



**US Army Corps
of Engineers**

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**FY12 TACTICAL EQUIPMENT
MAINTENANCE FACILITIES (TEMFS)**

**ELECTRONICS MAINTENANCE FACILITY – PN 68993
VEHICLE MAINTENANCE FACILITY – PN 68305**

FORT BLISS, TEXAS

2 PHASE DESIGN-BUILD REQUEST FOR PROPOSAL

DECEMBER 2011

**SECTION 01 10 00
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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
Tactical Equipment Maintenance Facility (TEMF)	Heavy Equipment/Vehicle Maintenance Garage

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. TACTICAL EQUIPMENT MAINTENANCE FACILITY (TEMF)

Provide Tactical Equipment Maintenance Facilities. This project type is to provide facilities for the purpose of maintaining and repairing vehicles, complete with equipment and parts storage and administrative offices. It is intended to be similar to heavy equipment or motor pool facilities in the private sector community. Assume 12 percent of personnel are female unless otherwise indicated.

The project will include TEMFs for 1 battalion(s). Specific sizing parameters for each battalion TEMF included in the project are as follows:

Electronics Maintenance PN 68993

TEMF size: Medium

A 10-ton bridge crane is required in this TEMF.

Number of organizational vehicles to be accommodated: 0

Organizational vehicle hardstand: 2,825 square yards

Organizational storage building: 0 square feet

POL storage building: 600 square feet

Hazardous waste storage building: 600 square feet

Distribution company storage building, 8000 SF w/445 SY Secure Storage, NOT required

UAV maintenance and storage, 1800SF, NOT required

POL vehicle parking NOT required

The maximum gross area for the primary Tactical Equipment Maintenance Facilities (excluding site storage buildings) in the project is limited to 35,290 SF.

2.2. SITE:

Provide all site design and construction within the TEMF limits of construction necessary to support the new building facilities. Supporting facilities include, but are not limited to, utilities, electric service, exterior and security lighting, fire protection and alarm systems, security fencing and gates, water, gas, sewer, oil water separators, storm drainage and site improvements. Provide accessibility for individuals with disabilities. Include Antiterrorism/Force Protection measures in the facility design in accordance with applicable criteria.

Maintain the construction site and haul route. Repair/replace damage to existing sidewalks, pavements, curb and gutter, utilities, and/or landscaping within the construction limit, adjacent to the construction site, and along the Contractor's haul route resulting from the Contractor's construction activities at no additional cost to the Government. Prior to construction activities, Contractor and Contracting Officer Representative shall perform an existing condition survey. At completion of the Task Order, Contractor and Contracting Officer representative shall perform a final condition survey to determine repair/replacement requirements.

Approximate area available for this (these) facility(ies) is shown on the drawings.

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

Approximate area available 8.00 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: No additional requirements.

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. Reference applicable appendix for Preliminary FF&E Information including furniture dimensions sizes as shown in the Standard Design.

2.5. NOT USED

3.0 TACTICAL EQUIPMENT MAINTENANCE FACILITY (TEMF)

3.1. GENERAL

- (1) Functional Areas. The primary TEMF is composed of two main types of functional areas: Repair Bays (consisting of Repair areas and Maintenance areas), and the Core Area. Refer to the attached Floor Plans for recommended layout.
- (2) Gross Building Area. Gross areas of facilities shall be computed according to subparagraphs below. Maximum gross area limits indicated in Paragraph 2.0, SCOPE, may not be exceeded. A smaller overall gross area is permissible if all established net area program requirements are met.
 - (a) Enclosed Spaces. The gross area includes the total area of all floors, including basements, mezzanines, penthouses, usable attic or sloping spaces used to accommodate mechanical equipment or for storage with an average height of 6'-11" measured from the underside of the structural system and with the perimeter walls measuring a minimum of 4'-11" in height, and other enclosed spaces as determined by the effective outside dimensions of the building.
 - (b) One-Half Spaces. One half of the area will be included in the gross area for balconies and porches; exterior covered loading platforms or facilities, either depressed, ground level, or raised; covered but not enclosed passageways or walks; covered and uncovered but open stairs; and covered ramps.
 - (c) Excluded Spaces. Crawl spaces; exterior uncovered loading platforms or facilities, either depressed, ground level, or raised; exterior insulation applied to existing buildings; open courtyards; open paved terraces; roof overhangs and soffits for weather protection; uncovered ramps; uncovered stoops; and utility tunnels and raceways will be excluded from the gross area.
- (3) Net Area. Net area requirements for functional spaces are included in the drawings. If net area requirements are not indicated, the space shall be sized to accommodate the required function, comply with code requirements, comply with overall gross area limitations and other requirements of the RFP (for example, area requirements for corridors, stairs, and mechanical rooms will typically be left to the discretion of the Offeror).
- (4) Deviations and Improvements. It is the intent of this document to allow deviations and improvements to the design shown.
- (5) Handicapped Access. All TEMF buildings are to be handicapped accessible.
- (6) Site Design and Functional Areas. Site features include vehicular hardstand, utilities and site improvements.

3.1.1. Repair Areas and Vehicle Corridor/Maintenance Areas

Repair areas and maintenance areas are garage areas used for service and repair of the full range of Army tactical equipment. They are single story ground floor spaces. A typical structural bay to accommodate both repair and maintenance areas is sized to measure 32' x 96'. Conceptually, this structural bay contains four 16' x 32' repair work areas, and a 32' wide vehicle corridor dividing them crosswise. The vehicle corridor also serves as a maintenance area. It accommodates pairs of 16' x 32' maintenance work areas down the length of the entire building. Two contiguous work areas may be required to accommodate work on larger equipment, thus resulting in the need for work areas to be constructed in pairs. Repair and maintenance areas are to be free of intermediate support columns, i.e. columns are only permissible along exterior perimeter walls. This allows complete shop floor coverage by a single bridge crane for all contiguous maintenance and repair areas (each wing of the facility). TEMFs requiring four structural bays or less shall be constructed contiguously in a single wing of the facility.

(1) Repair Areas

- (a) Function. Repair of vehicles as described above. Structural height shall be as required to allow minimum bridge crane hook cradle height of 20 feet (minimum of 25 feet for bays with 35-ton bridge

cranes). Overhead coiling doors, 24'-0" wide x 14'-0" high, shall be provided at each end of each structural bay.

(b) Equipment. Repair Bays shall be served by a 10-ton or a 35-ton capacity traveling bridge crane with full structural bay coverage as indicated in the Architectural TEMF Features Matrix and as specified in Para. 2.1. Additional requirements are specified in the paragraph ARCHITECTURE.

(c) Provide one hose bibb and two compressed air outlets 3'-0" above the floor for each pair of repair areas.

(d) Welding/Machine Shop Area: Provide special purpose repair space to support machine shop equipment and power connectivity for portable welding equipment within one pair of repair areas, typically in repair bay farthest from the Core Area. This area will not be used exclusively for welding. It may be utilized as a repair area also and shall be equipped with all requirements for repair areas except items (e), and (j).

(e) Provide utilities for component washing and vehicle spot washing in the outermost work area of each wing of repair/maintenance areas. Provide a 5'-4" high concrete masonry wall separating the outermost bay from others to contain spray resulting from engine and component wash functions. Terminate partition to provide 6'-0" clear space at each end of the partition.

(f) In each pair of repair areas, provide electric power for user provided (GFGI) portable hydraulic lift.

(g) Provide continuous 6-inch wide trench drains with continuous grating along full width of bays at exterior doors; locate drains approximately 3'-0" inside face of exterior walls. In addition to the outside trench drains, a center trench drain running the full length of maintenance area is provided to facilitate internal drainage of the facility. When a dedicated, partitioned welding area is provided, provide a solid cover to trench drain where it runs through the welding area.

(h) Each work area shall have access to NIPRNet data connection points.

(i) Provide an outlet to a vehicle exhaust evacuation system for each repair area.

(j) Tire Changing Area: Provide capability for tire changing function where shown on the TEMF Standard Drawings. Tire changing equipment shall be GFGI."

(k) POL Dispensing Points: Provide POL dispensing points between each pair of structural bays so that each repair area has ready access to POL fluids. Two points will be provided in the repair area of a small facility, four in a medium, etc. Hose and reel assembly shall be heavy duty, designed for the applicable fluid or oil. Provide shutoff valve at reel. Provide distribution for grease, engine oil, gear oil, transmission fluid, and antifreeze from each dispensing point.

(2) Vehicle Corridor/Maintenance Areas

(a) Function. Maintenance of vehicles as described above. Maintenance areas within core area shall be equipped for inspection, oil changing and lubrication. All requirements listed above, except items (d), (e), (f), (j), and (k) apply to the maintenance areas.

(b) Maintenance Area within the High Bay Portion of Facility. Access to compressed air, water, vehicle exhaust, power and data in the maintenance areas within high bay portion of facility shall be via connections along the nearest wall.

(c) Maintenance Area within the Core Area. Maintenance areas within the core area shall be equipped for inspection, oil changing and lubrication. The minimum clear ceiling height shall be 14'-0" Above Finished Floor. Provide an outlet to a vehicle exhaust evacuation system for each pair of maintenance areas. Bridge crane access is not required for maintenance areas along central vehicle corridor in the core area.

1. Maintenance Pit. Provide one 40-foot long x 3'-6" wide concrete maintenance pit in the central vehicle corridor portion maintenance area within the core with stair access. Due to inside clearance for some vehicles, the maximum 3'-6" width is critical for the pit and curbing. Pit shall have non-sparking, non-slip removable floor grating approximately 4'-4" below finish floor elevation, with concrete pit floor below sloping to sump. Provide sump pump, see Paragraph 3.1.8(4) Plumbing for additional information.

Provide compressed air outlet at two places in the pit. When not in use, pit shall be provided with removable cover capable of supporting pedestrian traffic. Provide minimum 4-inch high steel angle curb surrounding pit opening. Pit cover panels to be light enough to be handled by a maximum of two personnel.

2. POL Hose Reels. Provide two POL dispensing points mounted to the wall adjacent to maintenance area pit. They should be spaced along the length of the pit. Hose and reel assembly shall be heavy duty, designed for the applicable fluid or oil. Provide shutoff valve at reel. Provide distribution for grease, engine oil, gear oil, transmission fluid, and antifreeze at the two dispensing points on the wall. Provide a third dispensing point mounted in a recess in the maintenance pit. Provide only grease, gear oil and transmission fluid at the dispensing point inside the maintenance pit.

3. Fluid Recovery System: Provide a Pneumatic Fluid Recovery System that will allow the evacuation of used POL fluids and waste antifreeze to the appropriate 500 gallon wasted fluid tank. Provide two collection points for each type of waste fluid within the maintenance pit, and provide a third collection point at a central location within the facility (out of the flow of traffic) to accommodate used fluids collected in the repair area.

(3) Circulation Bays

(a) Provide an 8' wide x 96' long structural bay between each wing of repair bays and the core area to facilitate pedestrian egress from the building and shall conform to OSHA requirements.

(b) Equipment. Provide 4'-0" high x 8'-0" wide framed tack board (for 'safety board') mounted on wall along the circulation bay near the tool room. Provide one permanently installed emergency eyewash, hand held drench hose and shower station at each circulation bay that is adjacent to a core area and provide additional emergency eye wash, hand held drench hose and shower stations in other bays as required per OSHA standard 1910.151(c) and ANSI Z358.1. Provide one or more emergency eyewash, hand held drench hose and shower stations in Consolidated Bench Repair and in the Fluid Distribution Room when the equipment being serviced or solvents being used generate this requirement. Locate emergency wash stations in accordance with OSHA standard 1910.151(c) and ANSI Z358.1. Per OSHA 1910.151(c) emergency eyewash/shower units should be located such that a worker can reach one in 10 seconds. ANSI Z358.1 gives a guideline of 55 feet to meet this requirement.

3.1.2. Core Areas:

Core areas are arranged in one and two story configurations (refer to the attached floor plans for standard layouts). Internal walls within the core should be non-load bearing to the extent possible to allow future rearrangement of spaces.

(1) Administration and Shop Control. Office space to accommodate foremen, production control, and clerical personnel. Provide one space per core; may be located on first or second floor but shall be accessible to the physically disabled. Provide counter and pass-through window between this room and the customer Waiting Area; size pass-through window to accommodate transfer of 30-inch by 30-inch items, and layout the area outside window so that two people can stand at the window and be out of the corridor traffic pattern. Provide viewing windows from administration and shop control space into the repair areas.

(2) Training Room. The training room space is intended to facilitate the training mission for maintenance personnel. This space is to be divided into two training areas with an operable folding partition (movable wall) having a sound isolation of STC 45, minimum. Provision shall be made to accommodate up to 30 students for computer based training, including power and data connections for each student. Provide projection equipment hookups and a screen in the Training Room. In subdivided Training Rooms, two hookups and two pull-down screens are to be provided.

(3) Consolidated Bench. Shop space for unit-level maintenance of electronics, optics, and other gear. Locate on first floor.

(a) Equipment. Provide an overhead coiling door 10'-0" wide x 10'-0" high.

- (b) Furnishings/Fixtures. See Table 7 for furnishings. Provide capabilities shown in the features matrix for each work space.
- (c) Provide operable exterior windows. Provide at least one window with clear view and unobstructed line of sight out of the building to a minimum of 800 feet for testing weapon sights.
- (4) Tool Room. Designated space for the issue and secure storage of unit common tool kits, as well as supplemental tool kits and individual tools shared by shop personnel. Direct covered access from the tool room to the SATS containers (described below) on the exterior of the building is required. Provide lockable pair of personnel doors and pass-through opening with impact resistant counter and metal overhead lockable coiling shutter between Tool Room and Corridor.
- (a) Standard Automotive Tool Set (SATS). The SATS is a unit-owned (i.e. GF/GI) containerized tool system with the dimensions of 8' x 20' x 8' high. An exterior hardstand storage area adjacent to the Tool Room shall be provided for three SATS containers. Connectivity to building and installation network is required. SATS are accessed from the end. Provide wall mounted awning with minimum 14-foot clear height above hardstand for weather protected entry into SATS containers. The technical manual for SATS is TM 9-4910-783-13&P.
- (5) Tool Box Storage. Provide one Tool Box Storage Room for each wing of Repair Areas (if Repair Areas are located on both sides of a core, each side of core shall have a Tool Box Storage Room). Tool Box Storage is provided for personnel working inside the maintenance complex in the Repair Areas and the Consolidated Bench for the storage of individually assigned or personal (Contractor) tools requiring security. Provide lockable personnel door with closer between Tool Box Storage and Circulation Bay.
- (6) Combat Spares. Storage and issue of Prescribed Load List (PLL) and shop stock items kept in stock at all times because of demand or management decisions. Direct covered access from the Combat Spares room to the ASL-MS containers (described below) on the exterior of the building is required. Provide lockable pair of personnel doors so to accommodate 48" x 48" x 74" ASL-MS repair parts bins and shelving modules, and pass-through opening with impact resistant counter and overhead lockable coiling shutter between Combat Spares and Corridor.
- (a) Authorized Stockage List - Mobility System (ASL-MS). Similar to the SATS, the ASL-MS is a unit-owned (i.e. GF/GI) 8' x 20' x 8' high container for repair parts. An exterior hardstand storage area adjacent to the Combat Spares room shall be provided for three ASL-MS containers. ASL-MS are accessed from the side. Provide sufficient aisles between ASL-MS for access. Provide wall mounted awning with minimum 14-foot clear height above hardstand for weather protected entry into ASL-MS containers. Provide lockable pair of personnel doors at building exterior to accommodate large bulk portable tools and equipment, and ASLMS repair parts modules. The technical manual for ASL-MS is TM 9-5411-236-13&P.
- (7) Latrine, Shower and Locker Rooms
- (a) Latrines. Provide separate latrines for men and women on each floor. Provide water closets, urinals, lavatories and drinking fountains in accordance with established layouts and referenced codes.
- (b) Shower and Locker Rooms. Provide a Men's Shower and Locker Room and Women's Shower and Locker Room. Locate on first floor of each core, sized to accommodate the number of lockers and showers indicated. Shower and locker area shall be adjacent to and connect to the latrine area. Provide individual shower compartments (3'-0" x 3'-0") in the number indicated on the drawings. Provide a single tier steel locker for each non-administrational occupant of the building, minimum size 1'-0" wide x 1'-6" deep x 6'-0" high.
- (8) Break, Training, and Conference (BTC). Locate this room on same floor as Admin and Shop Control.
- (a) Furnishings. Provide kitchen, base and wall cabinets and 30-inch deep countertop minimum 10'-0" long.
- (b) Equipment. Provide stainless steel two-compartment sink.
- (c) Allow space and hookups for vending machines, refrigerator and microwave.

