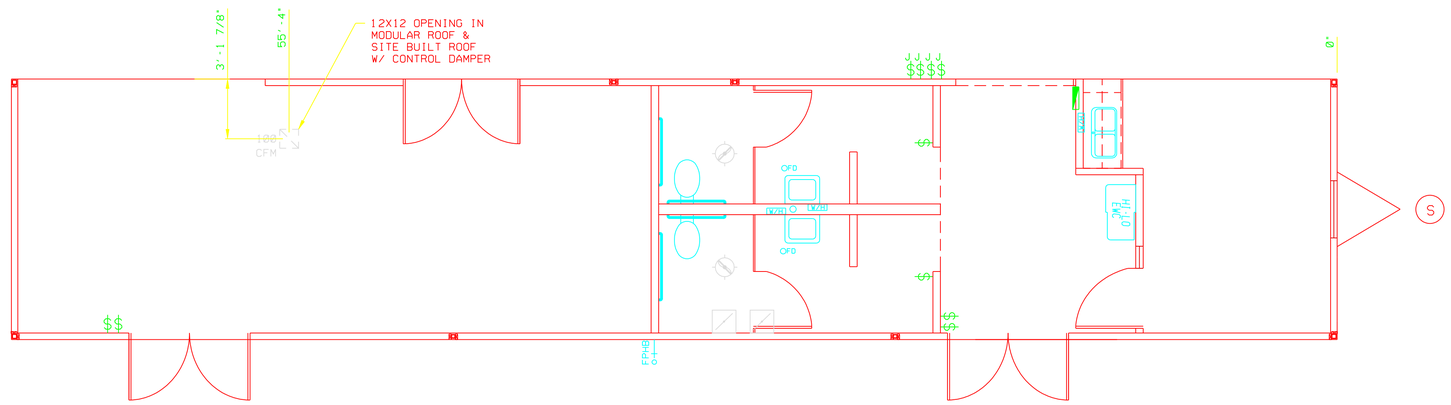
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FIRE ALARM	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



OUTSIDE AIR PLAN

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

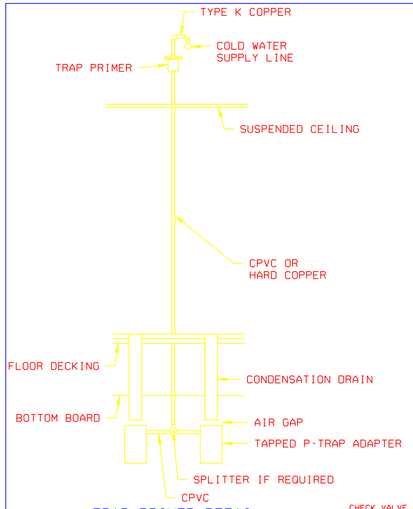
PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: OA8

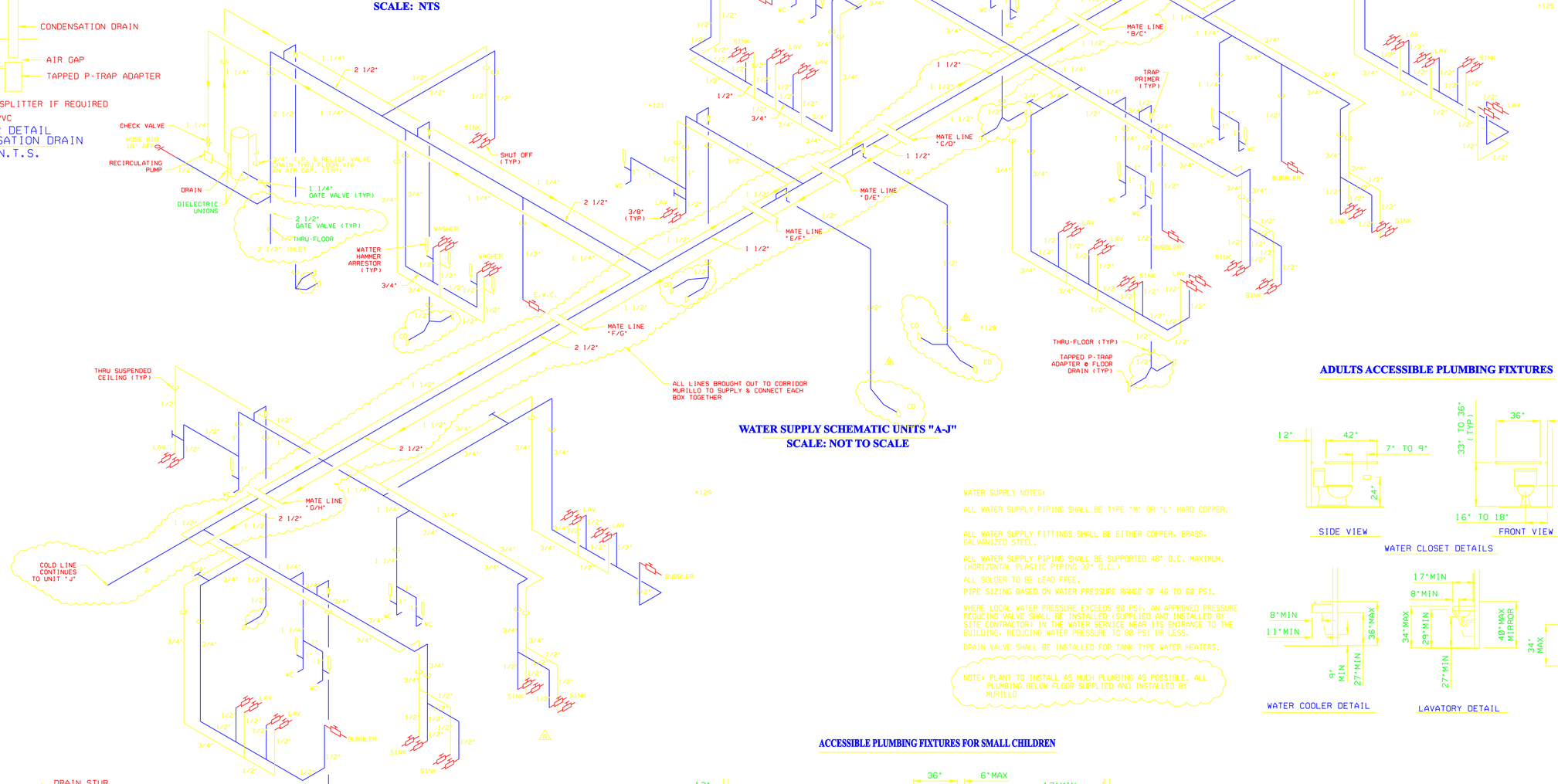
CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



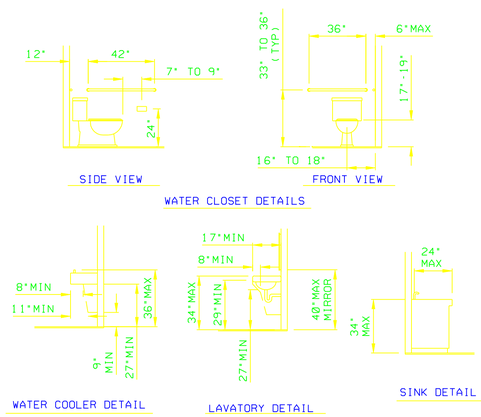
TRAP PRIMER DETAIL
FOR HVAC CONDENSATION DRAIN
SCALE: N.T.S.

WATER HEATER
SCALE: NTS



WATER SUPPLY SCHEMATIC UNITS "A-J"
SCALE: NOT TO SCALE

ADULTS ACCESSIBLE PLUMBING FIXTURES



WATER SUPPLY NOTES:

ALL WATER SUPPLY PIPING SHALL BE TYPE "M" OR "L" HARD COPPER.

ALL WATER SUPPLY FITTINGS SHALL BE EITHER COPPER, BRASS, GALVANIZED STEEL.

ALL WATER SUPPLY PIPING SHALL BE SUPPORTED 48" O.C. MAXIMUM. (HORIZONTAL PLASTIC PIPING 32" O.C.)

ALL SOLDER TO BE LEAD FREE.

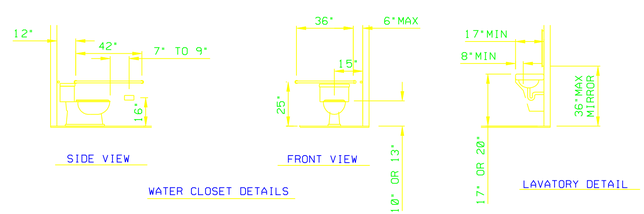
PIPE SIZING BASED ON WATER PRESSURE RANGE OF 46 TO 60 PSI.

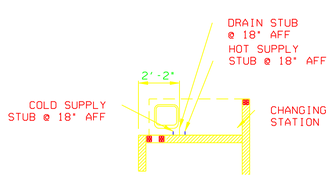
WHERE LOCAL WATER PRESSURE EXCEEDS 80 PSI, AN APPROVED PRESSURE REDUCING VALVE SHALL BE INSTALLED (SUPPLIED AND INSTALLED BY SITE CONTRACTOR) IN THE WATER SERVICE NEAR ITS ENTRANCE TO THE BUILDING, REDUCING WATER PRESSURE TO 80 PSI OR LESS.

DRAIN VALVE SHALL BE INSTALLED FOR TANK TYPE WATER HEATERS.

NOTE: PLANT TO INSTALL AS MUCH PLUMBING AS POSSIBLE. ALL PLUMBING BELOW FLOOR SUPPLIED AND INSTALLED BY MURILLO

ACCESSIBLE PLUMBING FIXTURES FOR SMALL CHILDREN





CHANGING STATION PLUMBING DETAIL
SCALE: 1/4"=1'-0"

PROPRIETARY AND CONFIDENTIAL
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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
	THIRD PARTY CUSTOMER	8/21/07	IW
		1/9/07	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: P1

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

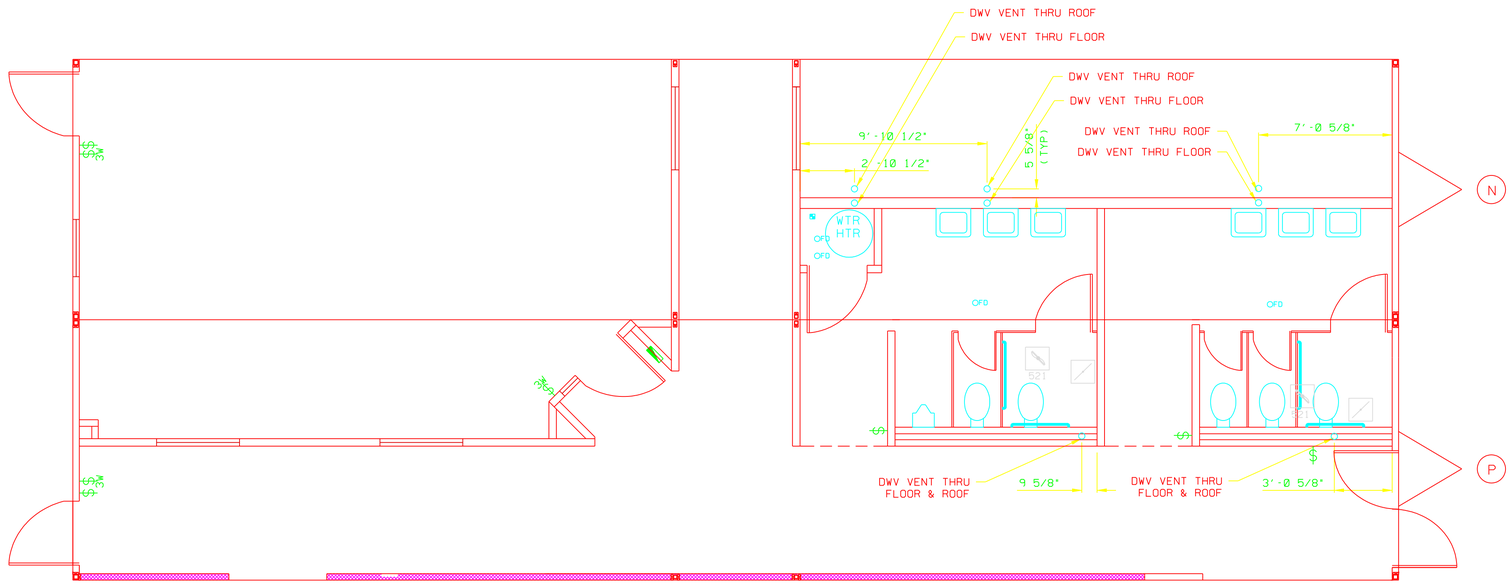
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY, 48" AFF
$	120 V., 20 AMP, TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP, DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP, DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP, GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

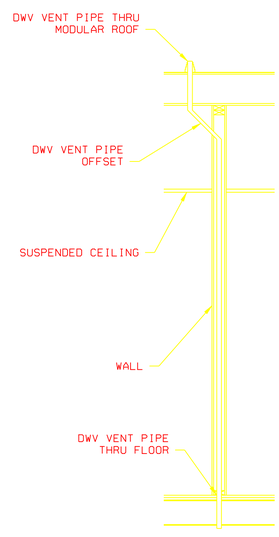
DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP, SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP, 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



PLUBMING VENT LOCATION PLAN



TYPICAL DWV VENT OFFSET DETAIL
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574 — PENNSYLVANIA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

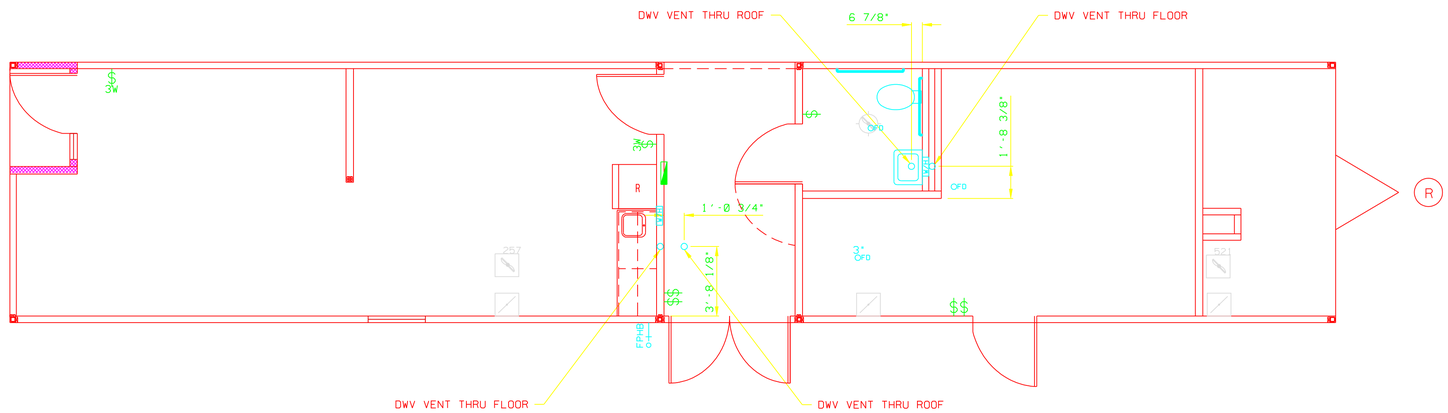
MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: P10

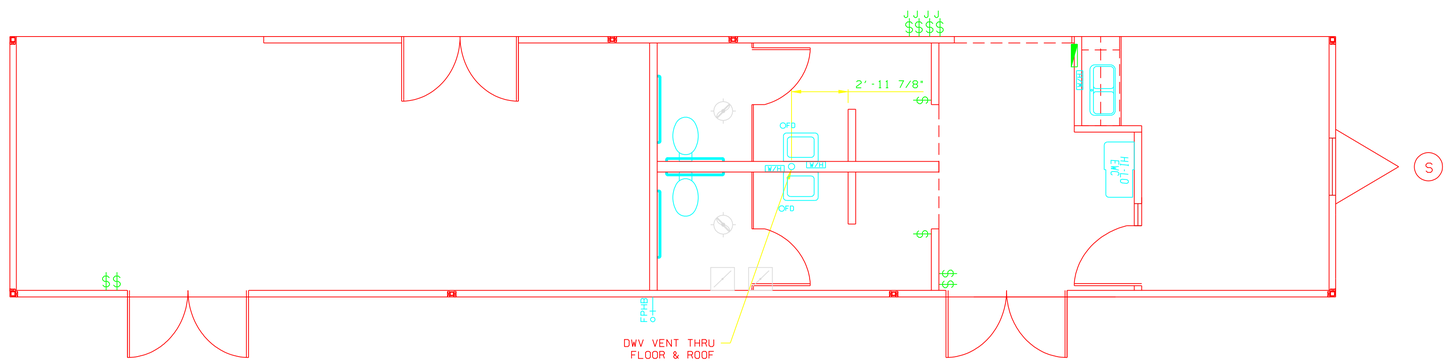
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY, 48" AFF
	120 V., 20 AMP, TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP, DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP, DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP, GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

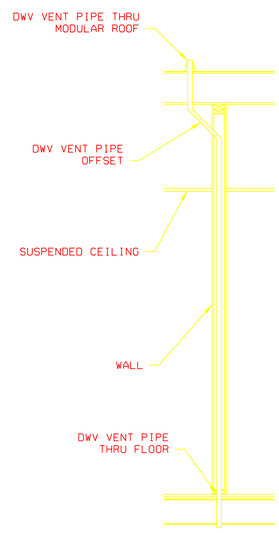
DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP, SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RA	RETURN AIR GRILLE @ UNIT
SA	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP, 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS





PLUBMING VENT LOCATION PLAN



TYPICAL DWV VENT OFFSET DETAIL
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: JW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: P11

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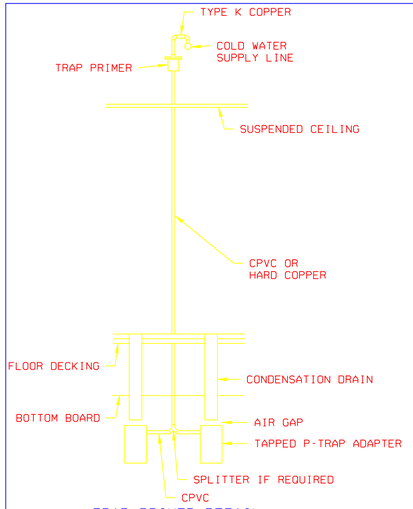
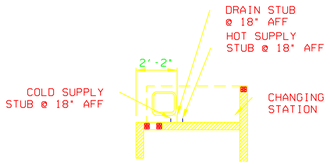
CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

"Quality & Integrity Since 1968"

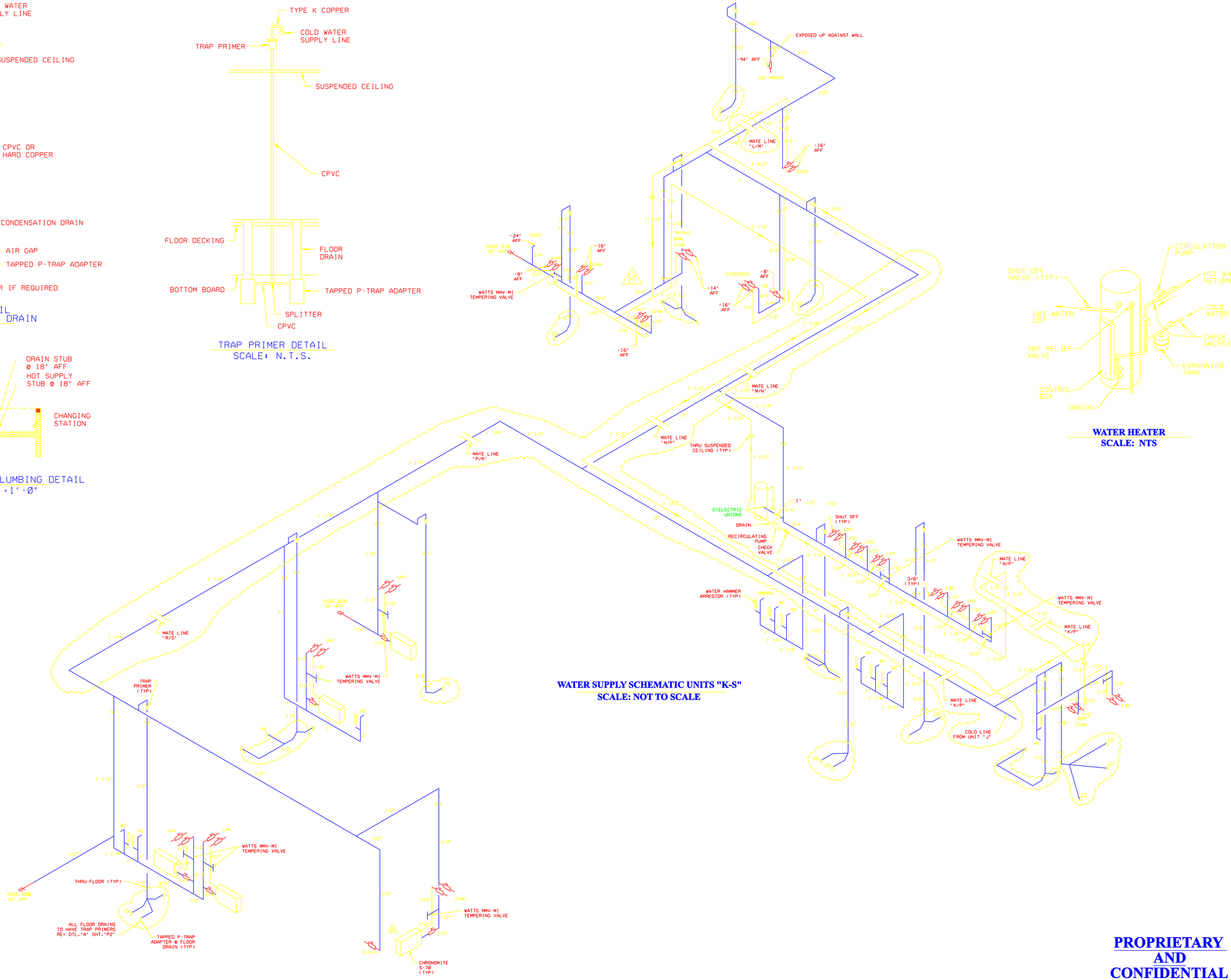


TRAP PRIMER DETAIL
FOR HVAC CONDENSATION DRAIN
SCALE: N.T.S.

TRAP PRIMER DETAIL
SCALE: N.T.S.



CHANGING STATION PLUMBING DETAIL
SCALE: 1/4"=1'-0"



WATER SUPPLY SCHEMATIC UNITS "K-S"
SCALE: NOT TO SCALE

WATER HEATER
SCALE: NTS

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
1	SINK HEATER	7/20/07	IW
2	CUSTOMER	1/9/07	JR

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DISTRICT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

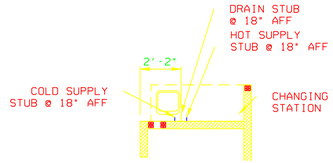
DRAWING SCALE: AS NOTED

QUOTE NO.:

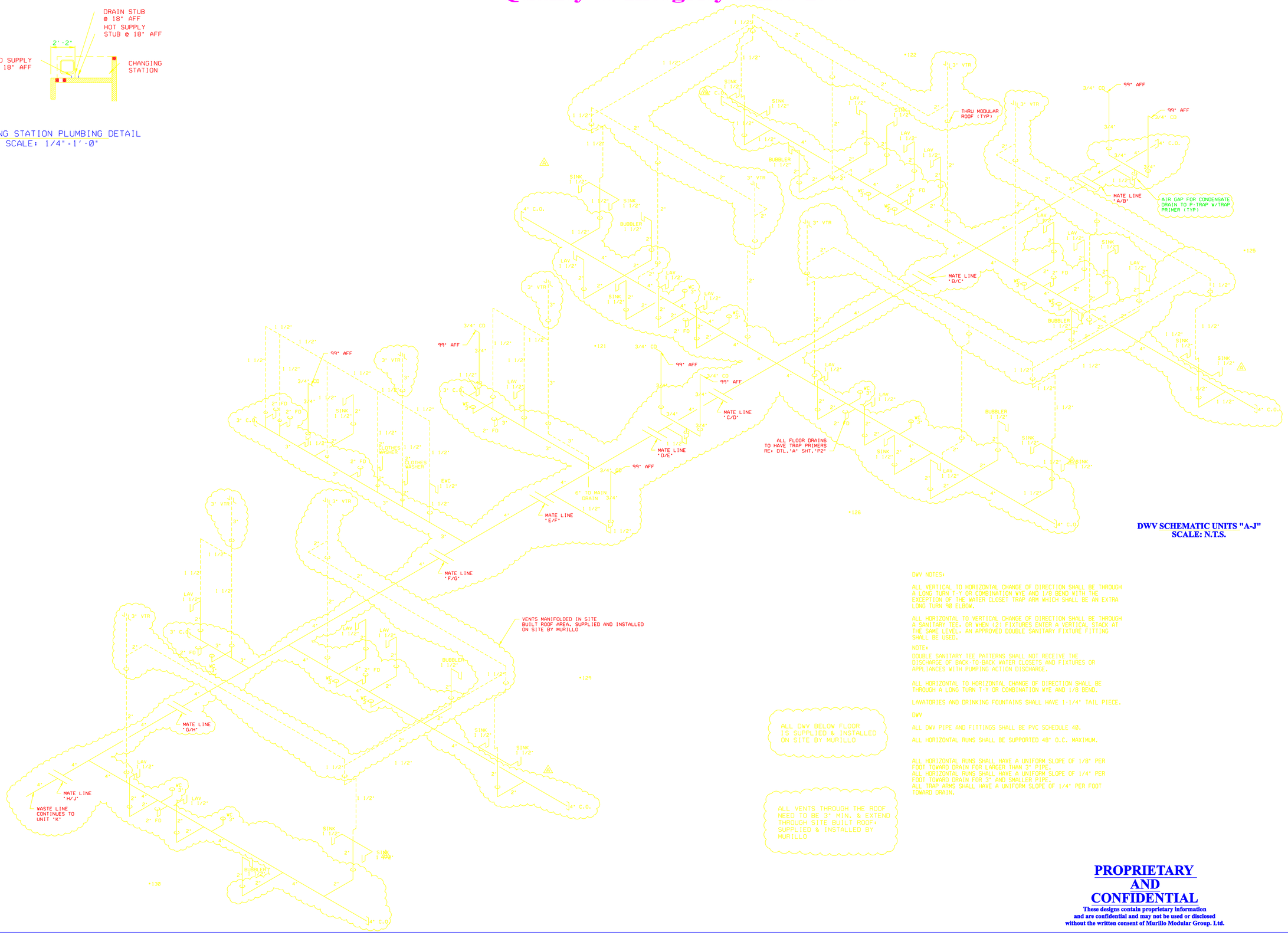
SERIAL NO.: 36133-49

DRAWING NUMBER: P2

"Quality & Integrity Since 1968"



CHANGING STATION PLUMBING DETAIL
SCALE: 1/4"=1'-0"



DWV SCHEMATIC UNITS "A-J"
SCALE: N.T.S.

DWV NOTES:

ALL VERTICAL TO HORIZONTAL CHANGE OF DIRECTION SHALL BE THROUGH A LONG TURN T-Y OR COMBINATION WYE AND 1/8 BEND WITH THE EXCEPTION OF THE WATER CLOSET TRAP ARM WHICH SHALL BE AN EXTRA LONG TURN 90 ELBOW.

ALL HORIZONTAL TO VERTICAL CHANGE OF DIRECTION SHALL BE THROUGH A SANITARY TEE. OR WHEN (2) FIXTURES ENTER A VERTICAL STACK AT THE SAME LEVEL. AN APPROVED DOUBLE SANITARY FIXTURE FITTING SHALL BE USED.

NOTE:

DOUBLE SANITARY TEE PATTERNS SHALL NOT RECEIVE THE DISCHARGE OF BACK TO BACK WATER CLOSETS AND FIXTURES OR APPLIANCES WITH PUMPING ACTION DISCHARGE.

ALL HORIZONTAL TO HORIZONTAL CHANGE OF DIRECTION SHALL BE THROUGH A LONG TURN T-Y OR COMBINATION WYE AND 1/8 BEND.

LAVATORIES AND DRINKING FOUNTAINS SHALL HAVE 1-1/4" TAIL PIECE.

DWV

ALL DWV PIPE AND FITTINGS SHALL BE PVC SCHEDULE 40.

ALL HORIZONTAL RUNS SHALL BE SUPPORTED 48" O.C. MAXIMUM.

ALL HORIZONTAL RUNS SHALL HAVE A UNIFORM SLOPE OF 1/8" PER FOOT TOWARD DRAIN FOR LARGER THAN 3" PIPE.
ALL HORIZONTAL RUNS SHALL HAVE A UNIFORM SLOPE OF 1/4" PER FOOT TOWARD DRAIN FOR 3" AND SMALLER PIPE.
ALL TRAP ARMS SHALL HAVE A UNIFORM SLOPE OF 1/4" PER FOOT TOWARD DRAIN.

ALL DWV BELOW FLOOR
IS SUPPLIED & INSTALLED
ON SITE BY MURILLO

ALL VENTS THROUGH THE ROOF
NEED TO BE 3" MIN. & EXTEND
THROUGH SITE BUILT ROOF:
SUPPLIED & INSTALLED BY
MURILLO

PROPRIETARY AND CONFIDENTIAL

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and are confidential and may not be used or disclosed
without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
	CUSTOMER	1/9/07	R

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MURILLO MODULAR

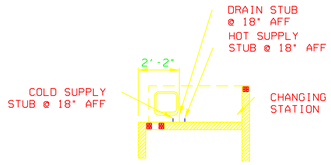
PROJECT NAME: CDC SCHOOL "160" (DISTRICT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

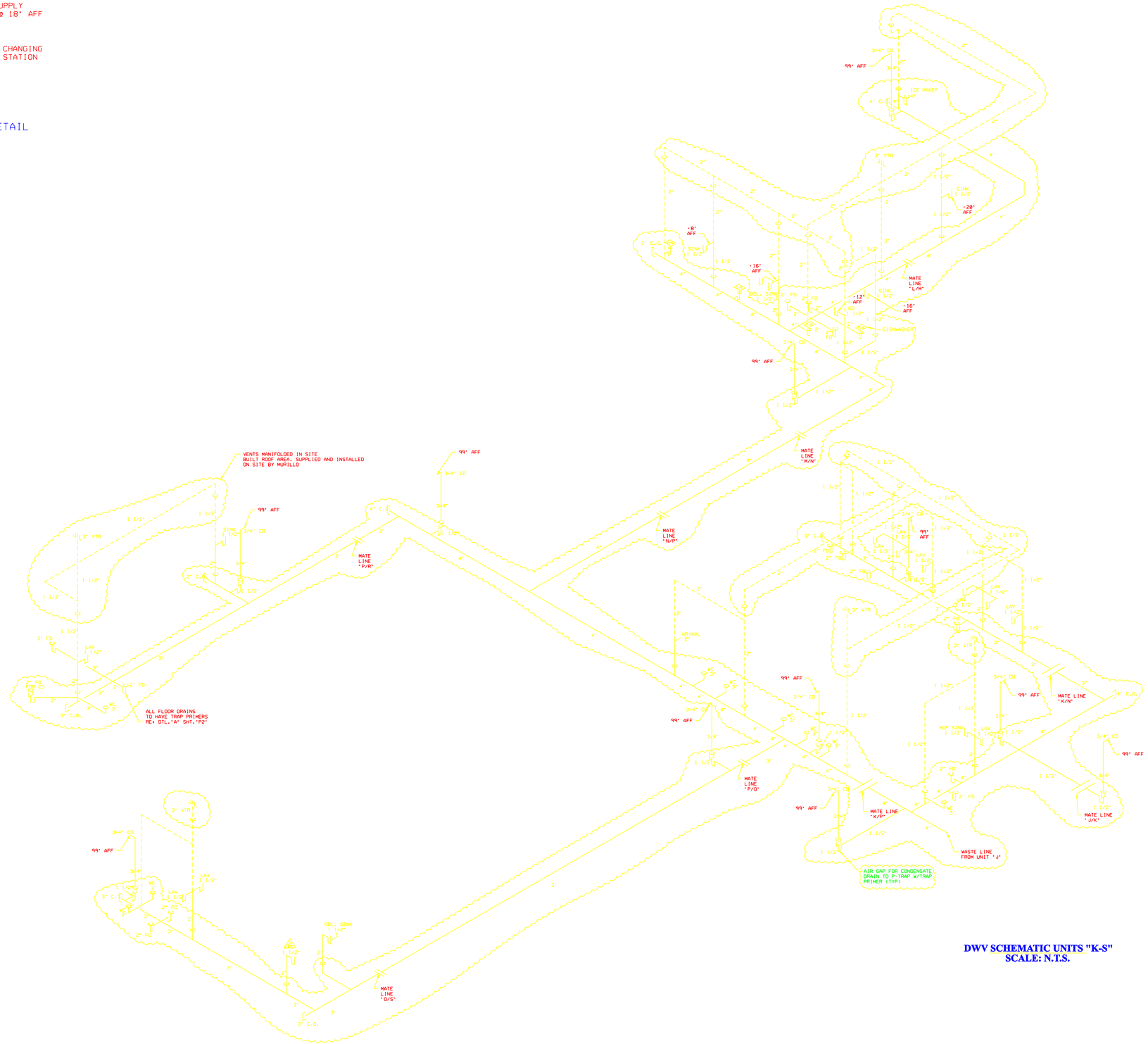
MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: LW/JR
DRAWING SCALE: AS NOTED
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: P3

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"



CHANGING STATION PLUMBING DETAIL
SCALE: 1/4"=1'-0"



DWV SCHEMATIC UNITS "K-S"
SCALE: N.T.S.