- (d) Projection equipment hookups and a pull-down screen are to be provided in Medium, Large and X-Large BTC Room only. Due to small size of BTC Room in the Small TEMF, no projection equipment hookup or screen will be provided in this area.
- (9) Vaults. All vault walls, floors and ceilings shall be constructed in compliance with appropriate requirements referenced below. Provision for a user provided (GFGI) intrusion detection system including motion detectors, door alarm, and camera, is required.
- (a) Weapons Storage Vault. Provide secure storage of weapons being repaired, especially vehicle-mounted weapons such as machine guns and firing port weapons. Weapons vault walls, floors and ceilings shall be constructed in compliance with AR 190-11, Physical Security of Arms, Ammunition, and Explosives. An option exists for use of prefabricated, modular vaults conforming to Fed. Spec. AA-V-2737 requirements. Provide a GSA-approved Class 5 Armory vault door with lock in accordance with Fed. Spec. AA-D-600D and a "Dutch door" style day gate. Provide an internal wire mesh partitioned space or provide space for GFGI lockable cabinets IAW installation requirements to accommodate armorer's tool kits, spare arms parts, machine gun barrels and major subassemblies. Coordinate arms rack anchor rings, common storage racks, etc with user.
- (b) COMSEC Vault. Provide secure storage of communications/cryptology equipment. Room must have a minimum 8-foot dimension. Refer to Physical Security Standards of Appendix D of AR 380-40, Policy for Safeguarding and Controlling Communications Security (COMSEC) Material (FOUO).
- (10) Nonsensitive Secure Storage. Nonsensitive Secure Storage shall be constructed to meet Secure Storage standards for Risk Level II per AR 190-51, Security of Unclassified Army Property.
- (11) Telecommunications- Room-. Telecommunications rooms shall be provided for voice and data. There shall be a minimum of one room on each floor, located as near the center of the building as practicable, and stacked between floors. The telecommunications rooms shall be designed in accordance with the Technical Criteria for Installation Information Infrastructure Architecture I3A Criteria and ANSI/EIA/TIA-569-B. SIPRNET Room shall also be provided for future SIPRNet connectivity in accordance with the Technical Guide for the Integration of Secret Internet Protocol Router Network (SIPRNet). Due to NEC security requirements, Mass Notification, Fire Alarm and CATV panels cannot be located in the Telecommunications Room, these panels will be located in the Electrical room. Where required, the Fire Alarm Panel may be located in the Mechanical Room.
- (12) Non-Assignable Spaces and Gross Area. The items below account for additional gross area within the core that is not specifically listed in the spaces above. These items may also vary in size contingent on site, climate, type and use.
- (a) Stairwells. Design in accordance with model and local building codes.
- (b) Elevator. Provide one passenger elevator in each two-story building. Elevator machine room is also part of the gross area of the core.
- (c) Common Circulation Corridors. All circulation corridors shall be a minimum of 6 feet wide.
- (d) Waiting Area. Locate adjacent to Admin and Shop Control pass-through window off of corridor. Size Waiting Area for the seating of a minimum of four persons.
- (e) Janitorial Spaces. Provide one janitorial space as shown on drawings with mop sink and heavy duty shelving. Expansion of the Janitorial Space to include a recycling function is optional.
- (f) Mechanical Rooms. Utility space must be provided for heating and cooling equipment. Where feasible, vertically stack like utility spaces if located on two floors. Locate first floor mechanical rooms adjacent to exterior walls for external maintenance access and ventilation. See paragraph 3.1.7 Heating, Ventilation, and Air Conditioning (HVAC) Systems, for additional requirement. Walls and floor/ceiling assemblies enclosing mechanical room shall have a sound transmission class (STC) rating of not less than 50 (45 if field tested) for air-borne noise when tested in accordance with ASTM E 90, and an impact insulation class (IIC) rating of 50 (45 if field tested) when tested in accordance with ASTM E 492.
- (g) Electrical Rooms. Locate first floor electrical rooms adjacent to exterior walls for external maintenance access and ventilation.

(h) Fluid Distribution Room. Provide a room to house the POL central distribution equipment and unused POL storage containers (typically 55-gallon drums) for five types of lubricants/fluids. Fluids shall be dispensed by automotive lubricant type air driven pump assemblies. Motor shall be heavy-duty compressed air driven reciprocating action. For antifreeze unit all parts shall be corrosion resistant. Locate near maintenance pit to minimize length of fluid distribution lines. Compliance with UFC 3-600-01, NFPA 30, and 29 CFR 1910.106 is mandatory. Provide secondary containment in compliance with applicable federal and state environmental regulations. Square footage for this space is part of the gross area for the core.

3.1.3. Site Functional Area

(1) Dock. Provide one docking location for maintenance and electronic testing of specialized, permanently vehicle mounted, communications equipment. Provide equipment power connections and grounding points for vehicle degauss and individual personnel static discharge protection of equipment.

(2) Organizational Vehicle Hardstand. This area consists of a rigid concrete paved area used for parking assigned vehicles (wheeled and heavy and tracked), commercial vehicles (Contractor support), trailers and generators. Organizational vehicle hardstand includes building aprons, parking spaces, and circulation lanes on site.

(a) Tactical/Military and Commercial Vehicle Parking. Maximize vehicle parking and traffic flow to best support the operation of the TEMF.

(b) POL Vehicle Parking Area. Not required.

(c) Dead Line Vehicle Parking. Parking for vehicles waiting for parts or for work to be performed. One dead line parking space for every pair of repair areas and shall be located in parking areas adjacent to repair bays that will service them.

(d) Building Aprons. Provide concrete pavement for aprons associated with each of the facilities located in the maintenance complex.

(3) Site Storage

(a) Hazardous Waste Storage Building. Provide a building with solid walls and roof. It is used to temporarily store used lubricants, flammable solvents, dry sweep, etc. A unit is authorized 60 square feet for each 25 vehicles, or part thereof, which it maintains. A minimum of 120 square feet of hazardous waste storage space will be provided. The specific requirement for this project is specified in Para. 2.1. Provide secondary containment in compliance with applicable federal and state environmental regulations. Compliance with UFC 3-600-01, NFPA 30, and 29 CFR 1910.106 is mandatory. Maintain minimum separation distance from other buildings in accordance with the IBC in order to eliminate the need for automatic sprinkler protection. Pre-fabricated, fire-rated, self-contained, moveable steel safety storage buildings are permitted as an option. Minimum size of 120 SF per container, though multiple containers may add up to the total quantity required per satellite accumulation area. Hazardous Waste Storage Buildings do not require sprinkler protection if the following conditions are met:

1. The buildings shall not exceed 1000 SF in area. For facilities over 1000 SF, in order to reduce costs, divide the total requirement for these facilities into multiple buildings so that each building is less than 1000 SF.

2. The buildings shall be separated from tactical equipment maintenance facilities or other important buildings by a minimum of 60 feet.

3. Construction and exterior separation of Hazardous Waste Storage Buildings shall be per UFC 3-600-01 and NFPA 30 as indicated with the following restrictions. Where multiple POL and Hazardous Waste Storage buildings are present, groups of POL and Hazardous Waste Storage Buildings shall not exceed two buildings and shall be separated by no less than 10 feet. Additional POL and Hazardous Waste Storage Buildings or groups of two buildings shall be separated by not less than 50 feet from adjacent POL and Hazardous Waste Storage Buildings.

(b) POL Storage Building. Provide a building for the storage of oil, lubricants, and flammable solvents for daily use. A unit is authorized 60 square feet for each 25 vehicles, or part thereof, which it

maintains. A minimum of 120 square feet of oil storage space will be provided. The specific requirement for this project is specified in Para. 2.1. Provide an access apron at the entry of this building. Provide secondary containment in compliance with applicable federal and state environmental regulations. Compliance with UFC 3-600-01, NFPA 30, and 29 CFR 1910.106 is mandatory. Maintain minimum separation distance from other buildings in accordance with the IBC and local codes in order to eliminate the need for automatic sprinkler protection. Pre-fabricated, fire-rated, self-contained, moveable steel safety storage buildings are permitted as an option. Minimum size of 120 SF per container, though multiple containers may add up to the total quantity required per satellite accumulation area. POL Storage Buildings do not require sprinkler protection if the following conditions are met:

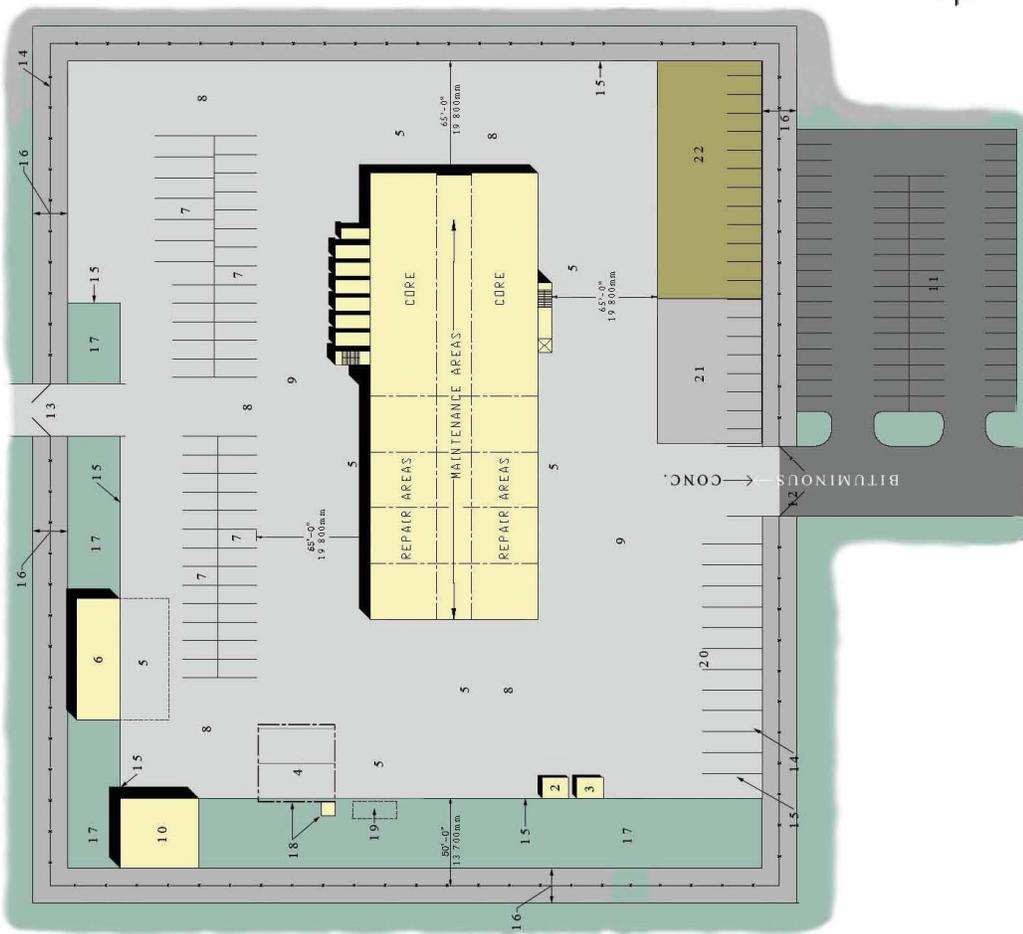
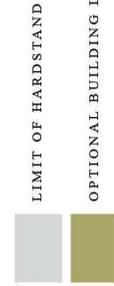
1. The buildings shall not exceed 1000 SF in area. For facilities over 1000 SF, in order to reduce costs, divide the total requirement for these facilities into multiple buildings so that each building is less than 1000 SF.
2. The buildings shall be separated from tactical equipment maintenance facilities or other important buildings by a minimum of 60 feet.
3. Construction and exterior separation of Hazardous Waste Storage Buildings shall be per UFC 3-600-01 and NFPA 30 as indicated with the following restrictions. Where multiple POL and Hazardous Waste Storage buildings are present, groups of POL and Hazardous Waste Storage Buildings shall not exceed two buildings and shall be separated by no less than 10 feet. Additional POL and Hazardous Waste Storage Buildings or groups of two buildings shall be separated by not less than 50 feet from adjacent POL and Hazardous Waste Storage Buildings.
 - (c) Organizational Storage Building. This building is for storage of deployment equipment. The size of this facility is determined by the organizational structure and the number of organizational vehicles; specific to each project. Provide a manual 10' x 10' coiling door and a personnel door for each 700 SF of company supply area along one side of building. Provide internal wire or secure partitions between each 700 SF space. Floor area of building shall be as specified in the project scope of work. Building shall be approximately 25 feet deep. The floor system of this facility should be designed for fork-lift lifting.
 - (d) Distribution Company Storage Facility. Not required
 - (e) Secure Open Storage. Not required
 - (f) UAV Storage Building. Not required
 - (g) Used Oil Storage Tank(s). Provide one 500-gallon above-ground used engine oil storage tank at the end of the Repair Areas. Tank shall be constructed of non-corrosive material. Provide secondary containment in compliance with applicable federal and state environmental regulations. Tank construction and location shall comply with IBC requirements. Recommended location is adjacent to the end repair area. Used oil, waste fuel, and used engine coolant storage tanks should be co-located, if possible.
 - (h) Used Engine Coolant (antifreeze) Storage Tank(s). Provide one 500-gallon above-ground used engine coolant storage tank at the end of the Repair Areas. Tank shall be constructed of non-corrosive material. Provide secondary containment in compliance with applicable federal and state environmental regulations. Tank construction and location shall comply with IBC requirements. Recommended location is adjacent to the end repair areas. Used oil, waste fuel, and used engine coolant storage tanks should be co-located, if possible.
 - (i) Out of Spec Waste Fuel Tank(s). Provide one 500-gallon above-ground Out-of-Spec Waste Fuel Tank at the end of Repair Areas. Tank shall be constructed of non-corrosive material. Provide secondary containment in compliance with applicable federal and state environmental regulations. Tank construction and location shall comply with IBC requirements. Recommended location is adjacent to the end repair area. Used oil, waste fuel, and used engine coolant storage tanks should be co-located, if possible.
- (4) Entrance Drives. Provide primary and secondary entrance drives to connect organizational vehicle hardstand to existing roads and/or tank trails.
- (5) Privately Owned Vehicle (POV) Parking. POV parking to be provided by others.

3.1.4. Site Design The following drawing should be used to associate relative adjacencies for site structures.

SITE ADJACENCY DIAGRAM

LEGEND

- 1. NOT USED
- 2. POL STORAGE BUILDING (OPTIONAL)
- 3. HAZARDOUS WASTE STORAGE SHED
- 4. POL VEHICLE PARKING
- 5. HARDSTAND
- 6. ORGANIZATIONAL STORAGE BUILDING
- 7. ORGANIZATIONAL VEHICLE PARKING
- 8. CIRCULATION LANE
- 9. ACCESS LINE
- 10. UAV STORAGE BUILDING (OPTIONAL)
- 11. PAVED NON-ORGANIZATIONAL VEHICLE PARKING
- 12. PRIMARY ENTRANCE/EXIT
- 13. SECONDARY ENTRANCE/EXIT
- 14. SECURITY FENCE
- 15. EDGE OF PAVEMENT
- 16. CLEAR ZONE(GRAVEL OR GRASS)
- 17. GRASS OR GRAVEL
- 18. POL CONTAINMENT CURB & SUMP
- 19. OIL/WATER SEPARATOR(BELOW GRADE)
- 20. DEAD-LINE VEHICLE PARKING
- 21. SECURED OPEN STORAGE (OPTIONAL)
- 22. DISTRIBUTION COMPANY STORAGE FACILITY



SITE PLAN - MEDIUM TYPE TEMF FACILITY
NO SCALE

- (1) **Hardstand.** All hardstand areas shall be rigid concrete pavement. Pavement design for organizational vehicle areas shall be designed to support the vehicles assigned to this facility and the heaviest vehicle at the installation. See appendix for Organizational Vehicle assigned to this facility. The parking layout and configuration shall be adjusted as necessary to for the site limits and space provided.
- (2) **Antiterrorism and Force Protection.** Each project should be evaluated for security requirements in accordance with UFC 4-010-01. Minimum requirement is a security fence at the site perimeter consisting of 7-foot high chain link fabric plus a single outrigger with 3-strand barbed wire, designed in accordance with STD 872-90-03, FE-6, Chain-Link Security Fence Details. A zone cleared of trees and shrubs, 20 feet wide inside the fence and 10 feet wide outside the fence is required. The clear zone shall be grass or gravel underlain by a synthetic fabric as preferred by the installation. The gravel clear zone shall be treated with herbicides to discourage vegetative growth. Manually operated vehicular gates, approximately 30 feet wide overall, shall be provided at each vehicle entrance/exit.
- (3) **Storm Water Management.** Site storm water management may require controls on the peak flow that can be discharged. Installations are required to have a storm water pollution prevention plan. Implement the applicable portions of this plan using best management practices. Segregate drainage from areas likely to be contaminated (e.g., fueling area). Provide treatment for contaminated water prior to its discharge. Maintenance should not be performed outside the primary facility.
- (4) **Storm Drainage System.** Construction and material specified for storm drainage installation shall be per the State's DOT requirements. All storm drainage lines constructed under organizational vehicle hardstand, entrance drives, and other surfaces subject to vehicular traffic shall be reinforced concrete pipe with watertight joints. See paragraph 6 for additional storm drainage system requirements.
- (5) **Oil/Water Separator.** One or more oil/water separators are required to remove, oil, lubricants, floatables, and grit from contaminated water sources (e.g., repair and maintenance areas, POL fluids distribution, etc.). Oil/water separators shall be designed in accordance with local codes and standard industry practice for the specific waste stream to be treated. Minimize maintenance requirements and locate oil/water separators to minimize pipe runs, provide vehicular access, and built out of circulation areas.
- (6) **Used and Waste Oil, Antifreeze, Solvents, Cleaning Compounds, and Hazardous Materials** Hazardous materials generated in the course of maintenance operations shall be classified in accordance with 40 CFR 261. Criteria for short term storage (less than 90 days) of hazardous materials is provided in 40 CFR 262. Long-term storage is not authorized for TEMF facilities. The installation Defense Resources Management Office has responsibility for long term storage. Long term storage of hazardous materials is governed by 40 CFR 264.
- (7) **Primary and Secondary drives.** Provide a primary and secondary entrance drive into the organizational vehicle hardstand area. The primary and secondary entrance drives shall be 30 feet wide.
- (8) **Organizational Vehicle hardstand.** Organizational vehicle pavement grades shall provide positive surface drainage with a 1 percent minimum slope in the direction of drainage. Maximum pavement slope shall be 2 percent.
- (9) **Circulation Lane.** Organizational vehicle parking circulation lanes shall be 20 feet wide when lanes are located adjacent to TEMF aprons. Parking stalls within the hardstand are to be placed back-to-back with circulation lane widths of 30 feet for vehicles less than or equal to 18 feet long and 45 feet for vehicles more than 18 feet long.
- (10) **Tactical/Military Vehicle Parking.** Tactical/Military Vehicle Parking spaces shall be spaced with side clearances of 3 feet and end clearances of 2 feet.
- (11) **POL Vehicle Parking (if applicable).** POL vehicle parking shall be physically separated from organizational hardstand. POL parking shall be spaced a minimum of 10 feet between vehicles. POL parking area circulation lanes shall be 50 feet wide. Drainage from the POL parking area shall be isolated and shall not be allowed to enter underground storm or sanitary sewer systems without being impounded first and manually released. POL drainage impoundment shall be located 100 feet from any structure.

- (12) Dead Line Vehicle Parking. Dead Line Vehicle Parking spaces shall be sized based on the largest vehicle for the assigned maintenance bay. Parking spaces shall be spaced with side clearances of 3 feet and end clearances of 2 feet.
- (13) TEMF Aprons. TEMF aprons shall measure 45 feet wide on all four sides of the facility. Circulation lanes are not part of the 45-foot wide apron.
- (14) Site Storage Building Aprons. Site storage building aprons shall measure 27 feet wide along the entire building length on the vehicular access side. Circulation lanes are not part of the 27-foot wide apron.
- (15) Bollards at TEMF repair bays. Provide 12-inch diameter steel bollards filled with concrete at all TEMF repair bay openings where frequent vehicle access/egress increases the risk of damage by vehicle impact. Bollard footings shall be designed to withstand organizational vehicular impact.
- (16) Mechanical and Electrical Equipment Yard. Provide 12-inch diameter by 5-foot high, concrete-filled, schedule 80 galvanized steel pipe bollards or painted steel pipe bollards as preferred by the installation, 5 feet O.C. spacing, 5 feet from edge of the mechanical and Electrical Equipment Yard, painted safety yellow, around the perimeter of the equipment yards. Provide vehicular access and locate out of circulation areas. Bollard footings shall be designed to withstand organizational vehicular impact.
- (17) Bollards at Out of Spec Waste Fuel, Used Oil and Used Engine Coolant (antifreeze) Storage Tank(s). Provide 12-inch diameter by 5-foot high, concrete-filled, schedule 80 galvanized steel pipe bollards, 5 feet O.C. spacing, 5 feet from edge of containment wall, painted safety yellow, around the perimeter of above-ground tank areas. Bollard footings shall be designed to withstand organizational vehicular impact.
- (18) Bollards at Site Storage Buildings. Provide 12-inch diameter by 5-foot high, concrete-filled, schedule 80 galvanized steel pipe bollards, 5 feet O.C. spacing, 5 feet from the edge of the building. Bollard spacing may be greater than 5' O.C. if portion of building being protected is not in a high volume traffic area. Bollard footings shall be designed to withstand organizational vehicular impact.

3.1.5. Architecture

- (1) Exterior Materials. Select exterior materials to be attractive, economical, and durable and low maintenance. Masonry walls are recommended at the ground floor level.
- (2) Floors. Provide concrete floors in maintenance and repair areas sloped in accordance with NFPA 30A and IBC/IPC. Provide a continuous trench drain located on the interior side of the overhead doors at repair areas and at centerline of central vehicle corridor, extending the length of maintenance areas.
- (3) Natural Lighting. Repair and maintenance bays, storage and admin areas shall be illuminated using hybrid lighting systems which includes electric lighting with electronic daylight controls in combination one or more of the following methods: with skylights with reflective tube that channels the light into the work area and a lens that diffuses the light, clerestory windows, and translucent wall panels above overhead doors. Open maintenance and storage sheds shall use hybrid lighting systems with a dome-shape skylights. Provide operable windows for natural lighting and ventilation in administration and shop control, training room, break/training/conference room, and consolidated bench repair shop. Preference will be given for designs providing vision panels in overhead doors.
- (4) Partitions. Fixed walls are required to separate repair areas and maintenance areas from the core areas, along corridors, and surrounding fixed areas such as latrines, vaults, storage areas and shops. Shops and storage areas may be subdivided with metal mesh partitions. Admin., training and break room walls should be non-load bearing to the greatest extent possible (for example, gypsum board on steel studs) except around latrines.
- (5) Sound Insulation. Provide sound insulation in all administration areas, training rooms, and bench repair areas to meet a minimum rating of STC 42 at walls and floor/ceiling assemblies, and a rating of STC 33 for doors. In addition to the sound insulation required, training areas shall meet a Noise Criteria (NC) 30 rating in accordance with ASHRAE Fundamentals Handbook.

(6) Repair Area Bay Doors. Provide overhead doors 24 feet wide by 14'-0" feet high in the exterior wall at each end of each structural bay. Provide doors of coiling, sectional, or telescoping design. Provide electrically operated doors with provision for manual chain operation. Provide manual 10-foot by 10-foot overhead doors for Consolidated Bench Repair Shop.

(a) Locking. Provide overhead doors that are operable from the interior only. Provide doors with a positive locking mechanism that will allow the door to remain open at engine exhaust position approximately 1 foot above the floor. Coordinate door locking requirements with the using service.

(b) Serviceability. Repair and maintenance bay doors shall be designed to meet heavy duty loads and high frequency of operation. Provide testing of deflection and operation of the doors prior to acceptance during construction. Doors shall be provided and installed by a commercial door company having not less than 5 years of experience in manufacturing, installing, and servicing the size and type of doors provided.

(c) Insulated Doors. Preference will be given to proposals that include insulated doors for thermal resistance and noise control.

(7) Personnel Doors. Provide exterior personnel doors in the ends of central vehicle corridor portion of maintenance areas and in the circulation bays as shown on the drawings. Provide steel doors with vision panels, except at storage, janitorial, and latrine areas. Minimum size for personnel doors is 3 feet wide by 7 feet high.

(8) Overhead Cranes. Crane shall be designed and constructed to CMAA 70 (Class C) or CMAA 74 (moderate requirements) for operation with hoist in accordance with ASME HST-1 or HST-4.

(a) The 10-ton crane shall have the following rated load speeds (plus or minus 15 percent):

1. Hoist - 20 fpm
2. Trolley - 65 fpm
3. Bridge - 125 fpm

(b) The 35-ton crane shall have the following rated load speeds (plus or minus 15 percent):

1. Hoist - 10 fpm
2. Trolley - 60 fpm
3. Bridge - 85 fpm

(c) Hoist motor control system shall provide one speed in each direction.

(d) Bridge and trolley main control systems shall provide one speed in each direction.

(e) Provide runway stops at limits of crane bridge travel.

3.1.6. Fire Protection

3.1.6.1. Standards and Codes

All fire protection and life safety features shall be in accordance with UFC 3-600-01 and the criteria referenced therein. Tactical Equipment Maintenance Facilities shall be classified as mission essential and shall be provided with complete sprinkler protection.

3.1.6.2. Fire Protection and Life Safety Analysis

3.1.6.3. A fire protection and life safety design analysis shall be provided for all buildings in the project. The analysis shall be submitted with the interim design submittal. The analysis shall include classification of occupancy (both per the IBC and NFPA 101); type of construction; height and area limitations (include calculations for allowable area increases); life safety provisions (exit travel distances, common path distances, dead end distances, exit unit width required and provided); building separation or exposure protection; specific compliance with NFPA codes and the IBC; requirements for fire-rated walls, doors, fire

dampers, etc.; analysis of automatic suppression systems and protected areas; water supplies; smoke control systems; fire alarm system, including connection to the base-wide system; fire detection system; standpipe systems; fire extinguishers; interior finish ratings; and other pertinent fire protection data. The submittal shall include a life safety floor plan for all buildings in the project showing occupant loading, occupancy classifications and construction type, egress travel distances, exit capacities, areas with sprinkler protection, fire extinguisher locations, ratings of fire-resistive assemblies, and other data necessary to exhibit compliance with life safety code requirements. Sprinkler System

Provide complete sprinkler protection for Vehicle Maintenance Shops, UAV Storage Buildings, Organizational Storage Buildings, and Distribution Company Storage Buildings. Wet pipe sprinkler systems shall be provided in areas that are heated and dry pipe sprinkler systems shall be provided in areas subject to freezing. All floors and all areas of the facilities shall be protected. The sprinkler system design shall be in accordance with UFC 3-600-01 and NFPA 13. The sprinkler hazard classifications shall be in accordance with UFC 3-600-01, NFPA 13, and other applicable criteria. Design densities, design areas and exterior hose streams shall be in accordance with UFC 3-600-01. The sprinkler systems shall be designed and all piping sized with computer generated hydraulic calculations. The exterior hose stream demand shall be included in the hydraulic calculations. A complete sprinkler system design, including sprinklers, branch lines, floor mains and risers, shall be shown on the drawings. The sprinkler system plans shall include node and pipe identification used in the hydraulic calculations. All sprinkler system drains, including main drains, test drains, and auxiliary drains, shall be routed to a 2' x 2' splash block at exterior grade.

3.1.6.3.1. Sprinkler Service Main and Riser

The sprinkler service main shall be a dedicated line from the distribution main. Sprinkler service and domestic service shall not be combined. The sprinkler service main shall be provided with an exterior post indicator valve with tamper switch reporting to the fire alarm control panel (FACP). The ground floor entry penetration shall be sleeved per NFPA 13 requirements for seismic protection. The sprinkler entry riser shall include a double check backflow preventer, a fire department connection, and a wall hydrant for testing of backflow preventer. The sprinkler system shall include an indicating control valve for each sprinkler system riser, a flow switch reporting to the FACP, and an exterior alarm bell. All control valves shall be OS&Y gate type and shall be provided with tamper switches connected to the FACP. Facilities with multiple floors shall be provided with floor control valves for each floor. The floor control valve assembly shall be in accordance with UFC 3-600-01, Figure 4-1.

3.1.6.3.2. Exterior Hose Stream

Exterior hose stream demand shall be in accordance with UFC 3-600-01. Exterior hose stream demand shall be included in the sprinkler system hydraulic calculations.

3.1.6.3.3. Backflow Preventer

A double check backflow preventer shall be provided on the fire water main serving each building. This shall be located within the building. An exterior wall hydrant with dual hose connections with OS&Y valve shall be provided to allow testing of backflow preventer at design flow as required by NFPA 13.

3.1.6.3.4. Fire Department Connection

fire department connection shall be provided for each building with sprinkler protection. These shall be located to be directly accessible to the fire department.

3.1.6.4. Elevators

The fire protection features of elevators, hoist ways, machine rooms and lobbies shall be in accordance with UFC 3-600-01, ASME A17.1, NFPA 13 and NFPA 72.

3.1.6.5. System Components and Hardware

Materials for the sprinkler system, fire pump system, and hose standpipe system shall be in accordance with NFPA 13 and NFPA 20.

3.1.6.6. Protection of Piping Against Earthquake Damage

Sprinkler and fire pump piping systems shall be protected against damage from earthquakes. Seismic protection shall include flexible and rigid couplings, sway bracing, seismic separation assemblies where piping crosses building seismic separation joints, and other features as required by NFPA 13 for protection of piping against damage from earthquakes.

3.1.6.7. Fire Water Supply

Fire flow test data is provided in Appendix D.

3.1.6.8. Fire Pump

The requirement for a fire pump installation shall be determined by the Contractor based on fire flow test data from the project site and fire protection system design requirements for the project. If required a complete fire pump installation shall be provided for the facility. It shall comply with the requirements of UFC 3-600-01, NFPA 13 and NFPA 20. The Contractor shall submit fire pump design analysis and drawings in the design requirements.

3.1.6.9. Fire Detection and Alarm

Refer to paragraph 3.1.9, Electrical and Communication Systems, for requirements.

3.1.6.10. Building Construction

Construction shall comply with requirements of UFC 3-600-01, the International Building Code and NFPA 101.

3.1.6.10.1. Fire Extinguishers Cabinets and Brackets

Fire Extinguisher cabinets and brackets shall be provided when fire extinguishers are required by UFC 3-600-01 and NFPA 101. Placement of cabinets and brackets shall be in accordance with NFPA 10. Semi-recessed cabinets shall be provided in finished areas and brackets shall be provided in non-finished areas (such as utility rooms, storage rooms, shops, and vehicle bays). Fire extinguishers shall not be provided in this contract.

3.1.6.10.2. Interior Wall and Ceiling Finishes

Interior wall and ceiling finishes and movable partitions shall conform to the requirements of UFC 3-600-01 and NFPA 101.

3.1.7. Heating, Ventilation, and Air Conditioning (HVAC) Systems

(1) Ventilation System. Ventilation Supply system for the repair and maintenance bays and the vehicle corridor shall be designed to provide 100% of outdoor air with no recirculation and sized for minimum of 1.5 cfm per square foot per ASHRAE 62.1. The ventilation air shall be tempered to 55 degrees (F). CO and NOx sensors shall be provided throughout the repair bays and vehicle corridor. If the sensors register concentrations above acceptable levels they shall initiate an alarm both locally and at the Building Automation System. The general system's fan shall be equipped with a VFD to adjust the exhaust airflow rate based on the operation of the vehicle exhaust systems. The repair and maintenance areas and vehicle corridor shall be maintained at negative pressure with respect to the air conditioned

core area. UAV Storage Building, Organizational Storage, Distribution Company Storage, POL Building, mechanical and electrical rooms, the ventilation rate shall be such that the space is maintained at a maximum of 10 degrees (F) above ambient conditions. Air supplied into the air conditioned core area shall be cascaded into adjacent areas for pressurization and to prevent polluted air from entering this area.

(2) System Selection.

(a) Repair and maintenance bays and the vehicle corridor are to be heated to 55 degrees F. The repair and maintenance bays shall be heated by some form of radiant heating; overhead gas infrared, in-floor hydronic, or some combination thereof. Other site storage buildings (see paragraph 3.2.f) are to be heated to 40 degrees F for freeze protection.

(b) Occupied spaces within the core shall be heated and cooled in accordance with Paragraph 5 of Section 01 10 00. Consider all viable alternative systems meeting the functional requirements of each of the areas of the facility. For the core spaces, consider packaged equipment, split systems or systems utilizing chilled/heating water from either a central plant or decentralized sources.

(c) Return air plenum systems are not allowed for Tactical Equipment Maintenance Facilities.

(d) Consider use of evaporative air pre-cooling in hot climates.

(e) Telecommunications Rooms and SIPRNet rooms will each be served by an independent and dedicated air-handling system. Air handling unit system(s) shall not be floor-space mounted within the actual space served. Rooms shall be maintained at 72 degrees F and 50 percent relative humidity year-round. Assume 616 Watts per hour for the equipment heat dissipation. Bollard spacing may be greater than 5' O.C. if portion of building being protected is not in a high volume traffic area. Contractor shall verify this load during the design stage.

(3) Building Exhaust Systems. Provide general exhaust in repair and maintenance areas and exhaust systems at maintenance area pit, welding area and weapons vault. Welding function is portable but welding exhaust shall be a part of the building construction. Exhaust fan shall be non-sparking. Maintenance area pit exhaust system will be ducted exhaust system with explosion proof fans. Welding exhaust shall be manually engaged during the welding activity. All other exhaust systems will operate continuously while the building is occupied. Exhaust duct openings shall be located so that they effectively remove vapor accumulations at floor level from all parts of the floor area. Exhaust systems shall be in accordance with NFPA 30 and 30A. Energy recovery from exhaust air shall be used where required by ASHRAE 90.1.

(4) Vehicle Exhaust Evacuation Systems. Vehicle exhaust evacuation system for wheeled and tracked vehicles shall be provided at each repair area and along the vehicle corridor allowing for capturing exhaust fumes from stationary vehicles and vehicles moving in and out of the building and along the vehicle corridor. Consider viable alternative systems meeting the functional requirements of each of the areas of the facility. Size and locate the exhaust lines as required to service vehicles and equipment within the repair areas. Lines shall not interfere with maintenance operations or obstruct equipment such as the traveling bridge crane. 50% duty cycle of the total available capacity of vehicle exhaust can be considered unless specified otherwise by the using service. The using service is responsible for providing the transition connectors (if required, depending on the type of exhaust system provided) between the vehicle exhaust and the vehicle exhaust system installed in the building. All system components must be compatible with the vehicle exhaust temperatures. Unless otherwise indicated by the user, design exhaust outlets for 1400 cfm and 900 degrees F. For vehicles with higher rate requirements, two exhaust lines may be combined. No exhaust system is currently available that will satisfy the requirements of the AGT 1500 Gas Turbine. Ventilation in the maintenance and repair bays shall be as a minimum per ASHRAE 62.1. Additional makeup air may be needed compensate for the exhaust requirements.

(5) HVAC Controls. HVAC Controls shall be in accordance with paragraph 5.8.3. See Appendix for HVAC Controls for typical control system points schedules. These schedules identify as a minimum points to be monitored and controlled by the building automation system (BAS). See paragraph 6 for any additional installation specific points. Points schedule drawings convey a great deal of information critical

to design, installation, and subsequent performance of the control system. It includes hardware input/output information, device ranges and settings, ANSI 709.1 communications protocol data, and information about data that is to be used at the operator workstation by Monitoring and Control software. These schedules are available as an excel spread sheet and as AutoCAD drawings on Engineering Knowledge Online (EKO) website <https://eko.usace.army.mil/fa/bas/>. Point schedule of system types not addressed in the appendix shall be developed by the Contractor, and shall be sufficiently detailed to a level consistent to a similar listed system in the appendix. It is recommended that all of the guidance and instruction documents be reviewed prior to using any of the info, as the documents provide necessary and critical information to the use of website drawings and other information.

3.1.8. Plumbing

(1) Trench Drains. Design trench drain for easy cleaning. Provide basket strainers to facilitate trash removal where trench drains discharge to piping systems. Convey waste to exterior oil/water separator prior to discharge to the sanitary sewer system. When a dedicated, partitioned welding area is provided, provide a solid cover to the trench drain where it runs through the welding area.

(2) Emergency Showers and Eye Washes. See Section 3.1.1 (3) (b) for eye wash, hand held drench hose and emergency shower requirements within the repair and maintenance areas and core area.

(3) Compressed Air. Provide the compressed air outlets with quick disconnect couplings in all repair and maintenance areas, along the vehicle corridor, at two places in the pit, and in the Consolidated Bench Repair area. Provide one compressed air outlet per bench in Consolidated Bench Repair area. Each drop shall include an isolation valve, filter and pressure regulator, condensate trap with drain cock. Provide air compressor with receiver, refrigerated air dryer, filtration and pressure regulation. The air compressor shall be installed building equipment. Size air compressor for 10 CFM per outlet in repair and maintenance areas and 5 cfm per outlet in the Consolidated Bench Repair area, with a 60 percent diversity (assume 60% of all drops in the facility will be in use at the same time), plus any additional compressed-air equipment in the facility. Unless otherwise indicated by the user requirements in paragraph 6, provide compressed air at 125 psi.