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
1	CUSTOMER	1/09/07	JR

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MURILLO MODULAR

PROJECT NAME: CDK SCHOOL 160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: P4

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

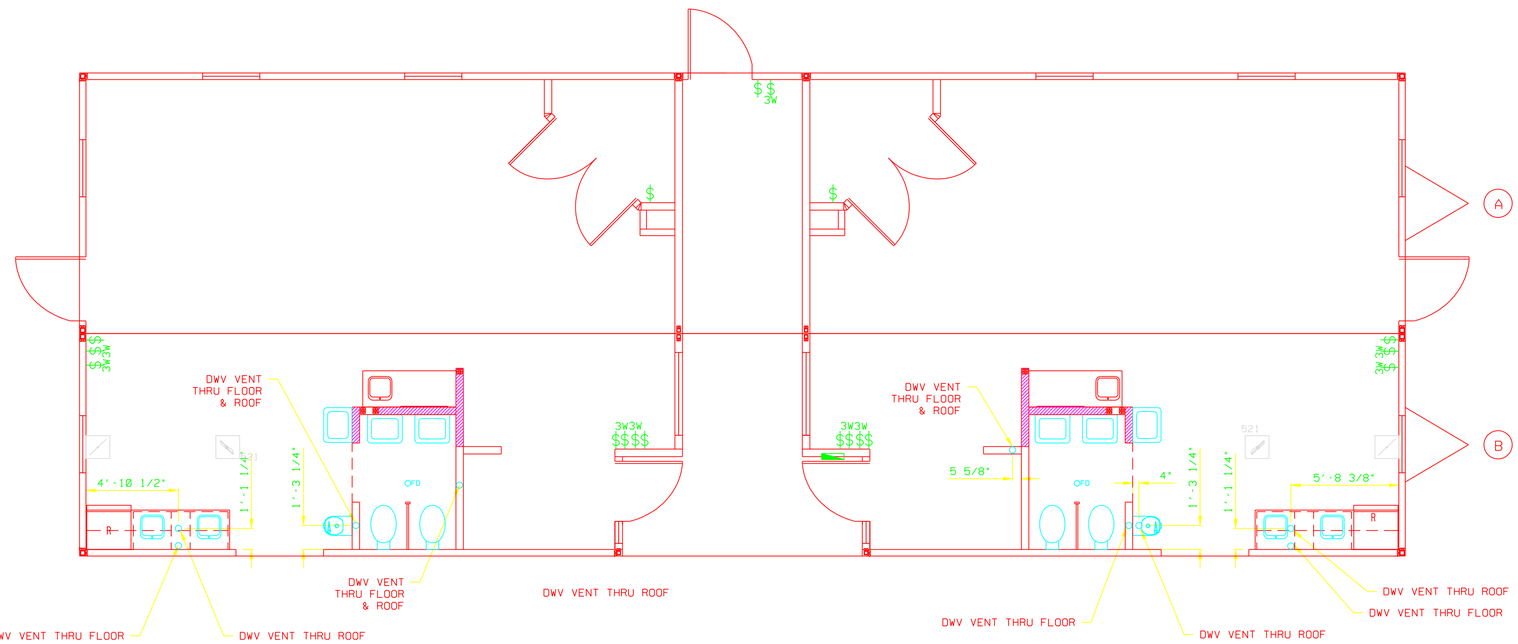
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

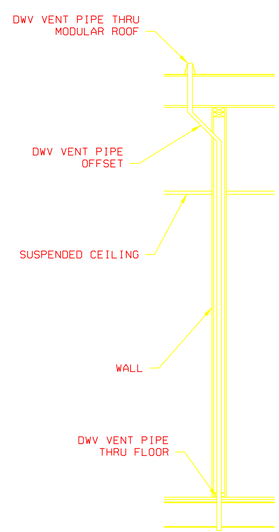
DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RGS	RETURN AIR GRILLE @ UNIT
SA	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



PLUBMING VENT LOCATION PLAN



TYPICAL DWV VENT OFFSET DETAIL
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group. Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "166" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: P5

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

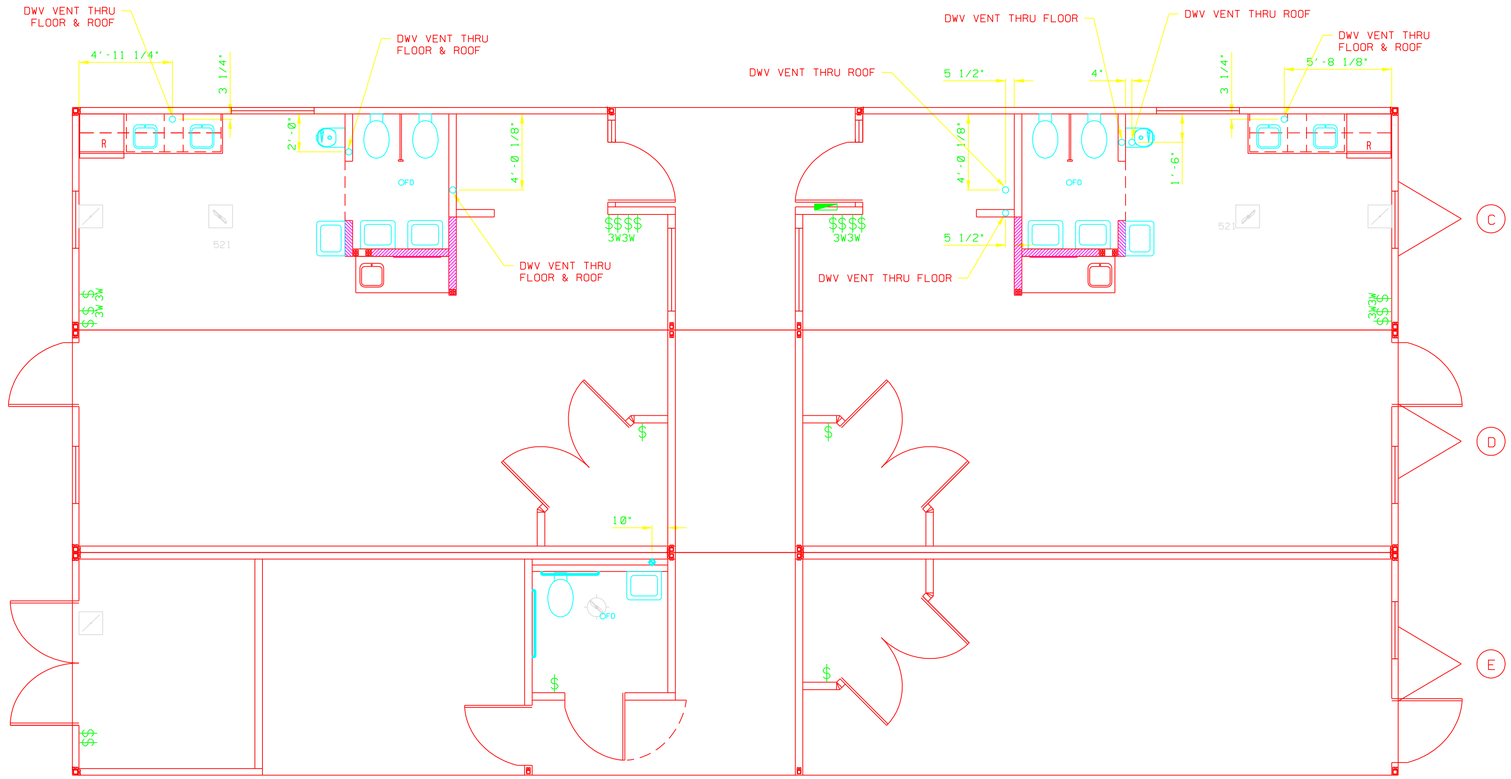
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V.. 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V.. 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V.. 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V.. 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A.. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V.. 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V.. 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V.. 20 A.. DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V.. 20 A.. DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

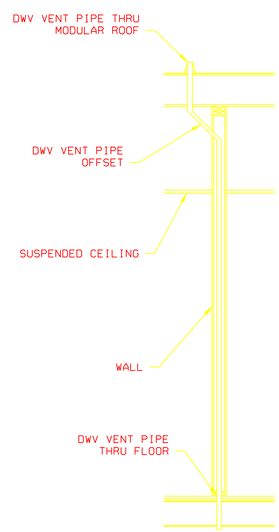
DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V.. 20 A.. DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V.. 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



PLUBMING VENT LOCATION PLAN



TYPICAL DWV VENT OFFSET DETAIL
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 1160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: LW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: P6

CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

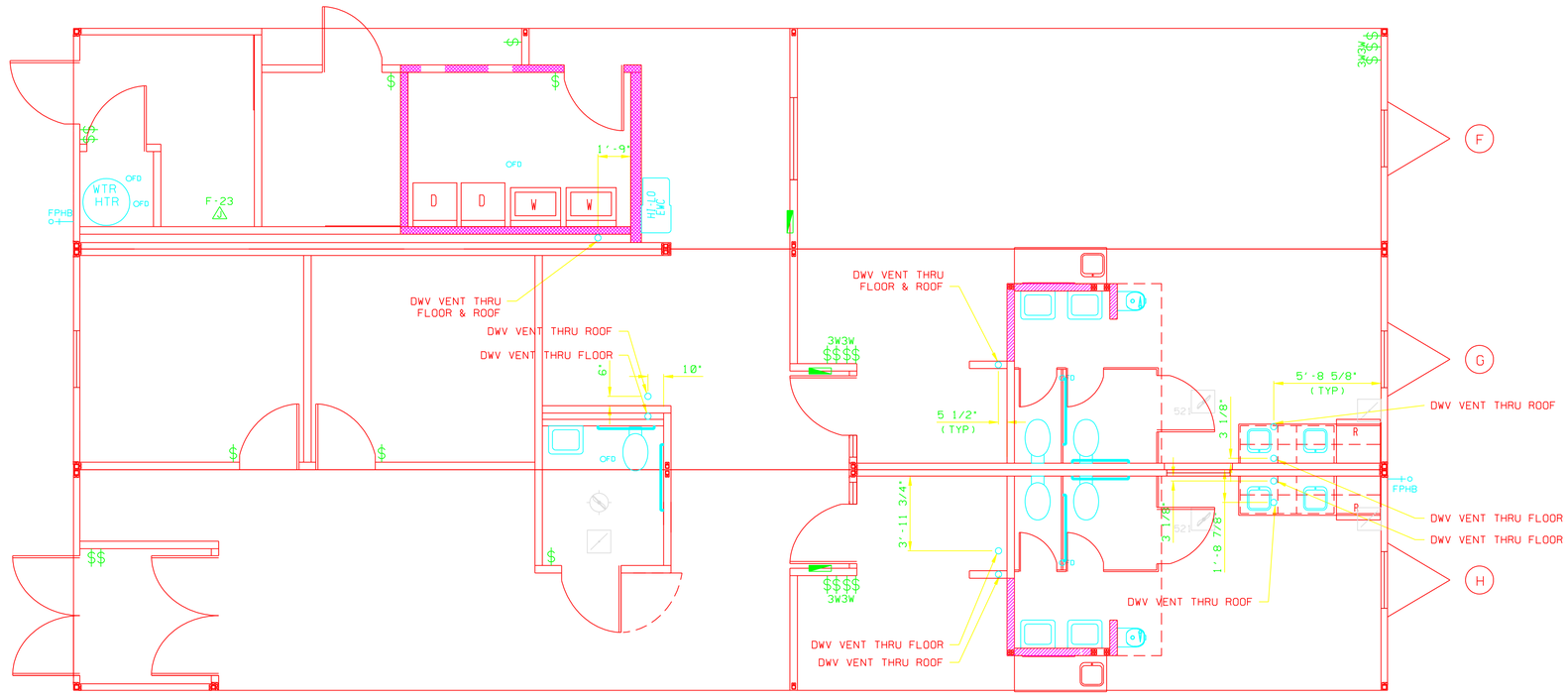
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL. WEATHERPROOF. 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V.. 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX. RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
OFD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT. 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W$	120 V.. 20 AMP.TOGGLE TYPE SWITCH 3-WAY. 48" AFF
$	120 V.. 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V.. 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A.. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V.. 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V.. 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V.. 20 A.. DUPLEX RECEPT ON DED. CIRCUIT. STANDARD HEIGHT (UN)
	120 V.. 20 A.. DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT. WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

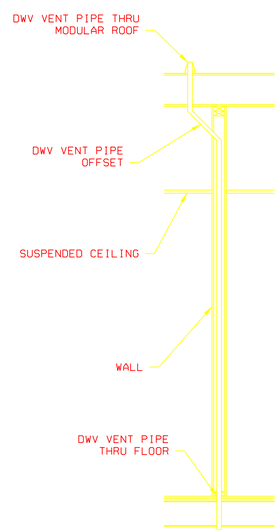
DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V.. 20 A.. DUPLEX. CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP. SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
RG	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP. 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING. FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V.. 20 AMP. J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP. DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



PLUBMING VENT LOCATION PLAN



TYPICAL DWV VENT OFFSET DETAIL
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: LW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: P7

CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574

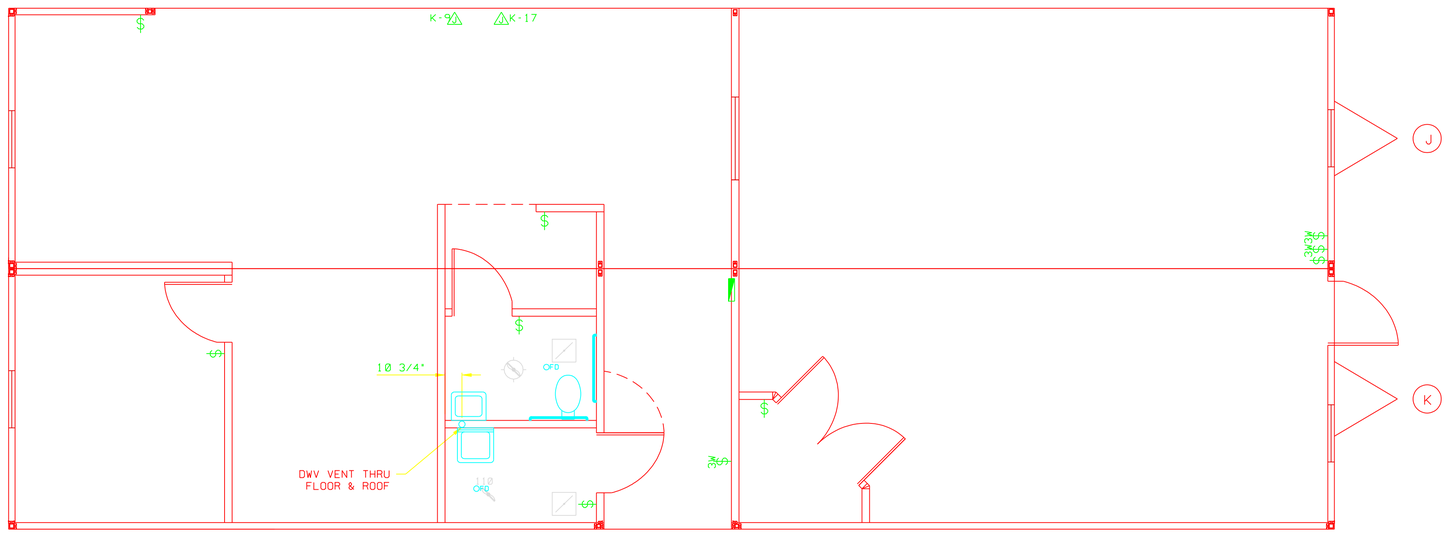
"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT
	INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHBo	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM SIGNAL 82" AFF
HD	J-BOX IN CEILING HEAT DETECTOR (CEILING MOUNTED)
SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W $	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY, 48" AFF
$	120 V., 20 AMP. TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP. DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP. DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP. GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

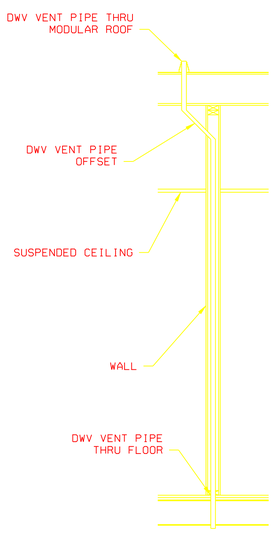
DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP, SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
R/G	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP, 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
$J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
	INTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS

DRAWING LEGEND



PLUBMING VENT LOCATION PLAN



TYPICAL DWV VENT OFFSET DETAIL
SCALE: 1/2"=1'-0"

PROPRIETARY AND CONFIDENTIAL

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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC 27574 — PENNSYLVANIA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133. BRISTOL, IN. 46507 — CORPORATE OFFICE: 51687 C.R. 133. BRISTOL, IN. 46507

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL 160' (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/4"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: P8

"Quality & Integrity Since 1968"