(4) Sump Pump. Provide sump pump in maintenance pit and elevator pit. Determine if maintenance pit sump pump shall be explosion proof type and provide explosion type, if required. Sump pump shall be submersible type and shall be capable of handling small amounts of oil and anti-freeze. Maintenance pit and elevator pit sumps shall discharge to an oil water separator.

3.1.9. Electrical and Telecommunications Systems

See Paragraph 6 for work to be performed by others (work indicated in paragraph 3 shall be a part of this contract unless otherwise indicated in paragraph 6), clarifications and additional requirements for the electric and telecommunications systems.

(1) Exterior Electrical Distribution System

(a) Parking Pad and Power Connections. Provide power connections to hardstand for existing equipment as required in Features Matrix.

(2) Exterior Lighting

(a) Exterior Lighting General. Exterior lighting systems inside the TEMF security fence shall be provided for sidewalks, roadways, service yards, facility aprons, open storage areas and parking areas. Exterior lighting shall consist of high intensity discharge (HID) or solid state (LED) light fixtures, mounted on poles located within the AT/FP fence line clear zone and elsewhere as required to attain illumination levels and uniformity. Poles located within the service yards, facility aprons and hardstand parking areas shall be located and protected to minimize damage from vehicles. Building-mounted light fixtures may be used around the building perimeter to supplement pole mounted light fixtures. Building mounted light fixtures used solely for building perimeter and doorway lighting may be fluorescent. Illumination levels shall be 5 foot-candles within 10 feet of the bay doors for repair areas and maintenance areas and for the canopy are for AS-LMS, SATS and vans. Illumination levels shall be no less than 0.5 foot-candles for parking areas. Exterior lighting shall be controlled by a photosensor or astronomical time clock that is

capable of automatically turning off the exterior lighting when sufficient daylight is available or the lighting is not required.

(b) Perimeter Security Lighting. Protective lighting systems shall be provided in response to project specific requirements to deter trespassers and make them visible to guards. Levels of exterior lighting for protected areas shall conform to the requirements in the IESNA Lighting Handbook. Lighting circuits shall be controlled by a photosensor with manual override.

(3) Exterior Communication Services

(a) Parking Pad and Data Connections. None required

(4) Interior Electrical and Telecommunications

(a) Electrical

i. Power Service. In the electrical equipment room provide a space for 3-phase, 200 ampere breaker with additional 3-phase, 200 ampere power capacity for this breaker in the main switch board. Installation shall conform to NFPA 70, National Electrical Code.

ii. Nonlinear Loads. The effect of nonlinear loads such as computers and other electronic devices shall be considered and accommodated as necessary. These loads generate harmonics, which can overload conventionally sized conductors or equipment and thereby cause safety hazards and premature failures. Circuits serving such devices shall be equipped with a separate neutral conductor not shared with other circuits. Panelboards and any dry type transformers shall be rated accordingly.

iii. Lightning Protection System and Transient Voltage Surge Protection. Design shall be in accordance with NFPA 780 and other referenced criteria. Provide transient voltage surge protection. All tactical equipment maintenance facilities are classified as mission essential and continuity of facility services is required for lightning protection risk assessments.

(b) Receptacles. Power receptacles shall be provided per NFPA 70 and in conjunction with the proposed equipment and furniture layouts. Provide power connectivity to each workstation. Provide a duplex receptacle adjacent to each duplex voice/data and CATV outlet.

(c) Special Power Requirements. Electrical power outlets for special power shall be coordinated with workbench locations in shops and provided in the maintenance areas. Both low voltage and high frequency power may be required in some areas. See the TEMF Features Matrix. Coordinate with the User for the electrical characteristics of the equipment to be provided by the Government.

(d) Hazardous Locations. Hazardous locations shall be clearly defined on the drawings by the designer based on the intended use of the facility and applicable criteria. Receptacles, devices, equipment and wiring in hazardous locations shall be designed (UL listed for the application) and installed in accordance with the NFPA codes. When hazardous locations are determined to be up to 18 inches above the finished floor, receptacles and devices and conduit routing to them shall be installed above the hazardous area, where possible.

(e) Lighting. Lighting and lighting controls shall comply with the recommendations of the Illumination Engineering Society of North America (IESNA) and the requirements of ASHRAE 90.1.

i. Office, Training Room and Conference Room Lighting. Interior ambient illumination shall provide a generally glare free, high quality lighting environment conforming to IESNA RP-1-04. Training rooms and conference rooms shall have a dimmable circuit providing general lighting without glare on audio-video displays. Dimming ballasts shall be capable of dimming to 5 percent.

ii. Repair and Maintenance Areas. Illumination of the repair maintenance areas shall consist of T5, T5HO, T8 or solid state fluorescent light fixtures. The fixture layout shall be coordinated with the traveling bridge crane requirements.

iii. Maintenance Pit Lighting. Illumination in maintenance pits shall consist of T5, T5HO, T8 fluorescent linear or solid state light fixtures mounted in the pit area for general illumination. Task illumination shall be provided by no fewer than four pit-mounted incandescent, compact fluorescent, or metal halide adjustable, or solid state swing-arm task lights. In lieu of swing-arm task lights, no fewer

than two receptacles with cord and plug incandescent, compact fluorescent or metal halide portable safety lights may be provided. Each cord shall be of adequate length to service no less than 60 percent of the pit area. All equipment shall be suitable for the hazardous classification of the pit.

iv. Illumination Levels. Maintained Illumination levels shall be in accordance with the Table 4 below. Maintained illumination levels in areas not included in Table 4 shall comply with the recommendations of the IESNA Lighting Handbook. Illumination levels in maintenance pits shall be calculated based on no contribution from the overhead ambient light fixtures.

TABLE 4 ILLUMINATION LEVELS	
FUNCTIONAL AREA	FOOT CANDLES
Administration and Shop Control	50
Warehouse, Storage, and Miscellaneous Rooms	20
Latrines, Showers, and Lockers	20
Break, Training, and Conference	30
Repair and Maintenance Areas	50
Weapons Storage and COMSEC Vaults	50
Maintenance Pit	15
Repair Shops (General Item, Compact Item, Special Environment, Battery, etc.)	50
Electrical/Mechanical Rooms	30

(f) Telecommunications System including Telecommunications and SIPRNET Minimum Room Sizes - Telecommunication Pathways, Outlets and Cabling. Telecommunications cabling shall be Category 6 for all voice and data connections unless length of run warrants need for multimode fiber optic cable. Provide number and type of connectors as defined by the User. Telecommunications outlets and conduits shall be provided in core areas and supply administration areas with a minimum of one outlet in each work area. Each Training Room shall have a voice outlet. Each Training Room shall have a data connection for each seat and for an instructor. Each repair area workstation shall have access to a data connection. In administration and shop control areas provide a voice and data outlet for every workstation. A data outlet shall be provided at each copier location. Provide a single jack outlet for wall mounted GFGI phones in mechanical, electrical, vaults, telecommunications room and corridors. For controlled access facilities, provide outlets for wall mounted GFGI phones at primary entrance. Additional outlet locations may be provided based on coordination with the facility User and where required for HVAC equipment or other equipment. Provide outlets per I3A technical criteria and Table 5 below. Provide Telecommunications and SIPRNET rooms minimum sizes as indicated in Table 5A below.

TABLE 5 OUTLET DENSITIES	
FUNCTIONAL AREA	AREA PER OUTLET (SF)

Administration and Shop Control	80
Latrines, Showers, and Lockers	0
Break, Training, and Conference	80
Repair and Maintenance Areas	500
Weapons Storage and COMSEC Vaults	80
Repair Shops (Consolidated bench repair, Battery, etc)	80

TEMF	Telecommunications Room		SIPRNET Room		
	Floor	Width Feet (min)	Square Feet (min)	Width Feet (min)	Length Feet (min)
1st Small		8	150	6	6
1st Medium		8	150	6	6
2nd Medium		8	110	None	None
1st Large		8	150	6	6
2nd Large		8	110	None	None
1st EXLarge		8	150	6	6
2nd EXLarge		8	150	None	None

General Notes:
 1. Width is a minimum inside edge of wall to inside edge of wall dimension inside the room. Length shall be greater than or equal to width.
 2. The Telecomm room shall not be less than the minimum width and square feet indicated above and the SIPRNET rooms shall not be less than the minimum width not be less than the minimum width and length indicated above.
 Telecommunications and SIPRNET rooms shall be rectangular in shape.

(g) Cable Television (CATV). A minimum of two CATV outlets shall be provided in the Break, Training, and Conference Room and Admin and Shop Control Room. The cable television system shall consist of cabling, pathways and outlets. All building CATV systems shall conform to applicable criteria to include I3A Technical Criteria and the UFC 3-580-01 Telecommunications Building Cabling Systems Planning Design.

(h) Audio/Visual Systems

i. Audio/Visual Systems. Provisions (consisting of a power receptacle and conduit for signal wiring) for a GFGI projector shall be provided in each Training Room.

ii. Paging Systems. A paging system shall be provided for the repair areas and maintenance areas with the microphone located in the administration and shop control area. The system shall be zoned for multiple bay operation and shall have input from the telephone system.

(i) Security Infrastructure. The security infrastructure shall be installed to support GFGI equipment including cameras, door alarms, and motion sensors.

i. Intrusion Detection and Security Systems. Provision for user provided ICIDS intrusion detection and security systems are required for secure and restricted areas including the arms vault, COMSEC vault and SIPRNet room. Provisions shall include dedicated power circuits, telecommunications connections, and raceways and signal wiring for user installed devices. System requirements shall be coordinated with the Installation Security Office.

ii. Access Control System. The access control system shall consist of proximity sensors throughout the facility with varying levels of security. System requirements shall be coordinated with the Installation Security Office.

(j) Mass Notification System (MNS). A mass notification system shall be provided as required by UFC 4-010-01.

(k) Grounding. Each maintenance building shall have a ground counterpoise around the building perimeter for grounding incoming service, building steel, lightning protection, telephone service, piping, and internal grounding requirements. Ground busbar shall be provided on walls of each repair area. A grounding point shall be provided in each repair area and each maintenance area. Each repair area and maintenance area is 16' x 32' in size. Grounding points shall be provided in vehicle and equipment parking areas on 40-foot centers (maximum) and coordinated parking layout. It will be acceptable to provide a minimum of one grounding point for every eight vehicles parked in a double row, and one grounding point for every four vehicles parked in a single row configuration. Equipment parking grounding shall be in accordance with the recommendations of MIL-HNBK-419A, which is referenced in I3A. This includes, but is not limited to, the earth electrode subsystem should exhibit a resistance to earth of 10 ohms or less and multiple ground rods should be interconnected using 1/0 AWG bare copper cable. Install an interior #2 AWG bare tinned copper ground loop around the perimeter of the Fluid Distribution Room for dissipation of potential static charge. Bond ground loop to building structure and grounding riser. Provide thirty (30) #6 AWG bare copper pigtailed complete with alligator clips on both ends for grounding of metallic barrels/dispensing equipment. Length of pigtailed should be based on potential layout of equipment/drums and the location of ground ring. Additional grounding may be provided based on project requirements. Systems shall conform to NFPA 70 National Electrical Code, NFPA 780 Standard for the Installation of Lightning Protection Systems, local codes and the Technical Criteria for Installation Information Infrastructure Architecture (I3A).

(l) SIPRNET. The SIPRNET room shall be designed and constructed in accordance with the "Building SIPRNET Communication Room – New Construction Guidance", paragraph of the Technical Guide for Integration of SIPRNET (Secret Internet Protocol Router Network). The SIPRNET room design and construction shall be coordinated with local NEC and Physical Security Office. SIPRNET conduit and cable to SIPRNET Drops and the SIPRNET Drops will be provided in the future and is not to be provided as part of this scope of work. Connection to the main telecommunications room from the SIPRNET room shall be via a 2-inch trade size steel conduit. Provide six strands of single mode fiber optic cable from Telecommunications Room to the SIPRNET Room. Provide a communications signal ground bus bar connected to the main communications room signal bus bar via a properly sized ground wire (see MIL-HDBK-419-A, which is referenced in the Technical Guide for the Integration of SIPRNET). Provide one dedicated standard 20-amp duplex receptacle for future SIPRNET rack in addition to convenience receptacles in the SIPRNET room.

(m) Hydraulic Lift. In each pair of repair areas, provide electric power for User provided (GFGI) portable hydraulic lift. Coordinate electrical requirements with the User.

(n) Fire Detection and Alarm

i. A fire alarm and detection system shall be provided for this facility. It shall comply with the requirements of UFC 3-600-01 and NFPA 72. The system shall be addressable and fully compatible with and integrated with the local installation wide central monitoring system. Coordinate fire alarm system requirements with the Fire Department's Representative during design.

ii. All initiating devices shall be connected, Class A, Style 6, to signal line circuits (SLC). All alarm appliances shall be connected to notification appliance circuits (NAC), Class A. A looped conduit system shall be provided so that if the conduit and all conductors within are severed at any point, all NAC and SLC shall remain functional.

iii. Breakglass manual fire alarm stations shall not be used.

iv. Over-voltage and surge protection shall be provided at the input power of all panels.

3.1.10. Energy Conservation

3.1.10.1. **Energy Performance.** The building, including the building envelope, HVAC, ventilation and exhaust systems, service water heating, power, and lighting systems shall be designed to achieve a non-plug 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 (see paragraph 5.9 Energy Conservation). (Note: Plug loads shall be included in building energy modeling but are subtracted in the final calculation of Energy Performance. See section “Design After Award” for additional guidance).

3.1.10.2. **Required Energy Conservation Features.** All items listed in the energy conservation features table shall be provided as a minimum. Additional energy conservation features may be required to meet the above energy performance. The contractor is responsible for determining and providing additional energy conservation features to meet the energy performance requirement.

Climate Zone 3B, Energy Conservation Features Table

Item	Component	Minimum Requirements
Roof	Insulation above deck	
	Metal building roof	R-13 + R-13
	Surface reflectance	0.65
Walls	Steel-framed	
	Metal building	R-13
Slabs	Unheated	NR
	Heated	R-10
Doors	Swinging	U-0.70
	Non-Swinging	U-0.25
Infiltration		0.5 ACH
Vertical Glazing	Window to Wall Ratio (WWR)	< 10%
	Thermal transmittance	U-0.45
	Solar heat gain coefficient (SHGC)	0.44 – N; 0.31 – S, E, W
	South Overhangs	NR
Skylights	Percent roof area	2%
	Thermal transmittance	U-0.69
	SHGC	0.19
Interior Lighting	Lighting Power Density	See Note 3
	Ballast	Electronic ballast
	Daylighting controls ⁴	Yes
	Automatic Lighting Shutoff	Occupancy sensors for all unoccupied spaces and where feasible for all occupied spaces
Ducts	Sealing	Seal class B
	Location	Interior only
	Insulation level ⁵	R-6
Service Water Heating	Gas storage	90% E _t

1. Not Used
2. NR means there is no requirement or recommendation for a component in this climate.
3. Lighting power densities in accordance with the following table:

Lighting Power Densities

Zone	Baseline	Minimum Requirements
Repair Bay	1.7 W/ft ² (18.3 W/m ²)	1.3 W/ft ² (14.0 W/m ²)
Vehicle Corridor	0.7 W/ft ² (7.5 W/m ²)	0.7 W/ft ² (7.5 W/m ²)
Showers	Use ASHRAE 90.1	0.6 W/ft ² (6.5 W/m ²)
Storage 1	Use ASHRAE 90.1	0.9 W/ft ² (9.7 W/m ²)
Consolidated Bench	1.9 W/ft ² (20.5 W/m ²)	1.3 W/ft ² (14.0 W/m ²)
Storage 2	Use ASHRAE 90.1	0.9 W/ft ² (9.7 W/m ²)
Office	Use ASHRAE 90.1	0.9 W/ft ² (9.7 W/m ²)

4. Daylighting should be included in the repair bays, vehicle corridor, and office.
5. The duct and pipe insulation values are from the ASHRAE Advanced Energy Design Guide for Small Offices.

System	Minimum Requirements	
	Fan Motor	Total Fan
Repair Bay	0.90	0.45
Vehicle Corridor	0.90	0.45
Showers	0.85	0.34
Storage 1	0.85	0.34
Consolidated Bench	0.90	0.45
Storage 2	0.85	0.34
Office	0.85	0.34
Fan Coil Units	0.85	0.34

3.1.10.3. Compliance Documentation

The required energy conservation features shown in the table above contributes to the achievement of the above energy performance and are life cycle cost effective for a TEMF. Use of the required energy conservation features does not eliminate the requirement for energy analysis calculations documenting compliance. The design-build contractor must document compliance with the above energy performance utilizing the methodology described in ASHRAE 90.1 Appendix G as discussed in section 01 33 16, Design After Award. The design analysis shall document each of the features selected to achieve the specified energy performance.

3.1.10.4. Schedules. The following load schedules must be used in all facility energy simulations for purposes of showing compliance with Paragraph 3.1.10.1.

Hr	Occupancy			Lighting			Plug Loads			Service Hot Water		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
2	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
3	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
4	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
5	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
6	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
7	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
8	0.15	0	0	0.4	0.04	0.04	0.5	0.2	0.2	0.1	0.03	0.03
9	0.7	0	0	0.9	0.04	0.04	0.8	0.2	0.2	0.7	0.03	0.03
10	0.9	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
11	0.9	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
12	0.9	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
13	0.5	0	0	0.8	0.04	0.04	0.8	0.2	0.2	0.7	0.03	0.03
14	0.85	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
15	0.85	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
16	0.85	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.7	0.03	0.03
17	0.2	0	0	0.9	0.04	0.04	0.9	0.2	0.2	0.2	0.03	0.03
18	0	0	0	0.3	0.04	0.04	0.4	0.2	0.2	0.03	0.03	0.03
19	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
20	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
21	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
22	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
23	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03
24	0	0	0	0.04	0.04	0.04	0.2	0.2	0.2	0.03	0.03	0.03

3.1.11. Equipment and Furniture:

(a) Equipment and furniture are necessary to make TEMF ready for daily operations. Some items are provided as integral parts of the building construction. Most furniture and equipment must be provided by others. Table 6 shows typical contract provided equipment that is needed to make TEMF ready for operations.