SYMBOL	DESCRIPTION
WP	J-BOX W/3/4" CONDUIT TO SUSPENDED CEILING FIRE ALARM SIGNAL, WEATHERPROOF, 115"AFF
	THREE BULB CHROME BAR LIGHT INCANDESCENT LIGHT 80" AFF
	120 V., 20 AMP. QUADPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
	PLUMBING VENT THRU ROOF
	POWERED J-BOX, RECESSED IN WALL STANDARD HEIGHT (UNLESS NOTED)
FPHB	FROST PROOF HOSE BIBB
WTR HTR	WATER HEATER
W/H	POINT OF USE WATER HEATER
FD	FLOOR DRAIN LOCATION
	MAIN DRAIN LOCATION
T	THERMOSTAT, 54" AFF
	2' X 2' RETURN AIR GRILLE IN CEILING GRID
	2' X 2' SUPPLY AIR GRILLE IN CEILING GRID
	SUB-CEILING MOUNTED EXHAUST FAN CFM AS NOTED
	DOUBLE FACE EXIT SIGN W/DIRECTIONAL ARROW & BATTERY BACK UP 84" AFF
J	J BOX FOR TROFFER LIGHT CONNECTION
J	J BOX FOR MATE LINE CROSSOVER (BELOW FLOOR)
FA PULL	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM PULL & AUDIO/VISUAL SIGNAL 48" & 82"AFF
	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM SIGNAL 82" AFF
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SD	J-BOX IN CEILING SMOKE DETECTOR (CEILING MOUNTED)
	SINGLE GANG J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, STANDARD HEIGHT (UN)
OC	OCCUPANCY SENSOR CEILING MOUNTED
3W	120 V., 20 AMP.TOGGLE TYPE SWITCH 3-WAY, 48" AFF
	120 V., 20 AMP, TOGGLE TYPE SWITCH 48" AFF
GFI WP	120 V., 15 AMP, DUPLEX GFI RECEPT WEATHERPROOF (AFF AS NOTED)
	240 V. 50 A., SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
GFI	120 V., 20 AMP, DUPLEX GFI RECEPT 48" AFF (UNLESS NOTED)
GFI HT	120 V., 15 AMP, GFI HEAT TAPE REC. (BELOW FLOOR) 36" MIN. FROM EDGE OF BUILDING
D	120 V., 20 A., DUPLEX RECEPT ON DED. CIRCUIT, STANDARD HEIGHT (UN)
	120 V., 20 A., DUPLEX RECEPT STANDARD HEIGHT (UNLESS NOTED)
VR WP	VANDAL RESISTANT EXT. INCANDESCENT LIGHT, WEATHERPROOF 80"AFF
EXIT	DUAL HEAD EMERGENCY LIGHT W/LIGHTED EXIT SIGN & BATTERY PACK 86" AFF
EMER	DUAL HEAD EMERGENCY LIGHT W/BATTERY PACK 86" AFF
MH	100 WATT METAL HALIDE W/PHOTO CELL WEATHERPROOF LIGHT 115"AFF
	80 CFM CEILING EXHAUST FAN W/LIGHT
	WALL MOUNTED INCANDESCENT LIGHT
	2' X 4' (4) TUBE LAY-IN TROFFER LIGHT
	LOAD CENTER

DRAWING LEGEND

SYMBOL	DESCRIPTION
	4' DOUBLE TUBE SURFACE MOUNTED FLUOR. LIGHT W/DIFFUSER
CP	120 V., 20 A., DUPLEX, CHILD PROOF STANDARD HEIGHT (UNLESS NOTED)
	HEAVY DUTY CONTROL DAMPER 115 VOLT
WP	30A/ 115V/ 3 PHASE WP EXTERNAL DISC. W/30A/1-POLE T.D. FUSE OR HACR BREAKER
	15 AMP, SINGLE RECEPT STANDARD HEIGHT (UNLESS NOTED)
	RETURN AIR GRILLE @ UNIT
	SUPPLY AIR DIFFUSER W/WIRE CAGE
	SINGLE FACE EXIT SIGN W/ARROW & BATTERY BACK UP, 84" AFF (UNLESS NOTED)
	SINGLE HEAD REMOTE EMERGENCY LIGHT 80" AFF
V	J-BOX W/3/4" CONDUIT THRU SUSPENDED CEILING, FIRE ALARM VISUAL SIGNAL 82" AFF
	LIGHTS IN MULTI PURPOSE ROOM SUPPLIED AND INSTALLED BY MURILLO
J	120 V., 20 AMP, J-BOX FOR SWITCH 48" AFF W/3/4" CONDUIT THRU SUSPENDED CEILING
	20 AMP, DUPLEX RECEPT IN CEILING
	EXTERIOR CCTV CAMERA SUPPLIED AND INSTALLED BY OTHERS
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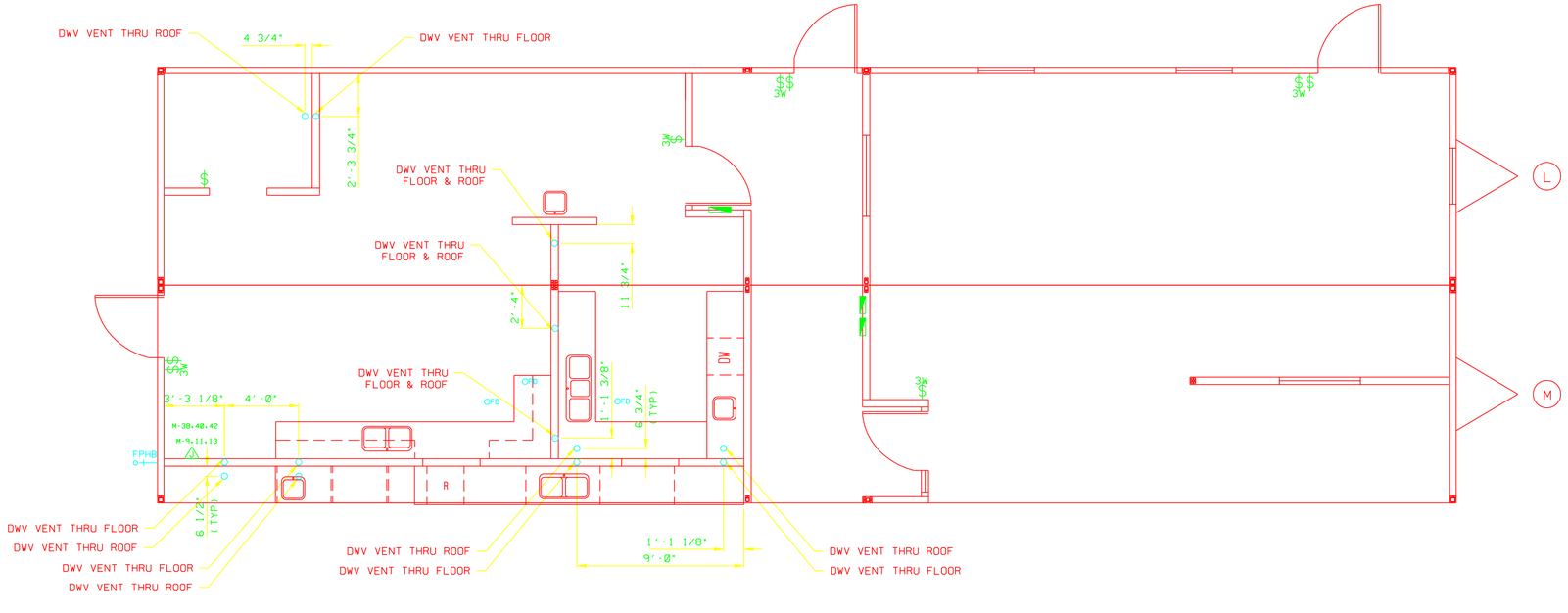
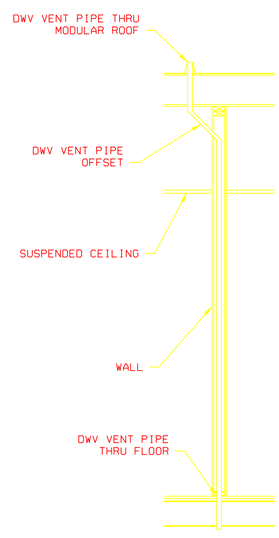
DRAWING LEGEND



PLUBMING VENT LOCATION PLAN



TYPICAL DWV VENT OFFSET DETAIL
SCALE: 1/2"=1'-0"

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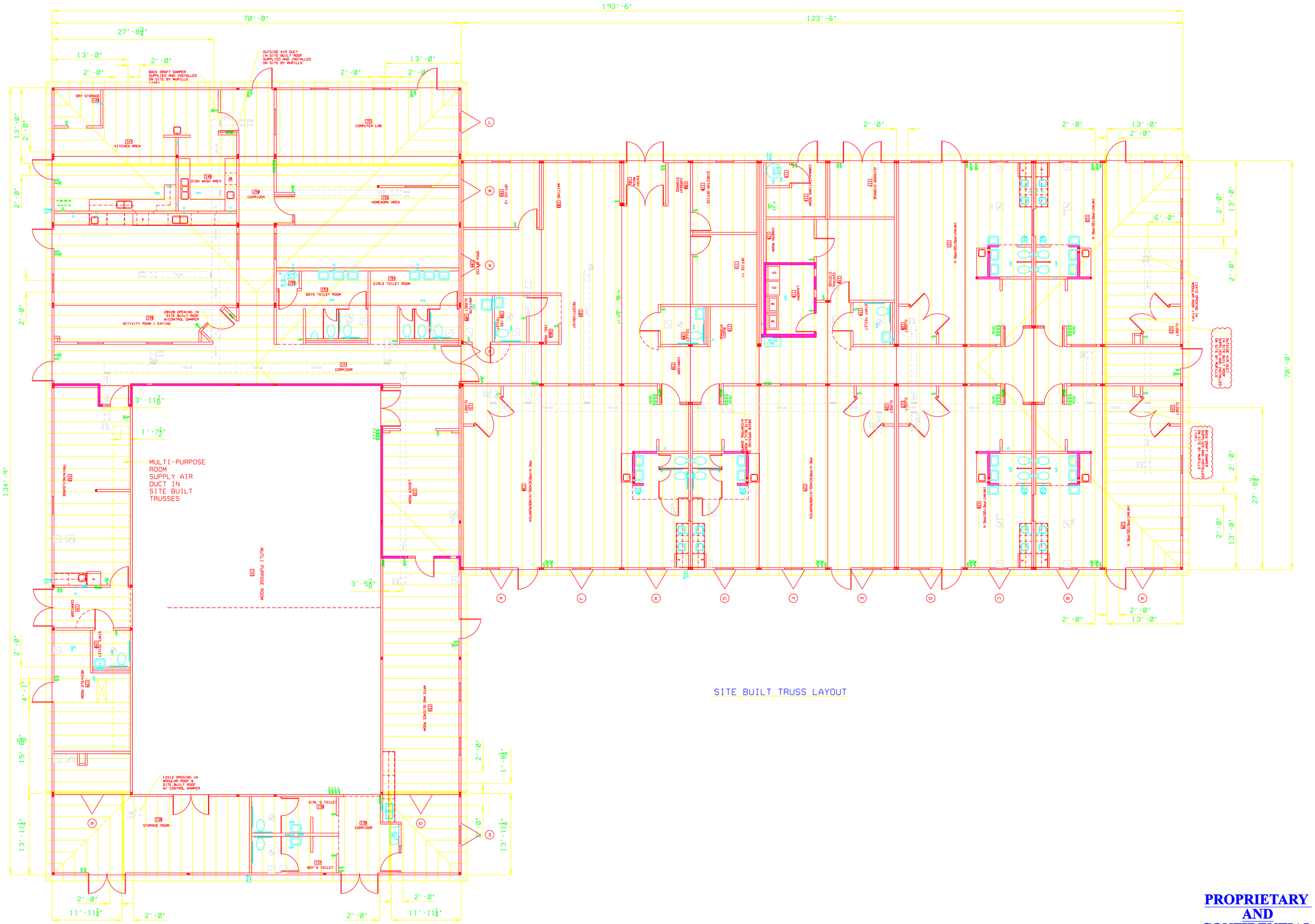
MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133. BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474
DATE: 8/21/06
DRAWN BY: IW/JR
DRAWING SCALE: 1/4"=1'-0"
QUOTE NO.:
SERIAL NO.: 36133-49
DRAWING NUMBER: P9



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STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)12/4, (8)14/4

DATE: 8/21/06

DRAWN BY: TW/JR

DRAWING SCALE: 1/8"=1'-0"

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: R1

"Quality & Integrity Since 1968"

SPECIFICATIONS

FRAMES:

QTY	ITEM	SPECIFICATION
	PERIMETER:	12"(M12X10.8) I-BEAM W/8"(M8X6.5) I-BEAM XMBRS @ 24" O.C. 14' WIDE UNITS "A, J, K, N, P, Q, R & S" (MAX. 164") 12' WIDE UNITS "B, C, D, E, F, G, H, L & M" (MAX 140") 69'-11" LONG (+1/2"/-0" TOLERANCE)
	MISC.:	HOLES IN FRAME FOR LAGGING FRAME TO WALL @ 32" O.C.
	HITCH TYPE:	DETACHABLE, HEAVY DUTY, TRIPLE BEAM W/PINTEL EYE
	AXLE:	AS REQ'D. SEE FRAME SCHEDULE ON THIS SHEET
	NOTE:	AXLES TO BE UNDERSLUNG
	NOTE:	SHIFT AXLES, SEE SHEETS "D13 - D21"
	NOTE:	FRAME CAMBER - 1" POSITIVE, 3/4" REVERSE
	MISC.:	20' DOUBLE BEAM CENTERED IN AXLE AREA
	TIRES:	AS REQ'D. SEE FRAME SCHEDULE ON THIS SHEET
	MISC.:	ADDITIONAL BLOCKING @ BOTTOM OF FLANGE FOR HARDI-BACKER RE: DTL. "J" SHT. "D2"
260	MISC.:	1/2" X 8" THREADED ROD W/ NUTS & WASHERS, RE.DTL."B" SHT."D1"

FLOORS:

QTY	ITEM	SPECIFICATION
	BOTTOM BOARD:	NONE
	INSULATION:	NONE
	NOTE:	DIRECT LAYED FLOOR
	DECKING:	DOUBLE LAYER T&G, 3/4" NOMINAL, PLYWOOD, UNDERLAYMENT GRADE
	DECKING:	SINGLE LAYER T&G, 3/4" NOMINAL, PLYWOOD, UNDERLAYMENT GRADE @ TILED AREAS ONLY, SEE SHEET "A4"
	DECKING:	SINGLE LAYER, CEMENT BOARD @ TILED AREAS ONLY, SEE SHEET "A4" SUPPLIED AND INSTALLED ON SITE BY MURILLO
	NOTE:	BOTTOM LAYER OF DECKING TO HAVE A CLASS "A" FIRE COATING ON THE UNDERSIDE OF THE DECKING FACING THE FRAME
	COVERING:	VINYL COMPOSITION TILE, CHECKER BOARD PATTERN
	COVERING:	SHEET VINYL
	COVERING:	ANTI-STATIC CARPET @ LAB
	COVERING:	SYNTHETIC ATHLETIC FLOORING @ MULTI PURPOSE ROOM
	NOTE:	ALL FLOOR COVERING SUPPLIED AND INSTALLED BY MURILLO SEE COLOR CHART ON "A3" FOR COLORS
	NOTE:	LOCATIONS OF FLOOR COVERINGS AS NOTED ON SHEET "A3"
	NOTE:	FLOOR DECKING HELD BACK 2" TOP LAYER AT MATE LINE RE. DTL."C" SHT."D1". SITE FINISH BY MURILLO
	MISC.:	OPENINGS IN FLOOR FOR FLOOR MOUNTED SINKS. SEE ARCH. PLAN, UNIT "M"
2	MISC.:	OPENING IN FLOOR FOR 32"X32" FLOOR HATCHS

EXTERIOR WALLS:

QTY	ITEM	SPECIFICATION
	FRAMING:	2X4, 16" O.C., (DOUBLE #2 SPF STUDS @ 4'-0" O.C.)
	WALL HEIGHT:	10'-3 1/2", FIRST 8'-0" @ CORNERS TO BE 12" O.C.
	NOTE:	SPECIAL STUDS @ MULTI PURPOSE ROOM WALLS, RE.DTL."F" SHT."D4"
	TOP PLATE:	DOUBLE 2X4
	BOTTOM PLATE:	SINGLE 2X4
	MISC.:	FIRE STOP @ WALL COVERING SEAM
	WALL COVERING:	5/8" TYPE-X GYPSUM, UNFINISHED, 12'-0" W/TAPERED EDGES
	WALL COVERING:	5/8" MR GYPSUM, UNFINISHED, 12'-0" W/TAPERED EDGES @ TILED AREAS ONLY AS NOTED ON SHEET "A4" CERAMIC TILE SUPPLIED & INSTALLED @ SITE BY MURILLO
	WALL COVERING:	5/8" VHI ABUSE GYPSUM, UNFINISHED, 12'-0" W/TAPERED EDGES @ MULTI PURPOSE ROOM WALLS ONLY, NOT REQUIRED @ MULTI PURPOSE ROOM CORRIDORS
57 PCS	NOTE:	5/8" VHI ABUSE GYPSUM FOR SITE BUILT KNEE WALL TO BE SHIPPED LOOSE AND INSTALLED ON SITE BY MURILLO
	NOTE:	TAPE, TEXTURE & PAINT BY MURILLO
	WALL SHEATHING:	NOMINAL 3/8" CDX PLYWOOD OR 7/16" OSB
	MISC.:	SIMPLEX BARRICADE BUILDING WRAP
	INSULATION:	R-13 FIBERGLASS, KRAFT FACED
	SIDING:	5/16" HARDIPANEL, STUCCO, W/T-MOLD, 8'-0" RE: DTL."L" SHT."D2" SIDING COLOR: BEIGE GRAY (LATEX) TRIM COLOR: OXFORD BROWN (LATEX)
	TRIM:	WOOD - WINDOWS, BRICK MOLD, 2 1/4" SEE DETAIL SHEET "D4"
	TRIM:	WOOD - TOP, 1X4 ROUGH SAWN, CEDAR
	TRIM:	WOOD - BOTTOM, 1X4 ROUGH SAWN CEDAR TOP & BOTTOM TRIM SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
	TRIM:	WOOD - CORNER, 1X4 ROUGH SAWN CEDAR
	TRIM:	WOOD - DOORS, BRICK MOLD, 2 1/4" (3" @ STOREFRONT DOOR, ONLY)
	TRIM:	WOOD - HORZ. BELT RAIL, 1X4 ROUGH SAWN CEDAR COLOR: BEIGE GRAY (LATEX)
	NOTE:	NO HORZ. BELT RAIL TRIM ON ENDS, SHIPPED LOOSE
	TRIM:	METAL CORNER BEAD @ OUTSIDE CORNERS, SHIPPED LOOSE
57 PCS	NOTE:	SIDING AND TRIM FOR SITE BUILT KNEE WALL TO BE SHIPPED LOOSE AND INSTALLED ON SITE BY MURILLO
	NOTE:	STENCIL ON SHIPPING WALLS .... DO NOT REMOVE SHIPPING WALLS UNTIL SITE INSTALLED ROOF IS SET
		EXTERIOR WALL COVERING HELD BACK 8" AT MATE LINES-SITE FINISH BY MURILLO RE: DTL."A" SHT."D1"
	NOTE:	SEE ARCHITECTURAL SHEETS FOR EXTERIOR SIDING HOLD BACK
	MISC.:	HARDI-BACKER FROM BOTTOM OF FRAME TO START OF SIDING RE: DTL."J" SHT."D2"
	MISC.:	BOLT WALLS TO FRAME @ CORNERS, FRONT OF AXLES AND REAR OF AXLES