TABLE 6 INSTALLED BUILDING EQUIPMENT		
Area	Equipment Class ¹	Equipment/Furniture Item
Repair Areas	CFCI	Exhaust System
	CFCI	Bridge Crane
	CFCI	Compressed Air
Maintenance Areas	CFCI	Bridge Crane
	CFCI	Maintenance Pit
	CFCI	Compressed Air
	CFCI	Dispensing/Disposal System
	CFCI	Emergency Eye Wash, hand wash and shower station

TABLE 6 INSTALLED BUILDING EQUIPMENT		
Area	Equipment Class ¹	Equipment/Furniture Item
	CFCI	Fire Extinguisher Cabinets
Administration and Shop Control	CFCI	Window/Reception Counter
	CFCI	Fire Extinguisher Cabinets
Consolidated Bench	CFCI	Compressed Air
Tool Room	CFCI	
Tool Box Storage	CFCI	Window/Reception Counter
Combat Spares	CFCI	Window/Reception Counter
Latrines, Showers & Lockers	CFCI	Lockers and Benches
Break, Training, Conference Room	CFCI	Counter with Sink
Weapons & COMSEC Vaults	CFCI	Vault Door
Site	CFCI	Oil/Water Separator

Note (1): CFCI is Contractor Furnished/Contractor Installed equipment. This equipment is always MCA funded and is part of the construction contract.

(b) Furniture Systems. The following criterion describes the furnishing requirements for all room types. Furnishings, other than installed building equipment, are to be Government-furnished and Government-installed (GFGI) unless otherwise specified in this document. The following furnishings table is provided for coordination of room and office layouts to ensure suitability for their intended function.

Table 7: Room Size and Furnishings Chart

Table 7- Room Size and Furnishings Chart				
Room	Description	NSF	Comments	Furniture Required
Admin & Shop Control	Administration & Shop Control	Varies	OPEN-PLAN OFFICE	Systems furniture open plan office area with workstations, approx. 64 SF, with work surfaces, file drawers and overhead storage each for six staff members in Small TEMF, 16 staff members in Medium TEMF, 40 staff members in Large TEMF, and 57 staff members in Extra Large TEMF. Records section to have min. of 1 linear foot of file space for every 4 SF of room (250 SF room = min 62.5 lf of file space). One 36" wide, 4 drawer file cabinet – 12 LF, room requires 5.2 x 4 –drawer file or 6 cabinets.

Table 7- Room Size and Furnishings Chart				
Room	Description	NSF	Comments	Furniture Required
TRAINING ROOM	Training Room	1080	CLASSROOM	1 desk and chair for each 20 SF to accommodate min. 30 students.
BREAK ROOM/ CONF/ TRAIN	Break Room/ with adjacent Multi-purpose Space	Varies	STAFF BREAK AREA & CONFERENCE ROOM	Min. 10 LF base and wall cabinets with space for commercial grade refrigerator with ice maker. Provide seating and tables to accommodate approx. 40 percent of the building occupants.
ARMS VAULT	Class 5A Vault	300	CONSTRUCTED IN ACCORDANCE WITH AR 190-11, APP G.	1 desk to accommodate a computer, 1 task chair, 1 bookcase for manuals, one 4-drawer file cabinet, and 1 work bench.
COMSEC VAULT	Class 5V Vault	300	CONSTRUCTED IN ACCORDANCE WITH AR 380-5.	1 desk to accommodate a computer, 1 task chair, 1 bookcase for manuals, 4 lockable metal cabinets with shelves, two 4-drawer file cabinets, industrial shelving approximately 10'wx4'dx6'h each.
COMBAT SPARES	Spare Parts	Varies	STORAGE ROOM	1 desk to accommodate a computer, 1 task chair, one 4-drawer file cabinet, and 4 lockable metal cabinets with shelves.
TOOL ROOM	Tools and Tool Set Storage	Varies	STORAGE ROOM	1 desk to accommodate a computer, 1 task chair, one 4-drawer file cabinet, and 4 lockable metal cabinets with shelves.
SECURE STOR.	Secure Storage	300	CONSTRUCTED IN ACCORDANCE WITH RISK LEVEL II ANALYSIS OF AR 190-51.	4 lockable metal cabinets with shelves and industrial shelving approximately 10'wx2'dx6'h each - 1 for small TEMF, 2 for medium, 3 for large, and 4 for extra large.
CONSOLD. BENCH REPAIR	Consolidated Bench Repair	Varies	WORK AREA	Min. 16 SF of Static-Free work bench space for each assigned repair technician – 6 for small TEMF, 20 for Medium, 36 for Large, and 71 for Extra Large.

3.2. FUNCTIONAL AND OPERATIONAL REQUIREMENTS

See the attached building plans for the required functional and operational spaces and required adjacencies.

- (a) Not Used
- (b) Medium TEMF. 35,270 SF
- (c) Not Used
- (d) Not Used

(e) Architectural TEMF Features Matrix

ARCHITECTURAL TEMF FEATURES MATRIX	COLUMN-FREE SPACE	WIRE MESH ENCLOSURE	STUDWALL PARTITIONS	CONC/CMU IMPACT RESISTANT PARTITIONS	GYPSBOARD IMPACT RESISTANT PARTITIONS	WINDOWS TO REPAIR BAYS	WINDOWS TO EXTERIOR	VINYL COMPOSITION TILE	CONCRETE FLOOR HARDENER	CERAMIC TILE FLOOR	PAINTED WALLS	WALL CORNER GUARDS	FINISHED CEILING	MOISTURE RESISTANT CEILING	EXPOSED STRUCTURE OVERHEAD	CEILING HEIGHT 9 FT.	CEILING HEIGHT 12 FT.	10 TON CRANE-HOOK HEIGHT 20 F (Note 4)	35 TON CRANE-HOOK HEIGHT 25 F (Note 4)	OPERABLE WINDOW FOR TESTING SIGHTS	LOCKERS	OVERHEAD COILING DOORS - 10 FT. X 10 FT.	OVERHEAD COILING DOORS - 24 FT. X 14 FT. 0 IN.	BOLLARDS @ OH DOORS INSIDE/OUTSIDE	GSA CLASS 5 VAULT DOOR	MAINTENANCE PIT	ISSUE WINDOW WITH COUNTER & COILING DOOR	BUILT-IN STORAGE BINS
	FUNCTIONAL AREAS																											
ADMIN & SHOP CONTROL			1			•	•	•			•	•	•															
UNASSIGNED			1			•	•	•			•	•	•															
TOOL ROOM		3			•				•		•	•	•					•									•	•
TOOL BOX STORAGE		3			•				•		•	•	•					•									•	•
COMBAT SPARES		2			•				•		•	•	•					•								•	•	
LATRINES, SHOWERS, LOCKERS					•					•	•	•	•	•							•							
TRAINING ROOM			•				•	•			•	•	•															
BREAK, TRAINING & CONF			•				•	•			•	•	•															
CONSOLIDATED BENCH REPAIR				•					•		•	•	•					•				•						
WEAPONS STORAGE VAULT		2		•					•		•	•	•				6					•						
COMSEC VAULT		2		•					•		•	•	•				6					•						
NONSENSITIVE SECURE STORAGE				•					•		•	•	•					•										
COMMUNICATION VEHICLE DOCK																												
CORRIDOR				•				5			•	•	•					•										
MECHANICAL ROOM				•					•		•	•	•					•										
ELECTRICAL ROOM				•					•		•	•	•					•										
COMMUNICATIONS ROOM				•					•		•	•	•					•										
SIPRNet ROOM									•		•	•	•					•										
FLUID DISTRIBUTION									•		•	•	•									9		•				
REPAIR AREAS	•	•							•		•	•	•					•	•	•			•					
MAINTENANCE AREAS	•	•							•		•	•	•					8	•	•			•		•			
HARDSTAND																												
ORG STORAGE	•	•							•		•	•	•									•						
UAV STORAGE BUILDING	•	•							•		•	•	•										•					
DISTRIBUTION COMPANY SUPPLY BLDG	•	•							•		•	•	•										•					
HAZ WASTE & POL STORAGE BUILDINGS	•	•							•		•	•	•										•					

Notes for Architectural TEMF Features Matrix

1. Lightweight, non-bearing partitions removable to rearrange space
2. Wire mesh partitions to subdivide where required

3. Wire mesh enclosed for tool storage to facilitate interaction of mechanics and tool room keeper, and for relocation flexibility.
4. Provide either a 10-ton or a 35-ton top running bridge crane for one wing of repair areas and maintenance areas as noted in para. 2.1.
5. VCT in corridor on 2nd Floor (except Small TEMF).
6. Provide top of Concrete Cap at 12'-0". Provide an additional dropped ceiling to protect weapons and COMSEC equipment under repair. Top of caps shall be secure from unauthorized access.
7. All Finishes are considered minimum finishes only.
8. The Maintenance Corridor through the Core Area shall have a minimum 14'-0" clear Ceiling Height.
9. Roll-up doors or double doors may be provided for exterior access to the Fluid Distribution Room POL and HAZMAT buildings based on User preference.

(f) Mechanical TEMF Features Matrix

MECHANICAL TEMF FEATURES MATRIX	VEHICLE EMISSIONS EXHAUST SYSTEM										PLUMBING & FIRE PROTECTION										MISCELLANEOUS									
	HVAC	HEAT	VENTILATE	AIR CONDITION	VEHICLE EMISSIONS EXHAUST SYSTEM	LAVATORY OR SINK	HOSE BIBB	WASH FOUNTAIN	WATER CLOSET	URINAL	SHOWERS	COMPRESSED AIR	EMERGENCY SHOWER & EYEWASH	SPRINKLER SYSTEM	TRENCH DRAIN AT DOORS	FLOOR DRAIN	STEAM CLEANING FOR PARTS/ENGINES	WELDING AND/OR MACHINIST AREA	POL/ANTIFREEZE DISPENSING WHOSE SYSTEM	POL/ANTIFREEZE WASTE DISPOSAL SYSTEM	ENVIRONMENTAL	OUT OF SPEC WASTE FUEL STORAGE	WASTE OIL STORAGE							
FUNCTIONAL AREAS																														
ADMIN & SHOP CONTROL		•		•										•																
UNASSIGNED		•		•										•																
TOOL ROOM		•		•										•																
TOOL BOX STORAGE		•		•										•																
COMBAT SPARES		•		•										•																
LATRINES, SHOWERS, LOCKERS		•	•	•		•	•	8	•	•	•			•		•														
TRAINING ROOM		•		•										•																
BREAK, TRAINING & CONF		•		•		•								•																
CONSOLIDATED BENCH REPAIR		•		•								•	•	•		7														
WEAPONS STORAGE VAULT		•		•										•																
COMSEC VAULT		•		•										•																
NONSENSITIVE SECURE STORAGE		•	•											•																
COMMUNICATION VEHICLE DOCK																														
CORRIDOR		•		•										•																
MECHANICAL ROOM		4	•							•				•		•														
ELECTRICAL ROOM		4	•											•																
COMMUNICATIONS ROOM				•										•																
SIPRNet ROOM				•										•																
FLUID DISTRIBUTION		•	•							•				•																
REPAIR AREAS		•	•		•					•	8			•	•	•	•	7		5	1	•	•	3	3					
MAINTENANCE AREAS		•	•		6					•				•	•	•	•	7				•	•	3	3					
HARDSTAND																														
ORG STORAGE		4	•											•																
UAV STORAGE BUILDING		4	•											•																
HAZ WASTE & POL STORAGE BUILDINGS				•																										
DISTRIBUTION COMPANY STORAGE FAC		4	•											•																

Notes for Mechanical TEMF Features Matrix

1. Welding exhaust system in one pair of repair areas. This area will also accommodate machinist function.
2. Not Used
3. Provide secondary containment in tanks outside of building.
4. Heat for freeze protection only.

5. Provide water and power connections for hook-up of user procured (GFGI) portable steam cleaner for cleaning of engines and engine components in a pair of repair areas.
6. Provide non-sparking explosion proof exhaust from pit.
7. Convey waste water through an oil/water separator prior to discharge to sanitary sewer.
8. Provide wash fountain in 8 FT circulation bay adjacent to the core area, or outside the latrines in the core area as shown on the drawings.

(g) Electrical TEMF Features Matrix

ELECTRICAL/ TELECOMMUNICATIONS TEMF FEATURES MATRIX	POWER	28V DC	120V SINGLE PH	208V SINGLE PH	208-230V 3 PH	208V-400 HZ	208V, 3PH, 50 HZ	FILTERED POWER	GROUND BUSBAR ON WALL	GROUNDING POINTS IN FLR OR HARDSTAND	COMMUNICATIONS	TELEPHONE	DATA CONNECTION	INTERCOM/PAGING/MASS NOTIFICATION	INTRUSION DETECTION SYSTEM	PANABLE ZOOM CAMERA	CATV	LIGHTING	FLUORESCENT OR SOLID STATE (LED)	(HID) METAL HALIDE OR SOLID STATE (LED)	EXPLOSION PROOF FLUORESCENT	(HID) HIGH PRESSURE SODIUM	
	FUNCTIONAL AREAS																						
ADMIN & SHOP CONTROL			•									•	•	•			•		•				
UNASSIGNED			•									•	•	•			•		•				
TOOL ROOM			•		12							•	•	•					•				
TOOL BOX STORAGE			•									•	•	•					•				
COMBAT SPARES			11									•	•	•					•				
LATRINES, SHOWERS, LOCKERS			•											•					•				
TRAINING ROOM			•									•	•	•			•		•				
BREAK, TRAINING & CONF			•									•	•	•			•		•				
CONSOLIDATED BENCH REPAIR		•	•					•	•			•	•	•					•				
WEAPONS STORAGE VAULT			•									•	•	•	•				•				
COMSEC VAULT			•						•			•	•	•	•				•				
NONSENSITIVE SECURE STORAGE			•									•	•	•	•				•				
COMMUNICATION VEHICLE DOCK			•		5				•			•	•	•					•				
CORRIDOR			•									•	•	•					•				
MECHANICAL ROOM			•									•	•						•				
ELECTRICAL ROOM			•									•	•						•				
COMMUNICATIONS ROOM			•						•			•	•						•				
SIPRNet ROOM			•						•			•			•				•				
FLUID DISTRIBUTION			•									•	•	•					•				
REPAIR AREAS	1	•	•	10	•		4	•	•			•	•			7			•				
MAINTENANCE AREAS		•	•	•	•		4	•	•			•	•			7			•		8		
HARDSTAND					2,6	3				•			•										
ORGANIZATIONAL STORAGE			•									9							•				
UAV STORAGE BLDG		•	•						•			•	•						•				
HAZ WASTE & POL STORAGE BUILDINGS			•																•				
DISTRIBUTION COMPANY STORAGE BLDG			•									9							•				

Notes for Electrical TEMF Features Matrix

1. Provide power connections for hook-up of user procured (GFGI) portable steam cleaner for cleaning of engines and engine components in a pair of repair areas. Coordinate power requirements with the User. It is prohibited to locate electrical disconnects, junction boxes, receptacles, transformers, panelboards, electrical devices and exposed conduit on the masonry partition in repair areas where the

partition is exposed to overhead bridge crane travel. All power connections in the Repair and Maintenance Area shall be GFCI protected

2. MILVANS (100A), TOE vans (50A), Hospital (100A, 208V, 3-PH, 5-Wire).
3. LCSS Vans (to be discontinued in future), Patriot Missile Units.
4. For Engineers shop.
5. Communications Vans (100A).
6. Hospital units require 120/208V, 3-PH, 5-Wire connection
7. Provide power and conduit and wiring system(s) for user provided panable zoom camera system; monitored in Admin and Shop Control.
8. Lighting classification for pit lighting shall be determined during the design.
9. Provide 1-4" conduit with a 6 pair copper cable to the Distribution Company

Storage and Organizational Storage Buildings from the main communications room in the TEMF. Conduit and cable routing may be to the nearest telecommunications maintenance hole before routing cable back to the TEMF main communications room. Provide Protected Entrance Terminal (PET) with one 110 type block mounted on a 4 ft by 8 ft backboard mounted vertically. Backboard treatment shall be in accordance with I3A. Provide one wall mounted telephone outlet inside the building. Ground PET in accordance with 250.50 and 800.100 of NFPA 70 National Electrical Code.

10. Provide 208V single phase power in all Repair Areas and with weather proof connection for tire changing machine where shown on the TEMF Standard Drawings.

11. ASLMS Containers

- a) The ASLMS Container is provided with the following:
 - 1) Each ASLMS container comes with a set of two – 150 foot cables with each end plug identical. MS part number for the plug used on cable is MS3456W16-10P.
 - 2) Electrical circuit is 20 ampere, 120 volt, single phase.
- b) Provide the following power provisions for each ASLMS container:
 - 1) Two dedicated 20 ampere, 120 volt, single phase circuits with a special receptacle for each circuit. MS part number for special receptacle to be provided is MS3451W16-10S.

12. SATS Containers

- a) The SATS Container is provided with the following:
 - 1) Integrated 10 KW generator (208V, 3 phase 60 Hz)
 - 2) A wall mounted 100 Amp, 208 volt, 3-phase, 60 Hz AC conforming to MIL-C-22992, Class L, Style P comprised of a MS90558 C 44 4 shell, with an MS14055 insert having insert arrangement 44-12, along with a MS90564 44 C weather-tight cover.
 - 3) Signal entry panel (SEP) with the following connections: RS 232 Male/Female small and large, RJ 11 (phone), RJ 45 (LAN), 10 Base 2 (BNC), and 10 Base T (Ethernet).
- b) Provide the following power and data provisions for each SATS container:
 - 1) A branch circuit sized to the full load capacity of the 10kw generator to a weatherproof wall mounted 100 amp disconnect switch located within the cable's reach.
 - 2) A pre-manufacturer cable, stock number 5995-01-435-8697. This cable is 50 foot long with a plug for the SATS receptacle at one end and terminal connections on the other end. Connect the cable's terminal ends to the disconnect switch. Provide a means to hang the cable.
 - 3) A weatherproof RJ 45 (phone) and RJ 45 (LAN) outlet with the conduit and cables (Category 6) to the Communication Room and connect per I3A requirements. Provide 50 feet of exterior cable with appropriate connectors on each end for each outlet. Provide a means to hang the cables.

3.3. References

- (1) 40 CFR 261, Identification and Listing of Hazardous Waste

- (2) 40 CFR 262, Standards Applicable to Generators of Hazardous Waste
- (3) 40 CFR 264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
- (4) American Society of Mechanical Engineers (AMSE)
ASME HST-1, Performance Standard for Electric Chain Hoists
ASME HST-4, Performance Standard for Overhead Electric Wire Rope Hoists
- (5) ANSI Z358.1, American National Standard for Emergency Eyewash and Shower Equipment
- (6) Not used.
- (7) AR 190-11, Physical Security of Arms, Ammunition, and Explosives (FOUO)
- (8) AR 190-51, Security of Unclassified Army Property (Sensitive and Nonsensitive)
- (9) AR 380-5, Department of the Army Information Security Program
- (10) Crane Manufacturers Association of America (CMAA)
CMAA 70, Top Running and Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes, No. 70
CMAA 74, Top Running and Under Running Single Girder Electric Overhead Cranes Utilizing Under Running Trolley Hoist, No. 74
- (11) Fed Spec AA-V-2737, Modular Vault Systems
- (12) UFC 4-020-01 DoD Security Engineering Facilities Planning Manual
- (13) UFC 3-550-1 Exterior Electrical Power Distribution
- (14) AR 380-40, Policy for Safeguarding and Controlling Communications Security (COMSEC) Material (FOUO).
- (15) USACE STD 872-90-03, FE6 Chain-Link Security Fence Details

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 – 13 th 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	National Electrical Safety Code
ANSI/AF&PA NDS	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(Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
ASTM E 779	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E1827-96	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	<p>International Building Code</p> <p>Note: All references in the International Building Code to the International Electrical Code shall be considered to be references to NFPA 70.</p> <p>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.</p> <p>All references in the International Building Code to the International Fire</p>

	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, Liquefied 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 70E	Standard for Electrical Safety in the Workplace
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	<p>ABA Accessibility Standard for DoD Facilities</p> <p>Derived from the ADA and ABA Accessibility Guidelines: Specifically includes: ABA Chapters 1 and 2 and Chapters 3 through 10.</p> <p>Use this reference in lieu of IBC Chapter 11.</p> <p>Excluded are:</p> <p>(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).</p> <p>(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).</p>
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 expectancy 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 finishes with 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 grout to 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. If garages under buildings are applicable, compartmentalize garages by providing airtight 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 water-use type, conforming to ASHRAE Standard 189.1 (0.5 gpf/1.9 lpf).

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), except as modified by LEED. See Appendix S. Public lavatory faucets shall deliver a maximum flow rate of 0.5 gallons per minute, when tested in accordance with ASME A 112.18/CSA B125 and use that flowrate as the Baseline figure for calculating the 30 percent reduction requirement from the Baseline.

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 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. See Also Appendix T, Functional Area Lighting Control Strategy.
- (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 setback. 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. In Air handlers that handle outdoor air and have fans that run continuously during the occupied mode, direct expansion cooling coils may be used only if the controls and compressor technology is provided that allows the compressor to operate down to 10% of full load without utilizing hot gas bypass to minimize the potential of delivering unconditioned outdoor air to the space.

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 (BAS), 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 all the heating, ventilating and air conditioning (HVAC) systems and for control of other building systems. 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 to perform the ASHRAE Commissioning activities. 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 Government will provide the Commissioning Authority for LEED Enhanced Commissioning. Cooperate and communicate with, fully coordinate with and provide the LEED CxA access to all necessary information and attendance in all necessary meetings and activities related to execution of enhanced commissioning. 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. All buildings with Minimum LEED Silver (or better) requirement will earn LEED Credit EA3 Enhanced Commissioning.

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 USACE LEED Commissioning Plan Template) 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 NC version 2.2 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 track 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 FORT BLISS, TX

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.

6.2.1. Irrigation Potable Water Use Reduction . The requirement for 100% reduction in potable water usage for irrigation in Paragraph 5.2.7.1 is waived. Instead, the requirement is to reduce irrigation potable water use 50 percent using LEED credit WE1.1 baseline, except where precluded by other project requirements.

6.3. SITE PLANNING AND DESIGN

6.3.1 General See Appendix J.

6.3.1.1. Site Preparation Plan, design, and construct all functional and technical site requirements listed in this project, including erosion control measures, underground conduit, piping, utility service lines and connections (electrical, communications, cable, water, sewer, stormwater, gas, mechanical), etc. within the project limits. The project limits are shown on the drawings. Base the site design upon conceptual site layouts provided in Appendix J.

6.3.1.2. Confine construction limits to the construction site boundaries for the specific facility location for the project.

6.3.1.3. Do not waste excess soil within the project limits without the written approval of the Government.

6.3.1.4. The Government may modify desired building placement within the site area to ensure adequate spacing between buildings and to ensure access is maintained. The Government will provide coordinates for two corners of the approved building location in order for the Contractor's surveyor to stake the site and building location.

6.3.2. Site Structures and Amenities See Appendix J.

Provide the following site structures and amenities.:

Dumpster Pad and Enclosure: Design and provide enclosure for dumpsters and recycling bins as required for facility size. Provide 6'-0" high rock wall enclosure. See Appendix J for requirements. Dumpster screening should be compatible with the building they serve and incorporates the concepts defined in the architectural theme in paragraph 6.5..

POV Parking and Access Drives. Design and construct POV parking areas and access drives as outlined in Paragraph 5 and paragraph 6.5 .

Provide fencing and enclosures in accordance with Appendix J.

See Appendices AA and GG for additional requirements for Site Structures and Amenities.

6.3.3. Site Functional Requirements:

6.3.3.1. Stormwater Management (SWM) Systems. See Appendix J.

(a) During construction of the facility the Contractor is responsible for SWPPP of the entire construction site limits. Coordinate the laydown spaces, haul roads and fabrication areas within the SWPPP.

(b) Storm Drainage – Design and install Storm Drainage. In areas where underground storm drainage piping exists, coordinate location and size for connection of roof drain leaders to the a storm water system with the Government prior to finalizing building design, but in any event, no later than 45 days prior to beginning building construction. Coordinate the storm water drainage system plan with the Government prior to finalizing building design. Construct the permanent storm water drainage system concurrently with the construction of the facility and will require coordination with the Installation.

(c) Most of the storm water runoff from the Main Cantonment Area drains via channels and lift stations to the Fort Bliss sump to the north of Fred Wilson Road and east of the Union Pacific Railroad. From the Fort Bliss Sump outlet, storm water drains to a series of basins including Pershing Dam Basin and connects to the river through the City of El Paso's municipal separate storm sewer system (MS4). Fort Bliss Sump and Pershing Dam Basin are the operational responsibility of the City and are located on Fort Bliss Property under long term leases. There are other smaller interconnections with the City of El Paso's MS4 at the post boundary, mainly via curb and gutter flows from access roads to the post.

(d) Storm water drainage from Biggs AAF flight line area is collected via a system of catch-basins and conduits which ultimately flow into a retention pond located east of taxiway G. Prior to the current construction of new Biggs AAF facilities, storm water conveyance within the remaining Biggs Army Airfield area was handled by swales and sheet flow. These flows would then collect in low areas and evaporate and infiltrate over time.

(e) Prior to current development of the East Biggs Area, drainage was via sheet flow through natural topography where storm water would infiltrate and evaporate. The existing Biggs AAF area and the East Biggs Area are being developed using on-site storm water retention basins as there are no natural drainages or adjacent urban drainage infrastructure sufficient to receive the increased post development runoff. Consistent with City of El Paso design requirements, the design criteria used by the Land Development Engineer for the new Biggs AAF and East Biggs infrastructure is the 10 year event for storm water conveyance and 25 year event for storm water retention.

(f) Fort Bliss maintains a TCEQ Multi-Sector General Storm Water Permit (TXR050000) for industrial activities at the post and a Phase II Small (MS4) General Permit (TXR040000) for operation of the installation urban MS4.

(g) Graded Slope and Fills: The angle for graded slopes and fills shall be no greater than the angle that can be retained by vegetative cover or other adequate erosion control devices or structures generally not to exceed 3:1 slope. In any event, plant slopes left exposed will, within 21 calendar days of completion of any phase of grading, or otherwise provide with temporary or permanent ground cover, devices, or structures sufficient to restrain erosion. Demonstrate the angle for graded slopes and fills to be stable. Stable is the condition where the soil remains in its original configuration, with or without mechanical constraints.

(h) Ground Cover: Whenever land-disturbing activity is undertaken on a tract, the entity conducting the land-disturbing activity shall install plant or otherwise provide a permanent ground cover per Fort Bliss seeding specification or Blue Grama, 11.25 Kg/ha of Pure Live Seed, unhulled, for erosion control.

(i) Final Inspection. When all construction on the project is complete, the Erosion and Sediment Control Inspector will evaluate the site and all permanent erosion control features, permanent ground cover and off-site impacts to other properties. If found to be in compliance, a close-out letter will be issued.

(j) Design Storm. Provide erosion and sedimentation control measures, structures, and devices to provide protection from the calculated maximum peak rate of runoff from the twenty-five (25) year storm.

(k) Grade. Provide newly constructed open channels and storm drainage ponds with side slopes no steeper than three horizontal to one vertical if a vegetative cover is used for stabilization unless soil conditions permit a steeper slope or where the slopes are stabilized by using mechanical devices, structural devices, or other acceptable ditch lines. In any event, the angle for side slopes shall be sufficient to restrain accelerated erosion. Typically the storm drainage ponds shall have a 3-strand barb wire fence, except if approved otherwise by the DPW.

(l) Acceptable Management Measures. Measures applied alone or in combination to satisfy the intent of this section are acceptable if there are no objectionable secondary consequences. The Installation recognizes that the management of storm water runoff to minimize or control downstream channel and bank erosion is a developing technology.

6.3.3.2. Erosion and Sediment Control

The Texas Pollutant Discharge Elimination System (TPDES) oversees the Stormwater Sediment and Erosion Control Management Plan for the post. Comply with requirement general permit number TXR150000. See Appendix J. Provide and maintain the SWPPP over the life of the project. Qualifying construction activities (greater than 1 acre) in the Texas portion of the installation are conducted under the TCEQ Construction General Permit (TXR150000) or, in New Mexico, under the EPA Region VI Construction General Permit (FRL-8690-8; EPA-HQ-OW-2008-0238). Construction site operators on Fort Bliss meeting the definition in the permits of primary or secondary operator must comply with the appropriate state construction general permit. Depending on the execution mechanism of the project, the construction site operator may be all, or a combination of the Directorate of Public Works, US Army Corps of Engineers, the Land Development Engineer, Land Development Infrastructure Contractor, Design Build contractor or other entities meeting the definition.

6.3.3.3. Vehicular Circulation.

NOT USED

6.4. SITE ENGINEERING

6.4.1. See Appendix J. The existing site survey for the project is included as Appendix JJ.. After award, conduct a site survey to establish survey control points and a coordinate system, based on UTM, 13N, WGS83. Identify horizontal and vertical data used. Bring any discrepancies which are found in the existing surveys to the attention of the Contracting Officer.

6.4.2. Existing Geotechnical conditions: See Appendix A for a preliminary geotechnical report.

6.4.2.1. Geotechnical borings, a boring location map, and the raw data on the subsurface conditions described in 5.2.2 are furnished as part of the RFP in Appendix A.

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 Registration. In areas under development or planned development, see Appendix D for fire flow data to be used for the basis of proposal preparation and for design in lieu of actual fire flow tests.

6.4.4. Pavement Engineering and Traffic Estimates:

NOT USED

6.4.5. Traffic Signage and Pavement Markings

NOT USED

6.4.6. Base Utility Information (See Appendix J.)

6.4.7. Cut and Fill

NOT USED

6.4.8. Borrow Material

NOT USED

6.4.9. Haul Routes and Staging Areas

6.4.9.1. A Map with available haul routes, construction water distribution point, construction entrance gate, common staging areas, landfill, and borrow areas (if applicable) is included in Appendix J. Disposal areas are off site and are the Contractor's responsibility.

6.4.10. Clearing and Grubbing:

Site grading will include clearing and grubbing for access drives, parking lots, and any site development

6.4.11. Landscaping:

6.4.11.1. See Appendix J.Landscaping. Design and install landscaping in accordance with Appendix AA. Install landscaping perimeters required for ATFP

6.4.12. Turf:

NOT USED

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 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 the Installation's 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 the installation's identified preferences. Implement these preferences considering the following:

- (a) Achievable within the Contract Cost Limitation
- (b) Meets Milestones within Maximum Performance Duration.
- (c) Achieves Full Scope identified 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:

Conform to the IBCT Area Development Guide (Appendix F). Site and Architectural conceptual drawings that meet this objective are shown in Appendix J.

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. 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

(b) Architectural Design Objectives

a. 1. Exterior Walls: If a stucco look is desired in the Theme, use more durable materials such as EIFS or stucco-like finish on prefabricated metal panels or concrete panels. If EIFS is used, use a heavy duty reinforcing mesh around all doors and window openings, and extend a minimum 8'0" above finished floor elevation on all exterior walls. The heavy duty reinforcing mesh used on the EIFS shall have a minimum combined weight of 20 ounces per square yard and this standard can be met by using multiple layers. Use high impact mesh on all other surfaces.

2. Roof:

a. Fully adhered, single ply Hypalon 45 mil / TPO 60 mil with a white color finish is required for flat roof systems. Minimum slope for flat roof system shall be 1/4 inch in 12 inches

b. Roof Mounted Equipment: Unless specifically required in Section 3 of the Scope of Work or the standard design provided herein, do not provide roof-mounted equipment. If roof-mounted equipment is provided, use modified bitumen roofing system.

c. Roof access from building exterior is prohibited.

d. Submit a Sample Warranty Certificate and Maintenance Guidelines for government review and concurrence prior to submission of final warranty. Provide a manufacturer's standard 20 year warranty. Warrant for 100 mph wind speed.

3. Trim and Flashing

Gutters, downspouts, and fascias shall be factory pre-finished metal and shall comply with SMACNA Architectural Sheet Metal Manual. Provide for bird habitat mitigation.

4. Bird Habitat Mitigation

Provide details necessary to eliminate the congregating and/or nesting of birds at, on, or in the facility.

5. Connect boot wash drains to underground drainage.

6. Exterior Doors and Frames

- a. Main Entrance Doors: Main Entrance Doors: Aluminum storefront doors and frames with Architectural Class 1 anodized finish, fully glazed, with medium or wide stile are preferred for entry into lobbies or corridors.
- b. Exterior Non-Main Entrance Doors: Exterior doors and frames opening to spaces other than corridors or lobbies shall be insulated hollow metal.
- c. Side Entrance / Exit Doors: Exterior doors and frames opening to corridors shall be insulated hollow metal and comply with ANSI A250.8/SDI 100. Fire-rated openings shall comply with NFPA 80, and the requirements of the labeling authority. Door and frame installation shall comply with applicable codes and UFC 4-010-01 requirements.

7. Exterior Doors Finish and Hardware

- a. Hardware General: All hardware in the facility shall be consistent and shall conform to ANSI/BMHA. Standards for Grade 1. Hardware finishes shall conform to ANSI/BHMA A156.18. Provide ANSI 626 (Satin Chromium plated on Brass or Bronze) or 630 (Stainless Steel). Disassembly of knob or lockset is not allowed in order to remove interchangeable core from lockset.
- b. Key locksets for mechanical rooms, electrical closets, and Telecommunications Rooms to the existing Post Engineer Key System without key removable cores.
- c. Auxiliary Hardware: ANSI/BHMA A156.16. Provide wall or floor stops for all exterior doors that do not have overhead holder/stops. Provide other hardware as necessary for a complete installation.

8. Exterior Windows:

Unless specifically required by the standard design, provide fixed windows. If the standard design requires operable windows, furnish windows with fiberglass or aluminum insect screens removable from the inside, secured with interior metal clips.

9. Exterior Louvers:

Design exterior louvers to exclude wind-driven rain, with bird screens and to withstand wind loads in accordance with the applicable codes. Wall louvers shall bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500-D and AMCA 511. Louver finish shall be factory applied color.

10. Roof Hatches:

Roof access hatches shall be a minimum of 16 square feet in opening area, with no dimension smaller than 4'-0". Equip roof hatches with Post Engineer Master Lock on operating hardware.

11. Exterior Signage

See Appendix H for Exterior Signage requirements

12. Additional Requirements

See Appendix AA for additional architectural design requirements.

6.5.3. Programmable Electronic Key Card Access Systems: Not required.

6.5.4. INTERIOR DESIGN

6.5.4.1. Interior building signage requirements: Furnish paper and software for creating text and symbols for computers for Owner production of paper inserts after project completion. Coordinate with user and installation facilities engineer (DPW). Provide Room Number and Room Function signage for all rooms, except apartment modules.

6.5.4.2. Interior Design Considerations:

(a) Interior Partitions and Walls.

(b) Interior Glass and Glazing: Coordinate the arrangement of fenestrations with the proposed furniture layout.

(c) Floors:

Provide durable and low maintenance materials

Carpet is not an allowable floor finish in corridors.

(d) Metal Support Systems

Non-load bearing metal studs and furring shall comply with ASTM C 645; stud gauge shall be as required by height and loading. Metal framing and furring system shall be capable of carrying a transverse load of 5psf without exceeding either allowable stress or a deflection of L/240, but shall not be less than 20 gauge. Provide galvanized finish.

(e) Gypsum Board

Comply with ASTM C 36. Minimum panel thickness shall be 5/8 inch. Provide moisture resistant panels (glass-mat panels are preferred) at locations subject to moisture. Glass-mat gypsum panels or water-resistant "greenboard" gypsum drywall shall be used as substrate for ceramic tile wall applications except at showers where cementitious backer board shall be used. Gypsum Board systems are to be constructed using Joint treatment per ASTM C 475, screws per ASTM C 646, and drywall installation per the requirements of ASTM C 840.

(f) Interior Doors and Frames

Provide hollow metal, flush solid core wood, or hollow core wood doors as specified below. All door frames shall be hollow metal.

1. Wood Doors: Provide flush solid core wood doors conforming to WDMA I.S.-1A. Stile edges shall be non-finger jointed hardwood compatible with face veneer. Provide Architectural Woodwork Institute (AWI) Grade A hardwood face veneer for transparent finished doors; provide AWI Sound Grade hardwood face veneer for painted doors. (Transparent finished doors are preferred.)