SUSPENDED CEILING CAVITY TO HAVE NO EXPOSED WOOD UNLESS IT IS FIRE TREATED

INTERIOR WALLS:

QTY	ITEM	SPECIFICATION
	FRAMING:	2X4, 16" O.C.
	WALL HEIGHT:	10'-3 1/2" 8'-4 1/2" AS NOTED ON ARCHITECTURAL SHEETS
	WALL HEIGHT:	4'-6" W/ SOLID SURFACE TOP SUPPLIED AND INSTALLED BY MURILLO W/ 1/4 ROUND TRIM, SHIPPED LOOSE AND INSTALLED BY MURILLO
	TOP PLATE:	DOUBLE 2X4
	BOTTOM PLATE:	SINGLE 2X4
	WALL COVERING:	5/8" TYPE-X GYPSUM, UNFINISHED W/TAPERED EDGES
	MISC.:	1-HOUR RATED WALL AS NOTED ON "A1" RE: DTL."E" SHT."D1"
	NOTE:	TAPE, TEXTURE & PAINT BY MURILLO
	TRIM:	METAL CORNER BEAD @ OUTSIDE CORNERS, SHIPPED LOOSE
	WALL COVERING:	5/8" MR GYPSUM @ TILED AREAS ONLY AS NOTED ON SHEET "A4" CERAMIC TILE SUPPLIED & INSTALLED @ SITE BY MURILLO
	INSULATION:	R-11 FIBERGLASS, SOUND DEADENING
	MISC.:	(2) 4'X8' SHEET 3/4" PLYWOOD OVER GYPSUM @ CAMERA & COMM. ROOM
	MISC.:	PLYWOOD BACKING BETWEEN STUDS IN KITCHEN AREA RE: DTL."A" SHT."D8"
	RUBBER BASE:	SUPPLIED AND INSTALLED BY MURILLO AS NOTED ON SHEET "A3" COLOR: SEE COLOR CHART ON "A3"
	LEGACY TRIM PACKAGE:	EXTERIOR DOOR
		INTERIOR WALL COVERING HELD BACK 8" AT MATE LINES-SITE FINISH BY MURILLO RE: DTL."D" SHT."D1"
		ALL GLASS IN INTERIOR PARTITION ARE TAPED FOR SHIPMENT

ROOF:

QTY	ITEM	SPECIFICATION
	RAFTER:	2X10, #2 SPF, 16" O.C., SEE RAFTER SCHEDULE ON THIS SHEET RAFTER LAYOUT - RE: DTL."L" SHT."D2"
	MATE BEAM:	STEEL C-CHANNEL, C10X25 (EACH SIDE ON ALL UNITS) 70'-0" LONG (+0"/-1/2" TOLERANCE) SEE SHEETS "D13 - D21"
	INSULATION:	R-30 FIBERGLASS, KRAFT FACED
	SHEATHING:	1/2" NOMINAL PLYWOOD
	CEILING SUBSTRATE:	SINGLE LAYER 5/8" TYPE-X GYPSUM, UNFINISHED
	CEILING:	SUSPENDED 2X2 PANELS, INSTALLED @ 8'-0" AFF SUSPENDED 2X2 PANELS, VINYL COVERED @ KITCHEN & DRY STORAGE INSTALLED @ 8'-0" AFF SUPPLIED & INSTALLED ON SITE BY MURILLO
	ROOFING:	GALVANIZED STEEL, 30 GA.
	MATE LINE:	PEEL AND SEAL FOR GALVANIZED STEEL ROOF SEAMS SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
	MISC.:	2/12 PITCHED HIP ROOF SUPPLIED AND INSTALLED BY MURILLO RUBBER: COLOR: BLACK SUPPLIED & INSTALLED BY MURILLO
	MISC.:	FRAMED OPENINGS FOR KITCHEN EXHAUST FANS RE: DTL."D" SHT."D8"
	MISC.:	FRAMED OPENING FOR CEILING HATCH RE. DTL."A" SHT. "H4" UNIT "C"
	MISC.:	FRAMED OPENING FOR CEILING HATCH RE. DTL."A" SHT. "H5" UNIT "H"
	MISC.:	FRAMED OPENING FOR CEILING HATCH RE. DTL."A" SHT. "H7" UNIT "M"
	MISC.:	SPECIAL MATE LINE CLOSE, RE DTL. "A & B" SHT. "D6"

EXTERIOR DOORS:

QTY	SIZE	SPECIFICATION
15	3/0X6/8:	300 STEEL W/STEEL JAMB, DOOR & JAMB (STEEL CRAFT, L18 SERIES DOOR) (STEEL CRAFT, K16 SERIES FRAME) COLOR: BEIGE GRAY (OUTSIDE) WHITE (INSIDE) W/ 24"X30" (FRAME SIZE) 1/4" LAMINATED SAFETY GLASS W/ OVERHEAD, HYDRAULIC (LCN 1370), (4) CLOSERS TO HAVE HOLD OPEN ARMS, SEE SHEET "A1" FOR LOCATIONS W/ LEVER TYPE PANIC AND CYLINDER (VON DUPRIN 22L SEIRIES) W/ REMOVABLE CORE TYPE & CONSTRUCTION CORE W/ DOOR SWEEP (PEMKO 307AV) W/ ADA THRESHOLD (PEMKO 1710A) W/ BULB SEAL
4	6/0X6/8:	303 STEEL W/STEEL JAMB & REMOVABLE MULLION (STEEL CRAFT, L18 SERIES DOOR) (STEEL CRAFT, K16 SERIES FRAME) COLOR: BEIGE GRAY (OUTSIDE) WHITE (INSIDE) W/ 24"X30" (FRAME SIZE) 1/4" LAMINATED SAFETY GLASS W/ OVERHEAD, HYDRAULIC (LCN 1370) W/ LEVER TYPE PANIC AND CYLINDER (VON DUPRIN 22L SEIRIES) W/ REMOVABLE CORE TYPE & CONSTRUCTION CORE W/ DOOR SWEEP (PEMKO 307AV) W/ ADA THRESHOLD (PEMKO 1710A) W/ BULB SEAL
1	6/0X7/0:	401 CLEAR STOREFRONT (KAWNEER 190) W/ CLOSER (LCN 1370), BRONZE FRAME AND LOCK W/ PANIC BAR UPGRADE (PANELINE CR-901) W/ REMOVABLE CORE TYPE & CONSTRUCTION CORE
	NOTE:	DOORS KEYED TO MASTER KEY PER DEVICE BY MURILLO
	NOTE:	DOORS TO HAVE HINGE PROTECTORS (LCN 700 & 750) SHIPPED LOOSE AND INSTALL ON SITE BY MURILLO
	NOTE:	ALL DOOR ADJUSTMENTS AT SITE BY MURILLO

INTERIOR DOORS:

QTY	SIZE	SPECIFICATION
6	6/0X6/8:	607 IMPERIAL OAK, SOLID CORE (JELD-WEN) W/STEEL KD JAMB, JAMB COLOR: WHITE W/ KEYED LOCKSET (CAL-ROYAL SL03), CLASSROOM FUNCTION LEVER TYPE, GRADE 2 W/ 24"X30" (FRAME SIZE) SAFETY GLASS W/ FLOOR MOUNTED DOOR STOP (TELL FS3026)
1	6/0X6/8:	699 STEEL DOOR W/STEEL JAMB DOOR AND JAMB COLOR: WHITE W/ KEYED LOCKSET (CAL-ROYAL SL03), CLASSROOM FUNCTION LEVER TYPE, GRADE 2 W/ 4"X24" (FRAME SIZE) SAFETY GLASS @ MULTI PURPOSE ROOM W/ FLOOR MOUNTED DOOR STOP (TELL FS3026)
9	3/0X6/8:	999 IMPERIAL OAK, SOLID CORE (JELD-WEN), 20 MINUTE SLAB W/STEEL KD JAMB & SELF CLOSING HINGES BY MURILLO, JAMB COLOR: WHITE W/ 24"X30" (FRAME SIZE) SAFETY GLASS W/ 12"X80" SAFETY GLASS SIDE LITE W/ KEYED LOCKSET (CAL-ROYAL SL03), CLASSROOM FUNCTION, LEVER TYPE, GRADE 2
14	3/0X6/8:	601 IMPERIAL OAK, SOLID CORE (JELD-WEN), 20 MINUTE SLAB W/STEEL KD JAMB, JAMB COLOR: WHITE (11) W/SELF CLOSING HINGES (AS NOTED ON "A1") (10) W/ 24"X30" (FRAME SIZE) SAFETY GLASS AS NOTED ON "A1" (1) W/ PRIVACY SET (CAL-ROYAL SL20), LEVER TYPE, GRADE 2 @ TOILET 106 (13) W/ KEYED LOCKSET (CAL-ROYAL SL00), LEVER TYPE, GRADE 2 AS NOTED ON "A1" (3) W/ FLOOR MOUNTED DOOR STOP AS NOTED ON "A1"
1	6/0X6/8:	444 STEEL W/STEEL JAMB, 45 MIN SLAB DOOR AND JAMB COLOR: WHITE W/ OVERHEAD, HYDRAULIC (LCN 1370) W/ LEVER TYPE PANIC AND CYLINDER (VON DUPRIN 22L SEIRIES) LEVER TYPE, GRADE 2 W/ 4"X24" (FRAME SIZE) WIRE GLASS
1	6/0X7/0:	499 CLEAR STOREFRONT (KAWNEER 190) W/ CLOSER (LCN 1370), BRONZE FRAME AND LOCK W/ PANIC BAR UPGRADE (PANELINE CR-901) W/ REMOVABLE CORE TYPE & CONSTRUCTION CORE
1	6/0X6/8:	888 STEEL W/ STEEL JAMB DOOR AND JAMB COLOR: WHITE W/ DOUBLE EGRESS W/ STAINLESS STEEL PUSH/PULL PLATES, GRADE 2 W/ 24"X30" (FRAME SIZE) SAFETY GLASS W/ OVERHEAD, HYDRAULIC (LCN 1370) W/HOLD OPEN ARMS
1	3/0X6/8:	555 IMPERIAL OAK, SOLID CORE (JELD-WEN), 45 MINUTE SLAB W/STEEL KD JAMB, JAMB COLOR: WHITE W/SELF CLOSING HINGES W/ 24"X30" (FRAME SIZE) WIRE GLASS W/ KEYED LOCKSET (CAL-ROYAL SL00), LEVER TYPE, GRADE 2 AS NOTED ON "A1"
2	3/0X6/8:	777 IMPERIAL OAK, SOLID CORE (JELD-WEN), 45 MINUTE SLAB W/STEEL WELDED JAMB JAMB COLOR: WHITE W/SELF CLOSING HINGES W/ 24"X30" (FRAME SIZE) WIRE GLASS W/ 12"X80" WIRE GLASS SIDE LITE W/ KEYED LOCKSET (CAL-ROYAL SL03), CLASSROOM FUNCTION, LEVER TYPE, GRADE 2
	NOTE:	DOORS TO HAVE HINGE PROTECTORS (LCN 700 & 750) SHIPPED LOOSE AND INSTALL ON SITE BY MURILLO
1	MISC.:	FO 3/0X6/8 FINISHED OPENING, INSTALLED ON SITE BY MURILLO
25	MISC.:	DOOR STOP, WALL MOUNTED, (TELL WS2526) DOOR STOPS SHIPPED LOOSE & INSTALLED BY MURILLO

WINDOWS

QTY	SIZE	SPECIFICATION
29	36"X60":(FRAME SIZE)	GS VERTICAL SLIDER, CLEAR GLASS, (MANKO) W/ PAINTED BRONZE FINISH W/D.I.G. W/LAMINATED GLASS ON THE INSIDE TOP SASH OPERABLE W/SCREEN SEE DETAIL SHEET "D4"
1	36"X30":(GLASS SIZE)	KN VIEW WINDOW W/STEEL JAMB, 20 MINUTE & SAFETY GLASS TWO PIECE SAFETY GLASS, JAMB COLOR: WHITE W/ 2X6 HEADER
14	48"X30":(GLASS SIZE)	KM VIEW WINDOW W/STEEL JAMB, 20 MINUTE & SAFETY GLASS TWO PIECE SAFETY GLASS, JAMB COLOR: WHITE W/ 2X6 HEADER
2	36"X33":	FP FINISHED OPENING, INSTALLED @ SITE BY MURILLO
	NOTE:	RATED LABEL TO BE ON THE TOP JAMB OF THE INTERIOR WINDOW

RAFTER LENGTHS

UNIT	LENGTH
A	155"
B	131"
C	131"
D	131"
E	131"
F	131"
G	131"
H	131"
J	155"
K	155"
L	131"
M	131"
N	155"
P	155"
Q	155"
R	155"
S	155"

FRAME SCHEDULE

UNIT	WEIGHT	AXLES	TIRES
A	46,200	8 *	12 PLY
B	38,600	6	12 PLY
C	38,600	6	12 PLY
D	38,500	6	12 PLY
E	39,900	6	12 PLY
F	39,700	6	12 PLY
G	39,200	6	12 PLY
H	39,200	6	12 PLY
J	38,800	8 *	12 PLY
K	45,700	8 *	12 PLY
L	41,500	6	12 PLY
M	37,200	6	12 PLY
N	40,100	8 *	12 PLY
P	46,000	8 *	12 PLY
Q	43,900	8 *	12 PLY
R	49,000	8 *	12 PLY
S	47,700	8 *	12 PLY

** DENOTES BOGGIE AXLES

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DESCRIPTION	DATE	BY
E	CUSTOMER	10/30/07	IW
D	CUSTOMER	10/22/07	IW
C	CUSTOMER	10/5/07	IW
B	MULTI-PURPOSE DOOR CHANGE	9/28/07	IW
A	VALUE ENGINEERING	9/27/07	IW

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)

PLANT: BRISTOL

ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL: (9)1274, (8)1474

DATE: 8/21/06

DRAWN BY: IW/JR

DRAWING SCALE: AS NOTED

QUOTE NO.:

SERIAL NO.: 36133-49

DRAWING NUMBER: S2

PROPRIETARY AND CONFIDENTIAL
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CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

"Quality & Integrity Since 1968"

ELECTRICAL:

QTY:	ITEM	DESCRIPTION
	SERVICE:	120/208 VOLT, THREE PHASE, 4 WIRE, 60 HZ. W/GROUND
9	LOAD CENTER:	125 AMP W/MAIN, THREE PHASE W/ 2" EMT CONDUIT (CUTLER HAMMER 3BR 3042 B125)
3	LOAD CENTER:	150 AMP W/MAIN, THREE PHASE W/ 2" EMT CONDUIT (CUTLER HAMMER 3BR 3042 B150)
1	LOAD CENTER:	200 AMP W/MAIN, THREE PHASE W/ 2 1/2" EMT CONDUIT (CUTLER HAMMER 3BR 4242 B200)
	NOTE:	ALL LOAD CENTER SERVICE ENTRANCES ARE THRU SUSPENDED CEILING @ 8'-10" AFF TO CORRIDOR, W/LOCKABLE COVERS
	NOTE:	ALL LOAD CENTERS TO HAVE (1) 3/4" EMTY CODUIT TO SUSPENDED CEILING CAVITY
10	NOTE:	1 POLE SHUNT TRIP BREAKERS, 20 AMP FOR EXHAUST FAN CIRCUITS
22	NOTE:	1 POLE SHUNT TRIP BREAKERS, 20 AMP FOR ALL AIR HANDLERS
2	NOTE:	2 POLE SHUNT TRIP BREAKERS, 20 AMP FOR EXHAUST FANS
1	NOTE:	3 POLE SHUNT TRIP BREAKER, 80 AMP FOR KITCHEN MAKE-UP AIR UNIT
3	NOTE:	3 POLE SHUNT TRIP BREAKERS, (2) 30 AMP & (1) 70 AMP @ PANEL "M-9,11,13", "M-38,40,42" AND "M-8,10,12"
	RACEWAY:	1/2" EMT CONDUIT W/MINIMUM #12 THHN, NO MC CABLE
149	LIGHT:	DIFFUSED, LAY-IN, 4', 4 TUBES, T-8 TUBES FLUORESCENT (COOPER 2GR8432/A120/EB82/L8735 3/18-6) FLUORESCENT LIGHTS TO HAVE ELECTRONIC BALLAST WIRED & STRAPPED TO SUB-CEILING, INSTALLED ON SITE BY MURILLO
3	LIGHT:	DIFFUSED, SURFACE MOUNTED, 4', 2 TUBE, FLUORESCENT @ MECH. ROOM
6	LIGHT:	7" DRUM, INCANDESCENT, WALL MOUNTED (MAXIM #5884 MRSH) SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
4	LIGHT:	EXIT, SINGLE FACE W/ARROWS & BATTERY BACKUP, CEILING MOUNTED (SLED B RW)
1	LIGHT:	EXIT, DUAL FACE W/ARROWS & BATTERY BACKUP, CEILING MOUNTED (SLED B RW) SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
25	LIGHT:	EMERGENCY, DUAL HEAD W/BATTERY BACKUP (SIMKAR SEM W REM) (1) W/WIRE CAGE SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
23	LIGHT:	EMERGENCY, DUAL HEAD W/EXIT SIGN & BATTERY BACKUP (SIMKAR SCLI 2 R W REM) (1) CEILING MOUNTED & (3) W/ WIRE CAGE SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
19	LIGHT:	EXTERIOR, VANDAL RESISTANT, WALL MOUNTED, WEATHERPROOF (SIMKAR V5000-AMS 120V)
13	LIGHT:	EXTERIOR, 100 WATT, METAL HALIDE W/PHOTO CELL (COOPER MHWL-100 HMTLL) (3) SHIPPED LOOSE & INSTALLED @ SITE BY MURILLO
6	LIGHT:	THREE BULB CHROME LIGHT BAR, SEA GULL #4737-05
65	SWITCH:	20 AMP, 120 VOLT, SILENT TOGGLE TYPE
38	SWITCH:	20 AMP, 120 VOLT, 3-WAY, TOGGLE TYPE
6	MISC.:	OCCUPANCY SENSOR, CEILING MOUNTED, CS1001 W/POWER PACK (PWP120)
1	MISC.:	LOCKOUT DEVICE FOR R-3 CIRCUIT BREAKER (SPRINKLER SYSTEM COMPRESSOR)
2	MISC.:	LOCKOUT DEVICE FOR CIRCUIT BREAKER (RECIRCULATIONG PUMP) CIRCUITS F-27,29 & P-19,21
98	RECEPT:	20 AMP, 120 VOLT, DUPLEX, GROUNDING TYPE
32	RECEPT:	20 AMP, 120 VOLT, DUPLEX, GROUNDING TYPE, CHILD PROOF @ 54" AFF INSTALL BLANK COVER, SHIP LOOSE RECEPT @ ROOMS 122,121,126
6	RECEPT:	20 AMP, 120 VOLT, DUPLEX, GROUNDING TYPE, CHILD PROOF @ WAITING AREA
38	RECEPT:	20 AMP, 120 VOLT, DUPLEX, GFCI TYPE W/BONDING JUMPER
21	RECEPT:	15 AMP, 120 VOLT, DUPLEX, EXTERIOR, GFCI TYPE W/BONDING JUMPER
1	RECEPT:	15 AMP, 120 VOLT, DUPLEX, GFCI, HEAT TAPE W/BONDING JUMPER
2	RECEPT:	30 AMP, 240 VOLT, SINGLE, GROUNDING TYPE, NEMA 10-30R, DRYER RECEPT
11	RECEPT:	20 AMP, 120 VOLT, QUADPLEX, GROUNDING TYPE
1	RECEPT:	20 AMP, 120 VOLT, DUPLEX, @ SUB-CEILING @ ENTRY
35	MISC.:	SINGLE GANG ACCESS BOX W/3/4" EMT CONDUIT THRU SUSPENDED CEILING CONDUIT STUBS @ 8'-6" AFF. (2) BELOW FLOOR @ RECEPTIONIST DESK
2	MISC.:	POWERED DOUBLE GANG ACCESS BOX @ SUB CEILING FOR SITE INSTALLED EXTERIOR LIGHTS
16	MISC.:	POWERED DOUBLE GANG ACCESS BOX W/DOUBLE MUD RING, (4) BELOW FLOOR
1	MISC.:	16/2 WIRE FROM MAIN ENTRY DOOR TO SUB-CEILING, RE.DTL."K" SHT."D2"
	NOTE:	SWITCH AND RECEPT COVERS TO BE WHITE. SHIPPED LOOSE & INSTALLED @ SITE BY MURILLO
	NOTE:	WIRING & CONNECTION TO MAIN DISTRIBUTION PANEL BY MURILLO
	NOTE:	CROSSOVER FROM MAIN LOAD CENTER TO SUBPANELS BY MURILLO
	NOTE:	ALL BATTERY PACK EQUIPMENT REQUIRES FIELD HOOK-UP BY MURILLO

PLUMBING:

QTY:	ITEM	DESCRIPTION
3	WATER CLOSET:	ELONG. BOWL (AMS MADERA #3043), FLUSHOMETER TYPE (SLOAN CROWN II #111) HANDICAP W/SEAT 17" HIGH, SEE "A1" FOR LOCATIONS
20	WATER CLOSET:	ELONG. BOWL, FLUSHOMETER TYPE (SLOAN CROWN II #111) W/SEAT, CHILD HEIGHT (CRANE PLUMBING) (4) 13" HIGH (#3309 SANTON JR), (8) 10" HIGH (#3380 BABY BOWL) (8) 15" HIGH (AMS MODERA #2234), SEE "A1" FOR LOCATIONS ALL WATER CLOSETS SHIPPED LOOSE & INSTALLED BY MURILLO
4	MODESTY PARTITION:	PLASTIC RESIN (HINY HIDER), 30"DPX36" TALL, 12" AFF, FLOOR BRACED
5	MODESTY PARTITION:	PLASTIC RESIN (HINY HIDER) W/DOOR, STANDARD (2) TO BE 36" TALL PANELS MOUNTED 12" AFF W/STD HEAD BAR (3) TO BE STD PANELS MOUNTED 12" AFF
6	MODESTY PARTITION:	PLASTIC RESIN (HINY HIDER) W/DOOR, HANDICAP (2) TO BE 36" TALL PANELS MOUNTED 12" AFF W/STD HEAD BAR (4) TO BE STD PANELS MOUNTED 12" AFF ALL MODESTY PARTITIONS COLOR: WHITE ALL MODESTY PARTITIONS INSTALLED ON SITE BY MURILLO
1	URINAL:	WALL HUNG W/CONCEALED TRAP & FLUSHOMETER SHIPPED LOOSE & INSTALLED BY MURILLO
28	LAVATORY:	WALL HUNG, VITREOUS CHINA (MANSFIELD 2008), 20"X18", HANDICAP W/ PUSH DOWN, TIMED LEVER HANDLE, SHIPPED LOOSE & INSTALLED BY MURILLO
1	SINK:	STAINLESS STEEL, TRIPLE BOWL W/8" CENTERSET, W/WRISTBLADE HANDLE SUPPLIED & INSTALLED ON SITE BY MURILLO
3	SINK:	STAINLESS STEEL, DOUBLE BOWL (DAYTON D233223) W/8" CENTERSET, W/WRISTBLADE HANDLE (1) SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO @ ROOM #134 (2) SUPPLIED & INSTALLED ON SITE BY MURILLO @ KITCHEN
14	SINK:	15"X15", STAINLESS STEEL, SINGLE BOWL (DAYTON D115152) W/GOOSENECK FAUCET (B&K 122-432L) W/WRISTBLADE HANDLE, SHIPPED LOOSE & INSTALLED BY MURILLO

PLUMBING CONTINUED:

QTY:	ITEM	DESCRIPTION
1	SINK:	SERVICE, 24"X24", FIBERGLASS FLOOR MOUNTED (FIAT MSB-2424) SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO W/830 AA WALL MOUNTED FAUCET & 889CC MOP BRACKET
21	FLOOR DRAIN:	BRASS, 2" (TOP OF DRAIN TO BE FLUSH W/TOP LAYER OF DECKING)
3	FLOOR DRAIN:	BRASS, 2" (FLOOR SLOPED TO DRAIN IN KITCHEN RE"DTL."F" SHT."D2")
1	FLOOR DRAIN:	BRASS, 3" @ MECH. ROOM (TOP OF DRAIN TO BE FLUSH W/TOP LAYER OF DECKING)
22	MISC.:	TRAP PRIMERS (PRIME PERFECT/SIOUX CHIEF #695-01) FOR ALL FLOOR DRAINS
12	MISC.:	TRAP PRIMER WYE SPLITTER (#695-Y52)
4	MISC.:	TRAP PRIMER DISTRIBUTOR (695-D30)
42	MISC.:	TAPPED P-TRAP ADAPTER (PRECISION PLUMBING PRODUCTS) (41) PPA-2P625 & (1) PPA-3P625
5	WATER HEATER:	POINT OF USE, CHRONOMITE S-70 240V ELEC.
2	WATER HEATER:	119 GALLON, 208 V., 3ø ELECTRIC 18 KW W/T&P VALVE (A.O. SMITH DSE-120)
	NOTE:	T&P HOOKED UP TO FLOOR DRAIN IN WATER HEATER CLOSETS
2	MISC:	RECIRCULATION PUMP, 220 V., W/ROTARY TIMER (GRUNDFOS #UP43-110F)
2	MISC:	EXPANSION TANK, 4.5 GAL. (GRAINGER #2P673)
	MISC:	PLASTIC OR METAL PAN FOR WATER HEATER, 119 GALLON
17	MISC.:	WATTS TEMPERING VALVE, SERIES MMV-M1
29	MISC.:	WATER HAMMER ARRESTORS
	MISC.:	ALL FIXTURES TO HAVE CHROME SHUT OFF VALVES
	MISC.:	ALL FIXTURES TO HAVE CHROME RISERS
	SUPPLY LINES:	COPPER, HARD TYPE "L"
	SUPPLY LINES:	CONCEALED WITHIN THE STRUCTURE
	SUPPLY & DWV LINES:	INSULATED WHERE EXPOSED @ LAV
84	MISC.:	FLEXIBLE COPPER CONNECTIONS FOR AIR HANDLERS RE: DTL."D" SHT."D5" (42) 1/2" & (42) 3/4"
	WASTE LINES:	ABS OR PVC SCHEDULE 40
	WASTE LINES:	CONCEALED WITHIN THE STRUCTURE
23	ACCESSORIES:	T-P HOLDER
10	ACCESSORIES:	GRAB BARS (JONES STEPHENS CORP. G13-136 & G13-142), SET, STAINLESS STEEL, (1)36", (1)42"
12	ACCESSORIES:	MIRROR, 18"X36" W/STAINLESS STEEL FRAME, UNBREAKABLE (M60-S)
18	ACCESSORIES:	MIRROR, 18"X24" W/STAINLESS STEEL FRAME, UNBREAKABLE @ STALL SINKS (M60-S) SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
4	ACCESSORIES:	MIRROR, 20"X6" @ CHANGING TABLE, SHIPPED LOOSE & INSTALLED BY MURILLO
2	ACCESSORIES:	WASHER BOX FOR CLOTHES WASHER (IPS WATER TITE)
2	DRINKING FOUNTAIN:	COOLED, BARRIER FREE, BI-LEVEL, (ELKAY #EZSTL8LC)
6	DRINKING FOUNTAIN:	WALL HUNG, HANDICAP, BUBBLER (ELKAY #EDFP210C) SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
	NOTE:	ALL PLUMBING TEMPERING VALVES AND ACCESS HOLES TO HAVE A PLASTIC ACCESS PANEL (SIOUX CHIEF MFG., 970-208 & 970-214)
2	MISC.:	PLASTIC ACCESS PANEL (SIOUX CHIEF MFG. 970-214) FOR PLUMBING ACCESS FOR FUTURE CHANGING STATION
7	APPLIANCE:	REFRIGERATOR UNDER COUNTER TOP, SUPPLIED & INSTALLED ON SITE BY MURILLO
1	APPLIANCE:	REFRIGERATOR IN KITCHEN, SUPPLIED & INSTALLED ON SITE BY MURILLO
1	APPLIANCE:	RANGE, SUPPLIED & INSTALLED ON SITE BY MURILLO
1	APPLIANCE:	FREEZER, SUPPLIED & INSTALLED ON SITE BY MURILLO
2	APPLIANCE:	WASHER, SUPPLIED & INSTALLED ON SITE BY NAFI
2	APPLIANCE:	DRYER, SUPPLIED & INSTALLED ON SITE BY NAFI
1	APPLIANCE:	RANGE HOOD, SUPPLIED & INSTALLED ON SITE BY MURILLO
	NOTE:	ALL PLUMBING SUPPLY LINES RUN ABOVE SUSPENDED CEILING TO CORRIDOR & CONNECTED ON SITE BY MURILLO
	NOTE:	ALL PLUMBING BELOW FLOOR SUPPLIED & INSTALLED ON SITE BY MURILLO
	NOTE:	HEAT TAPE SUPPLIED & INSTALLED ON SITE BY MURILLO
	NOTE:	VENT MANIFOLD SYSTEM IN SITE BUILT ROOF SUPPLIED AND INSTALLED ON SITE BY MURILLO
5	EXT FREEZE PROOF HOSE BIB:	W/BACKFLOW PREVENTOR (WOODFORD MODEL 17)

HVAC:

QTY:	ITEM	DESCRIPTION
	NOTE:	ALL HVAC EQUIPMENT BY AAON & WILLIAMS
1	HEAT/COOL:	CHILLER/BOILER SHIPPED TO SITE & INSTALLED BY MURILLO AAON MODEL: LL-085, 3 PHASE, 85 TON
	HEAT/COOL:	HORIZONTAL MOUNTED FAN COILS, SINGLE PHASE W/BLEADER VALVES AND FLOW CONTROLS SEE FAN/COIL SCHEDULE ON SHEET "H1"
	HEAT/COOL:	VERTICAL MOUNTED FAN COIL, THREE PHASE W/BLEADER VALVES AND FLOW CONTROLS SEE FAN/COIL SCHEDULE ON SHEET "H1"
	HEAT/COOL:	HORIZONTAL MOUNTED FAN COILS, SINGLE PHASE, #LH-R-003 MOUNTED BELOW FLOOR IN CRAWL SPACE W/BLEADER VALVES AND FLOW CONTROLS SEE FAN/COIL SCHEDULE ON SHEET "H1" SHIPPED LOOSE AND INSTALLED ON SITE BY MURILLO
	NOTE:	ALL FAN COILS TO BE A (4) PIPE HYDRONIC SYSTEM, ALL WATER PIPES TO BE RUN TO CRAWL SPACE, ALL LINES TO BE LABELED MY MARK LINE
	MISC.:	ARMAFLEX 3/4" INSULATIION, R-5, ON ALL HYDRONIC HOT & COLD LINES, IN WALL & @ SUB-CEILING. MURILLO TO SUPPLY & INSTALL MANIFOLD ON SITE
	MISC.:	3/4" PVC CONDENSATION DRAIN & RUNNING TRAP TO DWV SYSTEM W/ARMAFLEX 3/4" INSULATION, R-5, RE: DTL."E" SHT."D5"
	DUCTWORK:	24 GA., GALVANIZED STEEL, CEILING SUPPLY AS NOTED ON "H1"
	DUCTWORK:	1" FOIL FACE INSULATION FOR DUCT ON OUTSIDE
	DUCTWORK:	8" & 12" FLEX DUCT AS NOTED ON "H1" (6'-0" LONG MAX)
89	MISC.:	8" & 12" STRAIGHT TAKE OFF
89	SUPPLY AIR DIFFUSER:	24"X24" LAY-IN CEILING, WITH ADJUSTABLE DAMPER, HART & COOLEY HVS, STRAPPED TO SUB-CEILING & INSTALLED ON SITE BY MURILLO
	DUCTWORK:	24 GA., GALVANIZED STEEL, CEILING RETURN AS NOTED ON "H1"
	DUCTWORK:	1" FOIL FACE INSULATION FOR DUCT ON OUTSIDE
	DUCTWORK:	8" & 12" FLEX DUCT AS NOTED ON "H1" (6'-0" LONG MAX)
72	MISC.:	8" & 12" STRAIGHT TAKE OFF
72	RETURN AIR GRILLE:	24"X24" LAY-IN CEILING, PERFORATED, STRAPPED TO SUB-CEILING INSTALLED ON SITE BY MURILLO
17	MISC.:	8" & 12" TAKE OFF'S W/BALANCING DAMPERS AT RETURN AIR DUCT
2	MISC.:	120 V SMOKE DETECTOR IN RETURN AIR DUCT AS NOTED ON "H1"
2	MISC.:	8"X8" WALL GRILLE W/8" TO 12"X12" WALL PLATE, @ MECHANICAL ROOM RE.DTL. "A" SHT. "D4"
10	EXHAUST FAN:	521 CFM FAN, FANTECH FX8XL, GRAINGER #4YM45 SUB-CEILING MOUNTED (1) INSTALLED IN DUCT TO CRAWL SPACE, RE.DTL."E" SHT. "D7" (9) W/24" LAY-IN GRILLE, PERFORATED, STRAPPED TO SUB-CEILING INSTALLED ON SITE BY MURILLO 8" DUCT TO EXTERIOR WALL W/HOOD (V2247)
1	EXHAUST FAN:	257 CFM FAN, FANTECH FX6, GRAINGER #4YM44 SUB-CEILING MOUNTED W/24" LAY-IN GRILLE, PERFORATED, STRAPPED TO SUB-CEILING INSTALLED ON SITE BY MURILLO 6" DUCT TO EXTERIOR WALL W/HOOD (V2247)

HVAC CONTINUED:

QTY:	ITEM	DESCRIPTION
6	EXHAUST FAN:	80 CFM CEILING FAN W/LIGHT, BROAN, GRAINGER #5E834 4" DUCT TO EXTERIOR WALL W/HOOD (V2247)
1	EXHAUST FAN:	110 CFM CEILING FAN, BROAN, GRAINGER #4C377 4" DUCT TO EXTERIOR WALL W/HOOD (V2247)
	NOTE:	ALL EXTERIOR HOODS PAINTED TO MATCH SIDING
20	MISC.:	THERMOSTAT, A/C, AUTOMATIC CHANGE-OVER W/SETBACK (WHITE ROGERS 80 SERIES, 1F85-277) (1) SHIPPED LOOSE FOR MULTI PURPOSE ROOM RE. DTL. "E" SHT. "D4" FOR WIRING DIAGRAM
2	MISC.:	THERMOSTAT, HEAT ONLY, UNIT MOUNTED FOR CRAWL SPACE
20	MISC.:	LOCKING THERMOSTAT COVER, PLASTIC (WHITE ROGERS F29-0198) SHIPPED LOOSE & INSTALLED ON SITE BY MURILLO
	NOTE:	THERMOSTAT WIRE TO BE 10 CONDUCTOR
	MISC.:	MAKEUP AIR UNIT IN KITCHEN, SUPPLIED AND INSTALLED ON SITE BY OTHERS
	DUCTWORK:	24 GA., GALVANIZED STEEL, FOR MULTI PURPOSE ROOM, SEE SHEET "D12" SHIPPED LOOSE AND INSTALLED ON SITE BY MURILLO
	DUCTWORK:	1" FOIL FACE INSULATION FOR DUCT ON OUTSIDE
	DUCTWORK:	8" & 12" FLEX DUCT AS NOTED ON "H1" (6'-0" LONG MAX)
2	MISC:	14"X14" FIRE DAMPER W/12" COLLAR, VERTICAL MOUNT
1	MISC:	10"X10" FIRE DAMPER W/8" COLLAR, VERTICAL MOUNT
18	MISC:	8" HEAVY DUTY CONTROL DAMPER, GREENHECK MODEL HCDR-150 W/ 115 VOLT, 2 POSITION ACTUATOR, CLOSE ON POWER FAIL (9) @ 521 EXHAUST FAN, (1) W/6" COLLAR @ 257 EXHAUST FAN (1) @ 306 CRAWL SPACE FANS & (7) W/4" COLLAR @ FAN/LIGHT COMBOS RE.DTL."H" SHT. "D2"
2	MISC:	20"X20" HEAVY DUTY CONTROL DAMPER, GREENHECK MODEL HCD-120 W/ 115 VOLT, 2 POSITION ACTUATOR, CLOSE ON POWER FAIL
1	MISC:	12"X12" HEAVY DUTY CONTROL DAMPER, GREENHECK MODEL HCD-120 W/ 115 VOLT, 2 POSITION ACTUATOR, CLOSE ON POWER FAIL SEE SHEET "H2" THESE DAMPERS ARE SUPPLIED BY MARK LINE AND INSTALLED BY MURILLO

FURNITURE:

QTY:	ITEM	DESCRIPTION
	NOTE:	CABINETS ARE BY COUNTRY CABINETS, MEDIUM OAK
6	DESK:	SIGN IN DESK
1	MISC.:	GATE @ RECEPTIONIST DESK
1	DESK:	REC. DESK COLOR: RAISED TOP IRIS SP409, LOWER SECT. FRENCH BLUE S8005
	SHELVING:	12" DEEP FIXED & ADJUSTABLE
	COUNTERTOP:	SOLID SURFACE, COLOR:
	COUNTERTOP:	HIGH PRESSURE LAMINATE, COLOR:
6	BASE CABINET:	TWO DRAWER, B12, SINGLE DOOR
1	BASE CABINET:	TWO DRAWER, B30, SINGLE DOOR
1	BASE CABINET:	TWO DRAWER, B36, SINGLE DOOR
2	BASE CABINET:	TWO DRAWER, B48, DOUBLE DOOR
6	WALL CABINET:	30" HIGH, W1230, SINGLE DOOR
12	WALL CABINET:	30" HIGH, W2430, SINGLE DOOR
3	WALL CABINET:	30" HIGH, W3630, DOUBLE DOOR
7	WALL CABINET:	30" HIGH, W3030, DOUBLE DOOR
3	WALL CABINET:	30" HIGH, W4830, DOUBLE DOOR
12	SINK BASE CABINET:	SINGLE DOOR, SB24
2	SINK BASE CABINET:	DOUBLE DOOR, SB36
1	SINK BASE CABINET:	DOUBLE DOOR, SB48
104	MISC.:	CUBBIES
55	MISC.:	LOCKERS
	NOTE:	ALL ITEMS IN THIS CLOUD ARE SUPPLIED & INSTALLED BY MURILLO
	NOTE:	ALL BASE CABINETS CORNERS TO HAVE OUTSIDE CORNER TRIM ATTACHED SHIP LOOSE ENOUGH FOR ALL BASE CABINETS INSTALLED @ SITE
	NOTE:	NO KNOBS OR PULLS ON CABINETS, RECESSED AREA FOR FINGERS TO PULL OPEN
	NOTE:	ALL CABINETS SHOULD HAVE ROUNDED CORNERS & EDGES UP TO AT LEAST 4'-0" AFF.

SPECIAL EQUIPMENT:

QTY:	ITEM	DESCRIPTION
9	FIRE EXTINGUISHER:	10#, A:B:C, DRY CHEMICAL FOR WALL CABINETS
9	WALL CABINET:	FIRE EXTINGUISHER (J.L. IND. C1817G10), METAL SEMI-RECESSED
2	ROUGH-IN:	DOUBLE GANG ACCESS BOX W/3/4" EMT CONDUIT THRU SUSPENDED CEILING W/SINGLE GANG MUD RING
18	ROUGH-IN:	FIRE ALARM PULL STATION SINGLE GANG ACCESS BOX W/3/4" EMT CONDUIT THRU SUSPENDED CEILING
44	ROUGH-IN:	FIRE ALARM SIGNAL DOUBLE GANG 4X4 ACCESS BOX W/3/4" EMT CONDUIT THRU SUSPENDED CEILING W/SINGLE GANG MUD RING (6) TO BE EXTERIOR WEATHERPROOF
59	ROUGH-IN:	SMOKE DETECTOR SINGLE GANG ACCESS BOX W/3/4" EMT CONDUIT THRU SUSPENDED CEILING BOX ONLY, NO WHIP REQUIRED
4	ROUGH-IN:	HEAT DETECTOR SINGLE GANG ACCESS BOX W/3/4" EMT CONDUIT THRU SUSPENDED CEILING BOX ONLY, NO WHIP REQUIRED
	MISC.:	CAMERAS SUPPLIED AND INSTALLED BY OTHERS
	NOTE:	ALARM ROUGH-INS ONLY, ACTUAL SYSTEMS SUPPLIED & INSTALLED BY MURILLO

CODES:

NATIONAL ELECTRICAL CODE COMPLIANCE
THIRD PARTY PLAN REVIEW:
THIRD PARTY INSPECTION & SEAL
MODULAR BUILDING INSTITUTE SEAL
IBC CONSTRUCTION, NO STATE SEALS
APPROX. SHIPPING HEIGHT: 14'-0" W/PLUMBING VENTS INSTALLED
APPROX. SHIPPING WEIGHT: SEE FRAME SCHEDULE ON THIS SHEET

PROPRIETARY AND CONFIDENTIAL

These designs contain proprietary information and are confidential and may not be used or disclosed without the written consent of Murillo Modular Group, Ltd.

STATE SEALS:

ALL ITEMS THAT ARE CLOUDED ARE FIELD INSTALLED

REV	DATE	BY	DESCRIPTION
M	9/15/08	DC	AS BUILT
L	10/31/07	IW	CUSTOMER
K	9/28/07	IW	MULTI-PURPOSE DOOR CHANGE
J	9/24/07	IW	CRAWL SPACE VENTILATION
H	7/20/07	IW	SINK HEATER
G	6/21/07	IW	THIRD PARTY
F	4/12/07	IW	CUSTOMER
E	3/5/07	IW	CUSTOMER
D	3/1/07	IW	CUSTOMER
C	2/7/07	IW	CUSTOMER
B	1/8/07	JR	CUSTOMER
A	11/30/06	JR	CUSTOMER

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MURILLO MODULAR

PROJECT NAME: CDC SCHOOL "160" (DETROIT)
PLANT: BRISTOL
ADDRESS: 51687 C.R. 133, BRISTOL, IN. 46507

MODEL:	(9)1274, (8)1474
DATE:	8/21/06
DRAWN BY:	IW/JR
DRAWING SCALE:	AS NOTED
QUOTE NO.:	
SERIAL NO.:	36133-49
DRAWING NUMBER:	S3

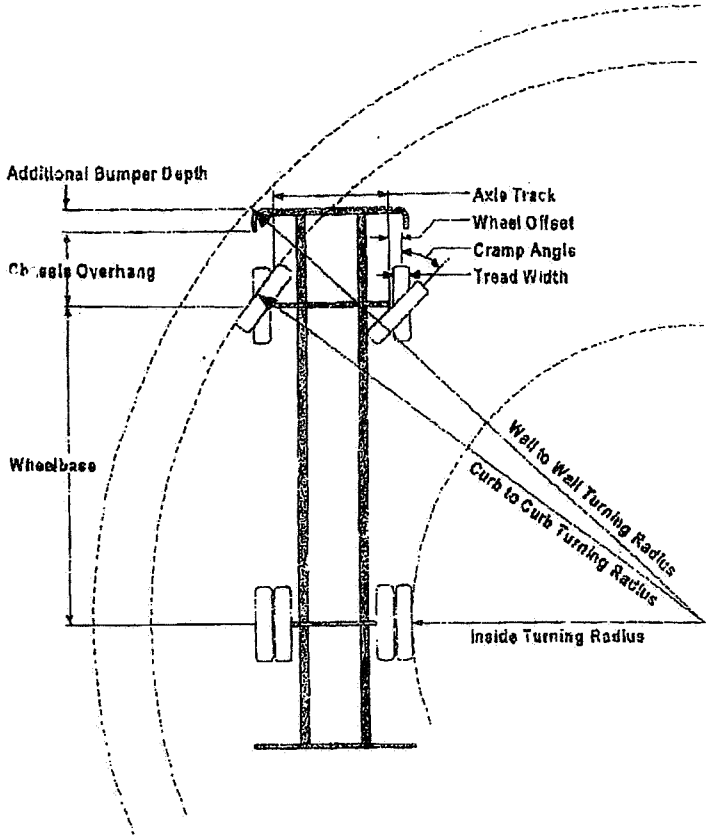
CORPORATE OFFICE: 51687 C.R. 133, BRISTOL, IN. 46507 — INDIANA PLANT: 51687 C.R. 133, BRISTOL, IN. 46507 — PENNSYLVANIA PLANT: 502 ALEXANDER DR. EPHRATA, PA. 17522 — NORTH CAROLINA PLANT: 455 LUCY GARRETT RD. ROXBORO, NC. 27574

APPENDIX DD
Emergency Vehicle Information

L-1

Turning Performance Analysis

12/29/2005



Parameters:

Inside Cramp Angle:	33.00 °
Axle Track:	83.11 in.
Wheel Offset:	5.25 in.
Tread Width:	16.60 in.
Chassis Overhang:	65.99 in.
Additional Bumper Depth:	1.00 in.
Front Overhang	150.60 in.
Wheelbase:	253.00 in.

Calculated Turning Radii:

Inside Turn:	31 ft. 4 in.
Curb to Curb:	45 ft. 10 in.
Wall to Wall:	52 ft. 8 in.

Comments:

Aerial Application

Attn Dan Lehman Pierce Job ED599 2 pages

Components	PRIDE #	Description
Front Axle	0000295	Axle, Front, Meritor FL-941, 21,000 lb
Front Tires	0078244	Tires, Michelin, 425/65R22.50 20 ply XZY 3 tread
Chassis	0060024	Lance-2000 Chassis, Aerials/Tankers/HDR Tandem 48K
Front Bumper	0003001	Bumper, Chrome Plated Steel, Non-extended, IHC
Aerial Device	0022160	Aerial, 100' Pierce Platform

Notes:

Actual Inside Cramp Angle may be less due to highly specialized options.

Curb to Curb turning radius calculated for a 9.00 inch curb.

APPENDIX EE
Geophysical Survey Information

Geophysical Survey Report

EM61 Site Investigation
Detroit Arsenal
Detroit, Michigan

Prepared For:

Barge Waggoner Sumner & Cannon, Inc.
8280 Yankee Street
Dayton, OH 45458-1806

Prepared By:

Prism GeoImaging, Inc.
11057 Allisonville Rd., #144
Fishers, Indiana 46038

Prism Project Number:

01.010.001

Prism GeoImaging

11057 Allisonville Road, #144
Fishers, Indiana 46038-2331
www.prismgeo.com

July 6, 2011

Robert D. Baird, PE, LEED AP BD+C
Asst. Proj. Mgr. - Civil Engineer
Barge Waggoner Sumner & Cannon, Inc.
8280 Yankee Street
Dayton, OH 45458-1806

Re: Geophysical Investigation Report
EM61 Site Investigation
Detroit Arsenal
Detroit, Michigan
Project Number: 01.010.001

Dear Mr. Baird,

In accordance with my proposal dated June 20, 2011, ***Prism GeoImaging, Inc.*** (***Prism***) is pleased to present Barge Waggoner Sumner & Cannon (BWSC) with this letter report documenting the EM61 geophysical investigation at the above referenced project site (the "Site"). My documentation of this project is included in the following sections.

Introduction

Based on information provided by BWSC, it is my understanding that as part of an upcoming construction project it is required that an EM61 site investigation be completed to characterize existing conditions at the Site. This sort of geophysical survey is commonly used to map the locations of metal objects such as underground storage tanks (USTs), buried drums, relict utilities and infrastructure, former building foundations, construction and industrial debris, and unexploded ordnance (UXO).

Geophysical Method

The selected geophysical instrument for this work was an EM61-MK2-HP manufactured by Geonics Limited. The EM61-MK2-HP is a high-sensitivity, high-resolution, time-domain metal detector. It consists of two vertically separated 1-meter by 0.5-meter coaxial coils mounted to a wheel assembly. The instrument operator pulls the coil assembly along the line of profile while data is collected nearly continuously (four readings per second). The EM61-MK2-HP takes readings from the bottom coil (designated as channel three) and an additional reading from the top coil. The top and bottom coil readings are then subtracted to selectively filter out the effect from near-surface metal objects (designated as channel difference calculation). The channel three reading is considered to be a measure of all metal within the detection zone both shallow and deep, while the channel difference calculation is a measure of predominantly deeper metal only. The HP designation to this instrument indicates that it has been upgraded by the manufacturer to provide an eight-fold increase in the amount of signal received by the instrument, resulting in significant improvements to the signal-to-noise ratio (SNR). Compared to the standard EM61-MK2 (or the older EM61), the HP modification increases the depth of detection by 45%-80% depending on target characteristics.

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Data Collection

EM61-MK2-HP data were collected along predominantly north-south lines using a sub-meter accuracy GPS receiver to record the instrument location in real time (see Figure 1 for data coverage). After the data were collected they were downloaded to a computer for subsequent processing. The EM61-MK2-HP data were processed with *Surfer v10* to create a channel three map (see Figure 2) and a channel difference map (see Figure 3).

Interpretation

EM-61 anomalies are generally consistent in character from site to site, independent of the environment. For a metal object buried at 2 to 4 feet in depth, the magnitude of the Channel 3 anomaly is generally in the upper 100's to near 1000 millivolts and the Channel Difference value is generally in the low to mid 100's millivolts. The contrast between the Channel 3 and Channel Difference values is more subdued for deeper metal objects than for shallow objects. Large metal objects close to the surface (e.g. reinforced concrete, manholes) cause too great of an instrument reading to be filtered out, so the anomalies from such features will remain on the channel difference map.

Site Specific Results and Interpretations

The parking lot and driveway areas were poorly characterized due to 1) obstructions to data collection (e.g. vehicles and structures), and 2) nearby reinforced concrete, utilities, and storm sewer lines that caused high instrument readings. Reinforced concrete and the like is notable because it can conceal any anomalies of potential interest that may be buried underneath or nearby. Areas that were poorly characterized are indicated with white translucent color fill; within these areas it is difficult to interpret any anomalies with regard to the project objectives.

The channel three map (Figure 2) shows several scattered low-level anomalies, these are consistent with any number of small metal objects and depending on their nature may be of potential interest to the upcoming construction project. These anomalies are denoted on Figure 2 with a black circle.

Seen on both the channel three and channel difference maps (see Figures 2 and 3) are several linear anomalies, these are interpreted as utility lines. Some of these utility features could be identified using maps provided by BWSC and have been labeled using that information. An unknown linear anomaly can be seen along the eastern edge of the Site, it is about 40’ long and trends west-southwest. This coincides with a drainage feature and is consistent with RCP or galvanized corrugated pipe; it is denoted on Figures 2 and 3 as “Drainage Pipe”.

Results Summary

The results and interpretations of this investigation are presented on Figure 4 and summarized as follows:

- There are several areas of reinforced concrete and/or metallic interference (e.g. vehicles, structures), which can conceal possible anomalies of interest buried beneath or nearby.

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- Several small shallow anomalies are scattered about the Site. These are consistent with a wide variety of small metal objects, some of which may be of concern to the upcoming construction project.
- A linear anomaly approximately 40 feet long is found in the southeastern portion of the Site, trending in a west-southwesterly direction. This anomaly coincides with a drainage feature in this location, and is interpreted as a drainage pipe.