2. Wood Doors – Provide hollow core, Type II flush doors conforming to WDMA I.S 1-A. Provide Architectural Woodwork Institute (AWI) Grade A hardwood face veneer for transparent finished doors; provide AWI Sound Grade hardwood face veneer for painted doors. (Transparent finished doors are preferred.)

3. Hollow Metal Doors: Comply with ANSI A250.8/SDI 100. Doors shall be minimum Level 2, physical performance Level B, Model 2; factory primed.

4. Hollow Metal Frames: Comply with ANSI A250.8/SDI 100. Frames shall be minimum Level 2, 16 gauge, with continuously welded corners and seamless face joints; factory primed.

(g) Interior Door Finish Hardware:

1. Hardware General: All hardware in the facility shall be consistent and shall conform to ANSI/BMHA standards for Grade 1. All requirements for hardware keying shall be coordinated with the Contracting Officer. Hardware finish shall conform to ANSI/BHMA A156.18. Provide ANSI 626 (Satin Chromium plated on Brass or Bronze) or 630 (Stainless Steel.)

2. Key locksets for mechanical rooms, electrical closets, telecommunications rooms (TR), and crawl spaces to the existing Post Engineer Key System, consisting of a lever with a dead bolt cylinder above passage lockset, AR-1 keyway, without key removable cores.

3. Auxiliary Hardware: ANSI/BHMA A156.16. Provide other hardware as necessary for a complete installation.

4. Locksets: Provide cylinders and cores with seven-pin tumblers for locks. Cylinders shall be products of one manufacturer, and cores shall be products of one manufacturer. Mortise cylinders, and knobs of bored locksets shall have interchangeable cores that are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core. Cylinders shall be fully compatible with products of the Best Lock Corporation, Arrow Lock Corporation, or Falcon Lock. Submit a core code sheet with the cores. Provide cores master keyed in one system for this project. Disassembly of knob or lockset is not allowed in order to remove interchangeable core from lockset. For interior locksets, use bored type vs. mortise lockset, to the maximum extent possible. The bored type lock will have a metal plate to prevent jimmying of lockset.

(h) Specialties And Furnishings:

1. Window Treatments: Provide aluminum horizontal mini-blinds or roller tube window shades (MechoEuroveil or equal) at all exterior glazing, except where noted otherwise. Provide roller tube window shades at clerestory windows or other difficult to access windows.

(i) Thermal Insulation: Do not install insulation directly on top of suspended acoustical panel ceiling systems.

(j) Elevators: Provide a State of Texas (or State of New Mexico, as applicable) licensed elevator inspector to inspect the elevator, test all new elevators, as applicable to the project, and to certify in writing that the installation meets all requirements.

(k) Provide 4 eye-bolts in each Arms Room / Vault, one in each corner. Eye bolts are to be drop forged steel, hot dip galvanized with a 1" diameter shank and a 2" diameter eye. Place bolt centered 6" above finished floor. Place each bolt 24" to the left of each room corner. Bolt shall be anchored so as to provide a minimum of 3.5 kips pull out strength. Place bolt to allow 1" of exposed shank between eye and surface of wall.

6.6. STRUCTURAL DESIGN

6.6.1. Site Specific Loading Requirements:

6.6.1.1. The basic wind speed, in miles per hour, for the determination of the wind loads shall be 100 mph 3-second-gust wind speed.

6.6.1.2. Use ground snow load of 5psf.

6.6.1.3. Use frost penetration of zero inches.

6.6.1.4. Use the following seismic acceleration parameters for mapped Maximum Considered Earthquake spectral response at short periods and at 1-second period, respectively: Ss: 31 (%g) and S1: 10 (%g).

6.6.2. Equipment Pads: Elevate floor or on-grade mounted equipment on minimum 4 inch thick concrete pads to prevent accumulation of water and metal corrosion.

6.7. THERMAL PERFORMANCE

There are no additional requirements other than those previously stated/referenced.

6.8. PLUMBING

6.8.1. Piping Materials: Use Type K copper for water supply under slab. Use CPVC and Type L (or above) copper for water supply above slabs. Use plastic pipe (schedule 40 PVC) for drainage and

venting including under concrete slabs or inside buildings. Do not use exposed PVC for exposed vent piping above roof. Type M copper is not allowed.

6.8.2. Cross Connection Control: See the Fort Bliss Cross Connection Control Manual, located in Appendix E, for specific requirements for cross connection control and backflow prevention.

6.8.3. Provide gas plumbing for GF Clothes dryers (provided by others).

6.8.4. Do not use electric water heaters, except that small on-demand applications may be used.

6.8.5. Natural Gas Supply: Furnish standard gas pressures from building regulator of 8-15 ounces, 2 psi or 5 psi.

6.8.6. Gas Regulator Venting: Vent all gas regulators in building to the outside

6.8.7. Exterior Water Piping Freeze Protection: Design seasonally (not used in winter) utilized water supply piping for complete drain down including interior or below grade isolation valve. Insulate exposed water piping that is utilized year round and heat trace and protect with pipe jacketing to ensure that the piping will not freeze.

6.8.8. Fixture Faucet Mixing Valves: Provide single handle type mixing faucet valves with seals and seats combined into one replaceable cartridge; the cartridge shall be designed to be interchangeable between lavatories, bathtubs, kitchen and bar sinks, etc. or provide replaceable seals and seats that are removable either as a seat insert or as a part of a replaceable valve unit. Approved manufacturers are Delta, Kohler, Price Pfister, Crane.

6.8.9. Use automatic infrared metered-flow faucets at lavatory sinks in public areas.

6.8.10. Provide monitoring panel with Oil-Water Separators. Submit design for Government concurrence. Post a sign at entry locations to drain systems including oil-water separators (OWS), as specified in Appendix Y.

6.8.11. Not Used.

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.9.1. Exterior Lighting: Exterior site and area lighting, including lighting for parking areas, roadways, walkways, and ball courts shall be high pressure sodium, except compact fluorescent lighting shall be acceptable for walkway lighting. Photo control devices for exterior lighting shall conform to ANSI C136.10 and shall have an adjustable operation range of approximately 0.5 to 5.0 footcandles.

6.9.2. Utility Metering: Provide Watt Node Plus LON Electric Power meter or equal. Provide pulse meter for gas and water. Provide a legibly and indelibly printed multiplier on the face of the meter. Wiring for UMCS system shall be compatible with Fort Bliss system. Install communications wiring in a 1" conduit from the Mechanical Room to the Pulse Kit on the Gas Meter for use by the UMCS system. Install communications wiring in a 1" conduit from the Mechanical Room to the Electric Meter for use by the UMCS system. Install communications wiring in a 1" conduit from the Mechanical Room to the Pulse Kit on the Water Meter for use by the UMCS system

6.9.3. Exterior Communications: Install communications infrastructure as required by the drawings in Appendix J. Cable TV is to be included in the Site Communication duct bank. Coordinate with Fort Bliss DOIM / NEC Plans Office.

6.9.4. Corrosion Control: Obtain the services of a "corrosion expert" to design, supervise, inspect, and test the installation and performance of the cathodic protection system. "Corrosion expert" refers to a

person, who by thorough knowledge of the physical sciences and the principles of engineering and mathematics, acquired by professional education and related practical experience, is qualified to engage in the practice of corrosion control of buried or submerged metallic surfaces. Such a person 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 (CP) Specialist or be a registered professional engineer who has certification or licensing that includes education and experience in corrosion control of buried or submerged metallic piping and tank systems, if such certification or licensing includes 5 years experience in corrosion control on underground metallic surfaces of the type under this contract. The corrosion expert shall obtain soil resistivity data, acknowledging the type of pipeline coatings to be used and reporting to the Contractor the type of cathodic protection required. Use sacrificial anode type cathodic protection.

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.10.1. Facility Telecommunications systems:

6.10.1.1. Telephone and Local Area Network (LAN):

- (a) All equipment racks shall have both vertical and horizontal cable management.
- (b) Line all walls in the telecommunications rooms with 4' X 8' X 3/4" plywood, painted flat white. All plywood shall be fire-rated and the fire-retardant stamp are shall remain unpainted and open to view. Provide a ladder type cable tray around the perimeter of the telecommunications room and from the perimeter ladder tray to the 19" communications rack. Mount the ladder cable tray 7-1/2 feet above finished floor. Install all horizontal cabling into the TR in this cable tray routing them around the room and into the 19" rack.
- (c) Terminate the incoming fiber optic cable on a 19" twelve port single mode fiber optic patch panel with SC type connectors.
- (d) No construction deviations in the communications system from the accepted design will be permitted without prior Government review and concurrence.
- (e) Submit a detailed test plan for all the cable plant installation for government review and concurrence. Include information on the test equipment and its calibration documentation.
- (f) Feed all electrical circuits within a TR from an electrical panel installed within that room.
- (g) Provide a 1" conduit from the electrical panel in the TR to outside of the building for future commercial cable television power. Provide a 2" conduit (adjacent to the 1" conduit) from the TR to outside of the building for future commercial cable television service entrance.
- (h) Terminate Single-Mode and Multi-Mode Fiber Optic cables on separate patch panels.
- (i) Terminate voice and data cables on separate patch panels located in the same equipment rack. Install voice patch panels in the copper equipment rack or cabinet.
- (j) All raised flooring shall have a cable tray management system in compliance with UFC 3-580-01 under the floor for communications cabling. Submit a cable management plan showing cable routing and cable management system installation for review and concurrence prior to commencement of work.
- (k) Install the horizontal cabling conduit from the outlet box, extending to the cable tray. The use of J-hooks is not permitted without prior written approval.
- (l) Terminate exterior communications drops for testing purposes and cover with a blank weatherproof faceplate.
- (m) Use green insulation on all bonding jumpers, regardless of size.
- (n) Floor mount communications and power drops to be used by modular furniture including those for modular furniture near a wall. Submit a communications and power plan showing locations of

communications and power drops superimposed over modular furniture plan with the interim and final design packages.

(o) Manholes shall be splayed type communications MH's with preinstalled terminators and internal grounding.

(p) Provide lockable, waterproof CMH covers. Submit for approval prior to use in accordance with Fort Bliss Force Protection Standards.

(q) Use the following color scheme for Telecommunications wiring and voice/data jacks:

NIPRNET – Green

SIPRNET – Red

TACNET – Yellow

Voice - Gray

6.10.2. Cable TV (CATV): Provide and install a pre-wired CATV system throughout the designated spaces. CATV system shall include but not limit to cables, conduits, pull boxes, and CATV jacks. Route all CATV signals conduits and cables back to the telecommunication room.

6.10.3. Closed Circuit TV (CCTV): Provide and install a conduit system to support CCTV throughout the designated spaces. Conduit system shall include but not limit to conduits, pull boxes, and pull wires. Route all conduits for CCTV signals back to the designated monitoring room. As part of the Interim Design Review, present the proposed Floor Plan to representatives of Fort Bliss and 1AD Security personnel to identify specific locations of security cameras, location of monitoring room, conduit routing, and system details.

6.10.4. Intrusion Detection (IDS): Provide and install conduit for IDS in the designated areas. The devices (motion sensors, contact switches, duress buttons, keypads and security panels) are provided by others. Provide conduit and a junction box for each device. Route all device conduits to a j-box in a designated wall space (for a security panel) near the entrance of the room. Provide and install a 1" conduit with a Category 6 cable routed from the j-box to the nearest communications room. Terminate and certify the cable inside the j-box on an RJ-45 Female Jack and inside the communications room on a patch panel. Provide a dedicated 120V single-phase circuit for IDS.

6.10.5. General: Ground and bond all inside plant cable pathways (e.g. cable trays, cable ladders, and conduits) to the Main Telecommunication Room (TR) ground bar (TMGB). Bond Individual sections of all metallic cable tray and ladder systems to each other and to the raceway (e.g. EMT) in which they support.

6.10.6. Landscape/Irrigation Controls – Provide power and outlet to accommodate the irrigation controller for each building. Make space available for the irrigation controller in the mechanical room or where designated by the Government.

6.10.7. Provide a weathertight through-roof conduit from Comm Room to roof for installation of communication cable and Government installed roof-mounted antenna.

6.10.8. Outside electrical panels: all electrical panels located in exterior areas shall be dustproof.

6.10.9. Control exterior security lighting by a switch and photocell.

6.10.10. Arms Rooms / Vaults: Provide a tamper-proof light fixture on separate switch outside the entrance to each Arms Room / Vault. Position the switch so that unauthorized personnel may not have access.

6.10.11. Where SIPRNET is required, the USAISEC-FDED SIPRNET Team will determine and engineer the SIPRNET.

6.11. HEATING, VENTILATING, AND AIR CONDITIONING

6.11.1. General: The existing UMCS is LonWorks Open.

6.11.2. System Selection: Current local utility rates for gas, electric, water and sewer are contained in Appendix K. These are rates paid by Fort Bliss to the local utility providers and are for use in LEED energy cost calculations. Provide CO2 sensors in return air stream to minimize the amount of outside air required to satisfy ASHRAE 62.1 requirements for building Indoor Air Quality. Provide one CO2 sensor per HVAC zone. Installation infrastructure has insufficient capacity to support use of electric HVAC systems. Provide gas-fired and/or renewable energy sources for heating.

6.11.3. Communication Rooms: Air condition communications equipment rooms to space comfort conditions as per applicable criteria by separate year round direct expansion cooling systems.

6.11.4. Mechanical Room Ventilation: Automatically ventilate mechanical, fire protection, electrical, and storage spaces to limit space temperatures to 10 degrees F above design outdoor air temperature.

6.11.5. Equipment Coordination: For Variable Air Volume (VAV) systems, limit size of any individual VAV box to approximately 2500 cfm to promote better zoning and fit of equipment to space available. Coordinate all mechanical systems and equipment with space available to prevent conflict with other building systems.

6.11.6. UMCS Base-wide System and Building Control Interface: A base-wide UMCS/EMCS system has been installed as part of a separate contract. Provide a 3/4" conduit with CAT VI cable from the EMCS router to the nearest comm room for connection to the building LAN. Integration to the base-wide system shall be done under separate contract and is not part of this scope of work. The building shall be capable of running stand alone until such time it is integrated into the base-wide system. Energy saving controls are desired such as schedule start/stop, optimized start/stop, occupancy sensors, etc. Locate AC control panels and routers in the Mechanical Room.

6.11.7. Existing IP Network: Existing IP network consist of Gig-backbone: 10/100MB to the user, 1GB between the end user building and ADN, and a 10GB core backbone.

6.11.8. Network Media: Existing network media consist of single-mode fiber optic.

6.11.9. Head-end hardware/Software location: Location of head-end UMCS hardware/software will be in Bldg. 777.

6.11.10. Water Quality Analysis and Treatment: Water quality for Fort Bliss and surrounding area is 'hard'. Treatment will be required for use as make-up water in HVAC equipment. Water Quality Analysis reports are inserted as Appendix DD. Additional water analysis data from water treatment contractor (POC: Gary Hamilton, Delta Water Laboratories, 915-892-8227) are as follows:

Chlorides: 70 ppm

P Alkalinity: 0 ppm

M Alkalinity: 100 ppm (Total alkalinity)

Total Hardness: 130 ppm (CaCO3)

ph: 7.89

Silica: 4 to 7 ppm (Can go as high as 11 ppm)

Iron: 0.01- 0.5 Reactive

Total Dissolved Solids: 475 to 680 ppm

Coordinate with water treatment contractor to confirm above data and current water treatment methods to obtain the required quantity and types of chemicals to be initially introduced into the closed loop heating and chilled water systems. Material Safety Data Sheets for current Ft. Bliss DPW chemical treatment method for hydronic water systems (Boiler heating hot water and chilled water) are contained in Appendix EE (Corrshield NT402).

6.11.11. Coordinate locations of emergency shut-off switches, central control area, and switch features with Fort Bliss DPW during design.

6.11.12. Evaporative cooling - Where evaporative cooling is provided, the preference for user occupied areas is that control be provided by temperature sensors instead of thermostats. The intent is to provide control of the space while not allowing occupant adjustment or intervention by adjustment of the space temperature set point. Provide ability for adjustment and maintenance of sensors by authorized personnel. Water softening is required where evaporative cooling is provided. Provide drain lines to drain to a specific location and not drain directly onto the roof.

6.11.13. HVAC Controls: Admin/Classrooms/Labs/Dining Facilities are to have a three-hour override switch on the thermostat.

6.11.14. HVAC Controls in Apartment Areas: The preference is that thermostatic control in each living unit be adjustable in allowing 2 deg F adjustment either side of design setpoints for heating and cooling. The UMCS system shall control the +/- 2 Deg F range limits and shall not be adjustable by the area occupant.

6.11.15. HVAC system preferences and requirements are:

(a) For air-conditioned core and related areas (central core work rooms, offices, conference rooms, laboratories, electronics repair shops, etc.): the preference is for heating, ventilating and air-conditioning systems that provide appropriate zoning and number of zones to allow comfort in spaces with varying occupancy (by time of day, etc.), exterior exposures, and internal loads due to equipment, door usage, etc. The expectation is for more rather than less zones to create an optimum balance of initial cost versus occupant comfort for peak human efficiency based upon temperature setpoints and thermal comfort requirements of this RFP. System complexity: provide integrated HVAC air handling system or systems that are only complex enough to meet all energy, quality and system longevity requirements and other goals of this RFP; this may entail economizers, will require proper air filtration provisions, etc.; additionally systems shall be fully accessible for maintenance and shall be easily and completely replaceable via removal through mechanical room doors, etc. HVAC system cooling shall occur within the HVAC air handling system(s) and be provided by electric refrigerated means, such as electric direct expansion, chilled water or other refrigerated cooling system..

(b) Mechanical and Fire Protection Room Heating and Ventilation; It is preferred that main mechanical and/or fire protection equipment spaces be heated with gas or hydronic unit heaters.

(c) Arms Vaults: Provide a ceiling fan and unit heater only. Arms Vault is not to be served by the building central HVAC system.