Limitations

This geophysical survey was intended primarily to locate metallic objects that may be of concern to an upcoming construction project. Areas obscured by features such as buildings or other structures, vehicles, waste storage containers, either physically or electromagnetically, or areas that are specifically covered with reinforced concrete, may conceal additional objects of interest that are unknown at this time.

The enclosed maps are considered to be of sufficient accuracy and precision to provide you with positional data for further investigation activities. However the Site features presented on the base maps are for informational purposes only and no representation is made as to the accuracy or completeness of this information. The enclosed maps, while they may indicate locations of utilities, are not to be taken as a map of utility locations and are not a substitute for a private utility locate.

Closing

Prism GeoImaging, Inc. appreciates the opportunity to provide BWSC with this geophysical survey, and I look forward to working with you on future projects. If you should have any questions regarding this project, please do not hesitate to contact me.

Sincerely,

Prism GeoImaging, Inc.

John Vanderlaan

John Vanderlaan, LPG
President / Geophysicist

Attachments:	Figure 1.	Site Layout and Data Coverage
	Figure 2.	EM61 Channel Three Map
	Figure 3.	EM61 Channel Difference Map
	Figure 4.	Results Summary Map

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US State Plane NAD83, Michigan South 2113, Feet

LEGEND

N

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Scale in Feet

0 10 20 30 40 50 60 70 80

1" = 60'

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Figure 1

Site Layout And Data Coverage

CDC Expansion, Detroit Arsenal
Detroit, Michigan
Project No. 01-010-001

LEGEND

Metal Object Response

Background (non-metallic) response

Instrument Response (mV)

1480
1400
1320
1240
1160
1080
1000
920
840
760
680
600
520
440
360
240
160
140
100
0
80
160
240
320
400

N

Small Anomaly of Potential Interest

Utility Line

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Scale in Feet

0 10 20 30 40 50 60 70 80

1" = 60'

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Figure 2

EM61 Channel Three Map
Shallow and Deep Metal Objects

CDC Expansion, Detroit Arsenal
Detroit, Michigan
Project No. 01-010-001

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US State Plane NAD83, Michigan South 2113, Feet

LEGEND

Instrument Response (mV)

Metal Object Response

1440
1360
1280
1200
1120
1040
960
880
800
720
640
560
480
400
320
240
160
140
100
0
80
160
240
320
400

Background (non-metallic) response

N

Utility Line

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Scale in Feet

0 10 20 30 40 50 60 70 80

1" = 60'

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Figure 3

EM61 Channel Difference Map
Predominantly Deeper Metal Only

CDC Expansion, Detroit Arsenal
Detroit, Michigan
Project No. 01-010-001

© 2011, Prism GeoImaging, Inc.

US State Plane NAD83, Michigan South 2113, Feet

© 2011, Prism GeoImaging, Inc.

US State Plane NAD83, Michigan South 2113, Feet

LEGEND

N

Small Anomaly of Potential Interest

Utility Line

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Scale in Feet

0 10 20 30 40 50 60 70 80

1" = 60'

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Figure 4

Results Summary Map

CDC Expansion, Detroit Arsenal
Detroit, Michigan
Project No. 01-010-001

APPENDIX FF
Detroit Arsenal Dig Permit

US ARMY GARRISON- DETROIT ARSENAL (USG-DTA) DPW-ENGINEERING PLANS & SERVICES DIVISION DETROIT ARSENAL BASE EXCAVATION PERMIT (See attached instructions)	Date Prepared	
	Permit No.	

1. Clearance is requested to proceed with work at the Detroit Arsenal Project_____
On Work Order /Delivery Order No. _____ ____, Contract No._____
Involving excavation or utility disturbance per attached sketch / drawing. This area ☐ has ☒ has not been staked or clearly marked

2. Type of Facility/ work Involved

	A. Pavements		B. Drainage Systems		C. Railroad Tracks		D. Fire Detection & Protection System		E. Utility: ☐ Overhead ☒Underground
	F. Comm ☐ Overhead ☐ Underground		Vehicular Traffic Flow		H. Security		I. Other (specify)		

3. Date Clearance Requested:	4. Date Clearance terminated:	
5. Contractor's Name & Signature of Requesting Official	6. Telephone No.	7. Organization/ Company

Clearance Reviews

POC #	Services/ Phone Extension	POC (*)	REMARKS See page 2 (Route Crossing utilities)	Reviewer Name & Initial & Date
8	A. Electrical			
	B. Roads & parking Lots			
	C. Water Distribution			
E	D. Sanitary Lines			
N	E. Industrial Waste lines			
G	F. Natural Gas Pipelines			
I	G. Oil & petroleum Pipelines			
N	H. Steam Distribution			
E	I. Compressed Air lines			
E	J. Telephone & Emergency Warning			
R	K. Storm drainage			
I	L. Fire Alarm system			
N	M. Fire Lines			
G	N. Irrigation Sprinkler system			
	O. LAN / Fiber Optics			
	P. Cathodic Protection			
	Q. Other (specify)			
9. Master Planning X6605				
10.. Environmental Division X45824				
11. Fire Department X46448				
12. Security Police / Traffic X45697				
13. Safety Office X46121				
14. Base Operations Contractor X45326				
15. Voice & Video Communication X47988				
16. TWLAN X47988				
21. Commercial Utility ☐ Telephone ☐ Gas ☐ Electric			CALL MIS DIG at 1-800-MISS-DIG Enter TICKET NO	
18. Other (specify)				

19. Requested Clearance ☐ APPROVED ☐ DISAPPROVED	
20. Name & signature of DPW Utility Reviewing Engineer:	20.a Date Signed
21 Name & signature of Approving Official Nabil Tominna Chief Engineering Plans & Services Division	21.a Date Signed

(*) = POC for courtesy utility identification

SEE REVERSE SIDE FOR INSTRUCTIONS

FORM XEE-103 issue 28 NOV 2007

INSTRUCTIONS

The Facilities Work Clearance Request is used for any contract work that may disrupt Vehicular traffic flow, installation utility services, protection provided by fire and intrusion alarm systems or routine activities of the installation. This form is used to coordinate the required work with key installation activities and organizations and keep customer inconvenience to a minimum. It is also used to identify potentially hazardous work conditions in an attempt to prevent accidents. The work clearance request is processed just prior to start of the work. If delays are encountered and conditions at the job site change (or may have changed) this work clearance must be reprocessed.

22. REMARKS: (This section must describe specific precautionary measures to be taken before and during work accomplishment. Specific comments concerning the approved method of excavations, hand or powered equipment should be included).

Protect following Utilities, Facilities & Services:

Protect following utilities & facilities: See also attached listing of Detroit Arsenal As-Built Utility Drawings and other drawings showing crossing or adjacent utilities that must be protected. The contractor shall field verify the location of all affected and adjacent underground utilities.

8.A
8.B
8.C
8.D
8.E
8.F
8.G
8.H
8.I
8.J
8.K
8.M
8.N
8.O
8.P
8.Q
9
10
11
12
13
14
15
16
17
18

SEE ATTACHED ADDITIONAL REQUIREMENTS, CONDITIONS AND NOTES

ADDITIONAL REQUIREMENTS, CONDITIONS AND NOTES

1. Restore all surfaces to original condition and all excavations shall be backfilled and compacted to assure no settlement.

2. The Contractor shall comply with Public Act 53 effective April 1 1975 as amended on December 21, 1989 by House Bill No. 5085. The Contractor shall notify the MISS DIG and the utility owners (3) full working days (excluding Saturdays, Sundays, and holidays) before any excavation, tunneling, drilling, boring or demolition the work begins. The contractor shall notify and call MISS DIG at 1-800- 482-7171 and coordinate his work accordingly. In addition, concerning this Detroit Arsenal Base Excavation Permit, the contractor shall hire proficient subcontractors to locate and field verify all Detroit Arsenal owned utilities shown on the drawings and within excavation / boring/ tunneling area. The contractor shall coordinate with the Base Operations contractor and the DOIM contractor and request a courtesy utility identification, however, the contractor is reminded that they are responsible for field locating and protecting the utilities and infrastructures and that this service by the Base Operations contractor is just a courtesy utility identification.

3. Request for all excavation permits must be accompanied by large scale drawings of at least 1"=30' in scale showing the existing utilities and infrastructures and how the new utilities and infrastructures are clearing them. NOTE: All request without these drawings will be denied until those drawings are made available to DPW. The contractor can obtain a copy of the existing 1"=30' drawings and other utilities and infrastructure maps from the Engineering Division, DPW. Request for excavation permits for geotechnical soil borings must be accompanied by drawings showing the location of the boring in a grid pattern to allow locating them from known surface features such as buildings, roads, etc

4. Contractor shall take precautions not to damage any existing structures, utilities, facilities and buildings.

5. Provide As-Builts of construction. All repairs to the Detroit Arsenal utilities, infrastructures and facilities shall meet the Unified Facilities Guide Specification standards. & the Unified Facilities Criteria. Comply with the Detroit Arsenal fire, safety & Environmental requirements.

6. The contractor shall aquatint their employees & subcontractors with the work under this permit, and with the Government policies and procedures that are to be observed during the prosecution of the work and to develop a mutual understanding relative to the administration of the contract.

7. Contractor shall comply with the requirements of the following safety manuals: (a) US Army Corps of Engineers Engineering Manual EM 385-1-1, Safety and Health Requirements Manual (b) Code of Federal Regulation, part 1926, Safety Rules and Regulations for Construction, Occupational Safety and Health Administration Standards.

8. Traffic & parking Interruption: The contractor shall obtain phasing & approval requirements from Emergency Services Directorate & the using agency.

10. AS-BUILTS: At the completion of the construction, the contractor shall provide a set of as-built blue prints. In addition, the contractor shall provide a set of as-built CAD drawings to the CAD department drawn in Micro-Station V8. The CAD file shall be archived on CD-ROM disc(s).

10. Utility Comments: The Detroit Arsenal utility comments are related to the route shown on the submitted drawings only. Any deviations from the proposed submitted Route shall require additional utility searches and approvals.

11.1. Released U.S. Government (USG) information shall be used for the purpose of this contract only, and shall not be released to third parties without approval from USAG-DTA. Upon project completion, this information shall be destroyed.

11.2. No reproduction of released USG information is authorized for other than the contract legitimate purpose. The contractor is responsible for handling and protection of FOUO materials, and is required to apply FOUO markings when extracting FOUO information from such material.

11.3. Access to this information shall to be controlled as UNCLASSIFIED / FOR OFFICIAL USE ONLY; and shall not be available for distribution under the Freedom Of Information Act (FOIA).

11.4. All information and drawing provided shall not be posted on any internet web site.

11.5 Information that is provided to the Contractor from the US Government shall be returned to USAG-DTA when no longer needed, or at the end of the contract. Under special provisions, USAG-DTA may authorize the contractor to destroy the information by shredding (paper) or degaussing (magnetic media) to make unreadable and unrecoverable. Confirmation of destruction shall be provided to USG-DTA.

11.6. The responsible USAG-DTA Point of Contact for coordination of release and return of USG engineering drawings / information at the Detroit Arsenal, MI, is Mr. Eddie D. Morris at (586) 574-5262

12. Contractors shall maintain vehicular traffic on roads at all times. Contractors may use directional bore where applicable, or block one lane only at a time and provide thick steel plates to main traffic. Contract shall maintain pedestrian traffic at all times.

LISTING OF ATTACHED DETROIT ARSENAL AS-BUILT DRAWINGS & OTHER DRAWINGS

SHEET NAME	DRAWING CODE #	SHEET # OF #	REVISION	DATE

FORM XEE-103 ADDITIONAL issue 28 NOV 2007

APPENDIX GG
Environmental System Management Goals

Environmental Management System Goals

Childhood Development Center

The following requirements and goals are developed by Detroit Arsenal and shall be fully incorporated by the Contractor into this project. In the event of contradiction between these goals and those of other RFP requirements, the strictest requirement shall govern.

1. Facility is to be designed to reduce energy consumption by 3% annual through the end of 2015 based upon a 2003 baseline or 30% by the end of 2015 based on a 2003 baseline.
2. More than 50% of non-hazardous waste, excluding construction and demolition debris (weight recycled/weight to landfill + weight recycled) by 2015.
3. At least 50% of all construction and demolition materials and debris must be diverted from area landfills.
4. Facility is to be designed to reduce potable water use by 2% annually from a 2007 baseline through 2020, or designed to achieve a 20% reduction from 2010 levels by 2020.
5. All material to be used to construct the new facility addition is to be inspected and determined free of hazardous constituent materials, to include asbestos containing materials.
6. The facility must meet the Guiding Principles of Sustainability to include:
    a. Planning and Design:
        i. Use of collaborate, integrated planning and design process, and total building commissioning practices.
    b. Energy:
        i. Optimize energy performance through whole building efficiency planning to achieve Energy Star 7 targets by reducing energy cost budget by 30% when compared to baseline building performance rating per ASHRAE and IESNA Standard 90.1-2004.
        ii. Install building level utility meters to track and continuously optimize performance per EPAct guidelines. Measure using Energy Star 7 Benchmarking Tool and manage data using High Performance Buildings Database.
    c. Water Conservation:
        i. Meet fixture performance requirements of EPAct, and employ strategies to use a minimum 20% less potable water than indoor use baseline for the building.
        ii. Design landscape and irrigation systems that reduce potable water consumption by 50% over that consumed by plant species.
        iii. Incorporate design and construction strategies that reduce storm water runoff and polluted site runoff.
    d. Indoor Environmental Quality:

i. All indoor-air quality system designs must meet current ASHRAE Standards 55-2004 (Environmental Conditions) and 62.1-2004 (Air Quality).
ii. Facility design must incorporate a strategy to control moisture so as to prevent building damage and mold contamination.
iii. Facility design must achieve a minimum daylight factor or 2% in 75% of all occupied spaces for critical visual tasks.
iv. All materials and products that are low pollutant type emissions must be specified.
v. Current SMACNA guidelines for the protection of indoor air quality during construction of occupied buildings must be used. This includes conducting a pre-occupancy and occupancy air flush-out of those spaces.

e. Environmental Impact of Materials:
   i. Use products or materials that meet or exceed EPA's recycled content recommendations for EPA – designated products. For non-EPA – designated products the sum of post-consumer recycled content divided by on half of the pre-consumer content must equal 10% (cost basis) of the total value of materials used in the project.
   ii. Use products or materials that meet or exceed USDA's bio-based content recommendations.
   iii. During project planning, identify local recycling and salvage operations that could process site related waste. Plan should include a program to recycle or salvage a minimum of 50% Construction and Demolition waste and land clearing wastes (excluding soils) where markets or on-site recycling opportunities exist.
   iv. Per Montreal Protocol and CAA Title V, eliminate use of ozone-depleting compounds during and after construction where alternative products or materials are available.

Amdt. #003
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APPENDIX HH
LEED 2009 Minimum Program Requirement (MPR) 6 Exemption Process

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MPR 6 EXEMPTION FORMS

Effective July 25, 2011, the U.S. Green Building Council has granted to the **U.S. Department of Defense** a blanket exemption from **Minimum Program Requirement (MPR) 6** (**Must Commit to Sharing Whole-Building Energy and Water Usage Data)** for projects registered under LEED 2009. This exemption is retro-active for projects certified under LEED 2009 prior to July 25, 2011. The exemption relieves any project owned by the DOD from the expectation that they provide energy and water data post-certification, and alleviates related concerns about national security. **However, USGBC will accept such data from any project that wishes to provide it.**

The **LEED 2009 Minimum Program Requirements** define the minimum characteristics that a project must possess in order to be eligible for certification under LEED 2009. These requirements serve three goals: to give clear guidance to customers, to protect the integrity of the LEED program, and to reduce challenges that occur during the LEED certification process. MPR 6 is essential to ongoing development of the LEED program, as it allows USGBC to evaluate the impact and efficacy of rating system requirements and of each rating system as a whole.

EXEMPTION PROCESS

1. Department of Defense distributes Exemption Forms to project managers
   Alternative: Project Administrators request the Exemption Forms from GBCI
2. Project Administrator completes the Exemption Forms and a DOD employee signs them
3. **Project Information (PI) Form 3 (Occupant and Usage Data)** in **LEED Online**, **Additional Details**: Project Administrator checks the box titled "Special Circumstances preclude compliance with the submittal requirements outlined in this form."
4. The Project Administrator uses the text box to acknowledge that the project will take advantage of the DOD exemption from the requirements of MPR 6
5. The Project Administrator uploads the completed Exemption Forms as supporting documentation.

Please use one of the following standard formats for Project Owner Organization (below):

Air Force
Air National Guard
Army
Army National Guard
Marine Corps
National Geospatial-Intelligence Agency
Navy
Washington Headquarters Service
Department of Defense – Other

Please provide the following information:

Project ID: _____

Project Name: _____

Current Project Owner (insert **Project Owner Organization** during design and construction):

_____

Intended Project Owner [insert **Project Owner Organization** during occupancy]:

_____

Signatory should be a DOD employee. Examples:

Air Force	Federal government employee of the Design/Construction Agent
Army	USACE Project Manager
Navy or Marine Corps	NAVFAC Design Manager

SIGNATORY

Signed,

_____

Name: _____

Title: _____

Organization: _____

Date: _____

PROJECT ADMINSTRATOR

Signed,

_____

Name: _____

Title: _____

Organization: _____

Date: _____