6.11.16. Piping Materials: Do not use Type M copper.

6.11.17. Equipment Placement: Place air handling equipment within the building spaces (i.e. equipment rooms, etc.) which are sound isolated, within exterior on-grade equipment yards which are enclosed with screen walls. Or, if placed on roof, provide equipment with screening to prevent viewing of

the equipment from a point 6 feet above any ground level at a distance of up to 300 feet from the building exterior wall in any direction. Organize vents, stacks, grilles, and placement of mechanical or electrical service fixtures into locations which do not provide visually negative design impacts. Avoid catwalks, especially when up and down travel is required to service multiple equipment pieces (coordinate with Architectural designer). Enclose mechanical and electrical equipment (transformers, chillers, boilers, etc.) installed at grade with screen walls. Screen wall finishes and appearance are subject to Government review and approval.

6.12. ENERGY CONSERVATION

6.12.1. 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:

See Appendix LL.

6.13. FIRE PROTECTION

6.13.1. The Fire Alarm Control Panel shall be fully compatible with the existing Monaco system presently in use at Fort Bliss. See Section 6.13.8 below for additional requirements.

6.13.2. HVAC Equipment Restart: After a fire alarm shut-down is cleared at fire alarm panel, affected mechanical equipment shall automatically restart.

6.13.3. Sprinkler Freeze Protection: Provide temperature sensor and alarm to notify fire department of possible freezing conditions for wet pipe sprinkler systems in spaces where heat may not be available due to being unoccupied or heating system may have failed.

6.13.4. Riser Location: Install fire risers in dedicated space or mechanical room with external access for fire department.

6.13.5. Provide and install a Fire Department Connection near the street curb, PIV, and fire hydrant. Coordinate exact location of Fire Department Connection with LDE and Fort Bliss Fire Department.

6.13.6. Fire Sprinkler Backflow Prevention: Backflow prevention shall be in accordance with the Fort Bliss Cross-Connection Control Manual. This requirement may be more stringent than the requirement in UFC 3-600-01.

6.13.7. Fire Alarm System:

6.13.7.1. The RF Transceiver shall be compatible with the Fire Department receiving system, operating on an RF frequency.

6.13.7.2. The RF transceiver shall be a Monaco BT-XM or approved equal operating on a frequency of 165.0625 MHZ.

6.13.7.3. The Fire alarm receiving system is a Monaco D-21 system.

6.13.7.4. The information sent to the Fire Department receiving system shall be zone by zone information.

6.13.7.5. All tamper devices shall be sent to the D-21 system as a supervisory tamper.

6.13.7.6. All initiating devices shall be connected, Style D, to signal line circuits (SLC), Style 6.

6.13.7.7. All alarm appliances shall be connected to notification appliance circuits (NAC), Style Z.

- 6.13.7.8. Provide photoelectric smoke detectors with 2.5% obscuration, pigtailed for permanent connections, continuous power indicator light, test button, and metal base.
- 6.13.7.9. RF transceiver shall be equipped with a directional antenna.
- 6.13.7.10. Fire alarm pull boxes shall be of metal construction, dual-action, and key operable.”
- 6.13.8. Provide keyed alike fire alarm panels, keys C415A, 17021, & PK625; C415 for MNS panels. PK625 on manual pull stations. Sample keys are available from Fort Bliss Fire Department upon request..
- 6.13.9. Not Used.
- 6.13.10. Do not use glass or lockable doors in fire extinguisher cabinets.
- 6.13.11. Mass Notification System. Mount a speaker system on the exterior of the building that will cover a 16' wide area around the perimeter of the buildings.
- 6.13.11.1. Connect the MNS to the Fort Bliss Fire Alarm System utilizing the Monaco BT-XM All equipment must be compatible with the existing Monaco D21 Central Receiving Unit utilized by the Fort Bliss Fire Department.
- 6.13.11.2. Program the following 8 pre-recorded messages into the system:
- (a) MESSAGE #1. Label message “Fire”. Five seconds of siren are played, followed by the message:
- “Attention, attention. A fire emergency has been reported. Please leave the building using the nearest exit or exit stairway. "Do not use the elevators if installed within this facility".
- (b) MESSAGE #2. Label message “Severe Weather.” Five seconds of 100-kHz steady tone are played, followed by the message:
- “This is the Fort Bliss Installation Operations Center. The National Weather Service has issued a severe weather alert for this area. Turn on your radios or televisions for the latest update and take required action. Again, this is the Fort Bliss Installation Operations Center. The National Weather Service has issued a severe weather alert for this area. Turn on your radios or televisions for the latest update and take required action.
- (c) MESSAGE #3. Label message “Bomb” A horn sound is played for 5 seconds, followed by the message:
- “Attention, attention. This building has received a bomb threat. All personnel are to evacuate immediately using the nearest exit and to report to our designated re-assembly area for accountability and additional instruction. Again, this building has received a bomb threat. All personnel are to evacuate immediately using the nearest exit and to report to our designated re-assembly area for accountability and for additional instruction.
- (d) MESSAGE # 4. Label message “Shelter In Place” Three 1-kHz tones (one second each) are played, followed by the message:
- “Attention, attention. All personnel “shelter in place”. Turn off fans, heating, ventilation and air condition systems. Close all doors and windows and remain indoors until the “All Clear” announcement is given.”
- (e) MESSAGE #5. Label message “FPCON C” Three seconds of HI/LOW tones, followed by the message:
- “Attention, attention. Fort Bliss is now at FPCON Charlie. Implement FPCON Alpha, Bravo and Charlie security plans immediately. Again, Fort Bliss is now at FPCON Charlie. Implement FPCON Alpha,

Bravo and Charlie security plans immediately and stand by for additional information from the Fort Bliss Installation Operation Center.

(f) MESSAGE # 6. Label message "FPCON D" Three seconds of HI/LOW tones, followed by the message:

"Attention, attention. Fort Bliss is now at FPCON Delta. Implement all FPCON security plans, Alpha through Delta immediately. Again, Fort Bliss is now at FPCON Delta. Implement all FPCON security plans, Alpha through Delta immediately and stand by for additional information from the Fort Bliss Installation Operation Center.

(g) MESSAGE #7. Label message "All Clear". Five seconds of chime sound are played, followed by the message:

"The emergency has now ended. Please resume normal operations. Thank you for your cooperation."

(h) MESSAGE #8. Label message "Test" A 1-kHz tone is sounded for 2 seconds, followed by the message:

"May I have your attention, please? This is the Fort Bliss Installation Operations Center conducting a test of the mass notification system. Repeat, this is only a test."

6.14. SUSTAINABLE DESIGN

6.14.1. LEED Rating Tool Version. Execute the project 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: HAZMAT and POL Storage Buildings.

6.14.3. Credit Validation: The project is the site work and building(s) portion of a multiple contractor Combined Project. 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 . Administration/team management of the online project will be by the Contractor per Appendix LEED Requirements for Multiple Contractor Combined Projects. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with GBCI and the Contractor will furnish audit data as requested at no additional cost.

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.

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 79906.

See LEED Multiple Contractor Responsibilities Table(s) for additional information.

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. Multiple Contractor Combined Project. When site work and building(s) are accomplished by separate contractors, it is a Multiple Contractor Combined Project for purposes of LEED scoring and documentation. This project is part of a Multiple Contractor Combined Project that includes site work and building(s) accomplished by separate contractors. See Appendix LEED Requirements for Multiple Contractor Combined Projects and Appendix LEED Multiple Contractor Responsibilities Table(s) for special requirements for this project.

6.14.8. Additional Information

6.14.8.1 Coordinate with the Government to input Government-achieved Credits into the project's online template. Submit documentation of LEED Credits to the Government in PDF format on three (3) CD's with formatting and directory structure designed for easy access to documentation. Submit LEED Design Credit documentation to the Government no later than 60 days after issuance of Design Complete documents. Submit LEED Construction Credit documentation to the Government no later than 60 days after Construction Complete as awarded.

6.14.8.2 Appendix M contains a modified LEED v3.0 Registered Project Checklist. This checklist identifies:

- 1) those specific Credits/Prerequisites that the DB Contractor must provide, listed in the "Y DB" column,
- 2) those Credits/Prerequisites that the Government will provide, listed in the "Y GOV" column,
- 3) those specific credits that the DB Contractor may provide above and beyond those required (applies only to Energy and Atmosphere Credit 1, where 6 credits are required by other Army Regulations, but an additional 4 credits may be achievable at the DB Contractor's option) listed in the "? D/B" column,
- 4) those Credits that the Government may provide, but should not be considered by the DB Contractor, listed in the "? GOV" column, and
- 5) those Credits that the DB Contractor is prohibited from pursuing, listed in the "NO" column.

6.14.8.3 In addition to the 31 specific Credits that the DB Contractor is required to provide by the Checklist in Appendix M, achieve an additional 14 credits to be selected by the DB Contractor.

6.14.8.4 Provide documentation for design and construction LEED Credits, regardless of LEED Credit responsibility called out in the LEED Credit Worksheet in Appendix M.

6.14.8.5 Statement in para 5.8.5 that all buildings with minimum LEED Silver (or better) requirement must earn LEED Enhanced Commissioning credit does not apply to this project. Work as described in that paragraph is required but because required CA contractual relationship may not be acceptable to GBCI for LEED certification earning of this credit is not required. Do not include credit EA3 in the minimum overall project points. Upload all documentation for EA3 to LEED Online.

6.14.8.6 In addition to the requirements stated elsewhere in this RFP, consider including the energy enhancements listed in Appendix LL in the project. Include the rationale for not including any of these energy enhancements in the Design Analysis.

6.15. ENVIRONMENTAL

6.15.1. Do not use Asbestos containing materials in the new construction.

6.15.2. The impacts of the Fort Bliss Expansion have been adequately addressed in the Fort Bliss, Texas and New Mexico Mission and Master Plan Programmatic Environmental Impact Statement (MMPEIS). The environmental documents that apply to this task order are the City of El Paso Rule Regulation #9 (available at http://www.epwu.org/PDF/rules_regs.pdf), as well as the following documents included in Appendix E: Potable Regulatory Policy (Policy Letter #16, Cross connection control manual for Fort Bliss, Installation environmental Noise Management Plan, Installation hazardous waste management plan, and the Cost Schedule for Hazmat disposal. Comply with all Federal, State, and Local environmental requirements.

6.16. PERMITS

6.16.1. Obtain digging permit from Fort Bliss DPW, unless any government installed utilities have not been turned over to Fort Bliss. In this case, coordinate with USACE prior to any digging.

6.16.2. See Appendix FF for Fort Bliss Access Control Policy

No additional requirements.

6.17. DEMOLITION

6.17.1 See Appendix E.

6.18. ADDITIONAL FACILITIES

See Appendix PP for the Controlled Humidity Warehouse requirements. ***AM4 Also refer to Appendix NN for plans and specs for the fully-designed Vehicle Maintenance Facility (large TEMF).** * See Appendix MM (provided for information) for the infrastructure package (work by others under separate contract). The Contractor for the **EMF *AM4 & VMF TEMFs TEMF*** shall be required to coordinate work with the infrastructure contractor.

End of Section 01 10 00

**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 (Available through the Publications page of the US Army Corps of Engineers TECHINFO Website at <http://www.hnd.usace.army.mil/techinfo/>. See link for Engineer Regulation ER 1-1-11).

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 in the accepted

contract proposal, 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 Contractor shall include all project and site overhead expenses through the required contract duration period in the contract cost. The Contractor will not be entitled to a time extension or price adjustment for extended overhead related costs due to any delays which may affect early contract completion prior to the required contract completion date. 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: <http://rms.usace.army.mil> .

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. Status 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. The Contractor will not be entitled to a time extension or price adjustment for extended overhead related costs due to any delays which may affect early contract completion prior to the required contract completion date.

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 identify 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 four (4) copies of the submittal and return one (1) 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 five (5) 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**

1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.2. DESIGNER OF RECORD

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1. PRE-WORK ACTIVITIES & CONFERENCES

3.1.1. Design Quality Control Plan

3.1.2. Post Award Conference

3.1.3. Partnering & Project Progress Processes

3.1.4. Initial Design Conference

3.1.5. Pre-Construction Conference

3.2. STAGES OF DESIGN SUBMITTALS AND OVER THE SHOULDER PROGRESS REVIEWS

3.2.1. Site/Utilities

3.2.2. Interim Design Submittals

3.2.3. Over-the-Shoulder Progress Reviews

3.2.4. Final Design Submissions

3.2.5. Design Complete Submittals

3.2.6. Holiday Periods for Government Review or Actions

3.2.7. Late Submittals and Reviews

3.3. DESIGN CONFIGURATION MANAGEMENT

3.3.1. Procedures

3.3.2. Tracking Design Review Comments

3.3.3. Design and Code Checklists

3.4. INTERIM DESIGN REVIEWS AND CONFERENCES

3.4.1. General

3.4.2. Procedures

- 3.4.3. Conference Documentation
 - 3.5. INTERIM DESIGN REQUIREMENTS
 - 3.5.1. Drawings
 - 3.5.2. Design Analyses
 - 3.5.3. Geotechnical Investigations and Reports
 - 3.5.4. LEED Documentation
 - 3.5.5. Energy Conservation
 - 3.5.6. Specifications
 - 3.5.7. Building Rendering
 - 3.5.8. Interim Building Design Contents
 - 3.6. FINAL DESIGN REVIEWS AND CONFERENCES
 - 3.7. FINAL DESIGN REQUIREMENTS
 - 3.7.1. Drawings
 - 3.7.2. Design Analysis
 - 3.7.3. Specifications
 - 3.7.4. Submittal Register
 - 3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)
 - 3.7.6. Acceptance and Release for Construction
 - 3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS
 - 3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES
 - 3.9.1. Submittal Distribution and Quantities
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- ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS**
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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. Examples include specifications from MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2004 numbering system), etc. The UFGS are available through the "Whole Building Design Guide" website, using a websearch engine. 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). Note that the UFGS are NOT written for Design-Build and must be edited appropriately. For instance, they assume that the Government will approve most submittals, whereas in Design-Build, the Designer of Record has that action, unless this Solicitation requires Government approval for specific submittals. The Designer of Record should also note that some UFGS sections might either prescribe requirements exceeding the Government's own design standards in applicable references or contain requirements that should be selected where appropriately required by the applicable references. At any rate, where the UFGS are consistent with other major, well known master commercial guide specifications, then generally retain such requirements, as good practices.

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 AutoCAD 2000 or higher. Save all design CAD files as AutoCAD 2000 or higher files. All submitted BIM Models and associated Facility Data shall be fully compatible with Bentley BIM Workspace and the USACE Bentley BIM Workspace 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) Full Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) Half Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF & .dwg)	Furniture Submittal (Per Attachment B)	Structural Interior Design Submittal	BIM Data DVD (Per Attach F)
Commander, U.S.Army Engineer District Ft. Worth	0/0	7/0	8/0	8	1	1	2
Commander, U.S.Army Engineer District, Center of Standardization Savannah	0/0	1/0	1/0	3	0	0	1
Installation	0/0	9/0	10/0	28	2	2	1
U.S.Army Corps of Engineers Construction Area Office	0/0	4/0	4/0	9	1	2	2
Information Systems Engineering Command (ISEC)	0/0	0/0	0/0	1	*Partial Set (Work Station/System Furniture- IT Details)	N/A	1

Activity and Address	Drawing Size (Full Size) Full Full Sets/ *Partial Sets	Design Analyses & Specs Full Sets/ *Partial Sets	Drawing Size (Half Size) Half Full Sets/ *Partial Sets	Non-BIM Data CD-ROM or DVD as Necessary (PDF & .dwg)	Furniture Submittal (Per Attachment B)	Structural Interior Design Submittal	BIM Data DVD (Per Attachment F)
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 twenty six (26) 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 STRUCTURAL 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 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 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.

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.

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. Coordinate the overall furniture and area plans with the Life Safety Code Review to ensure adequate clearances are provided for egress. Provide a narrative of this coordination to accompany the Furniture and Area plans.

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 components. Show 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.

1.2.9. Portable Fire extinguishers:

Provide a list of all required portable fire extinguishers, with descriptions (location, size, type, etc.) and total number per type. See also attachment D, "SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW", paragraph 1.14.

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 for 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 specify 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 commercial 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.

training tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or casters 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 Accessibility 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 Section 712, 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	REQUIRED DOCUMENTATION	Date Submitted (to be filled in by Contractor)	Government Reviewer's Use
PAR		FEATURE	DUE AT		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 GBCI for purposes of compliance with project requirement to obtain LEED certification.				
		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 building, statement indicating distance from building entrance.		ARC

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PAR		FEATURE	DUE AT		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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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 interior fixtures 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 facade/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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PAR		FEATURE	DUE AT					
			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 conveyance 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					
EAPR1		Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	**Final Design	**Owner's Project Requirements document				ALL MEC, ELEC
			**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 listing, 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
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 listing, 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					
			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	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	Manufacturer published product data or certification confirming regional material percentages in spreadsheet		PE

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PAR		FEATURE	DUE AT					
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 manufacturer 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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PAR		FEATURE	DUE AT					
			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	Manufacturer published product data or certification confirming material VOCs in spreadsheet	X			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	Manufacturer published product data or certification confirming material VOCs in spreadsheet	X			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	Manufacturer published product data or certification confirming material compliance label in spreadsheet	X			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	Manufacturer published product data or certification confirming material urea formaldehyde in spreadsheet	X			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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PAR		FEATURE	DUE AT					
			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 with compliant daylight zone. Percentage calculation of areas with compliant 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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PAR		FEATURE	DUE AT	REQUIRED DOCUMENTATION	DATE	REV
IDc1.1		Innovation in Design	Final Design	Narrative describing 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 responsibilities 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 Full 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 Bentley BIM Workspace. 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. The USACE Bentley BIM Workspace Workspace must be used and can be downloaded from the CAD/BIM Technology Center website, currently <https://cadbim.usace.army.mil>.
 - 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 Tulsa 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 device
- 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, or by Section 00 73 10 if this is a task order). 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 Ft. Worth District Office (See Section 00 73 10). 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:
 - As directed by the Contracting Officer
 - As directed
 - As directed

- As directed
- For other deliveries:
 - As directed by the Contracting Officer
 - As directed
 - As directed
 - As directed

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 the US Army Corps of Engineers Techinfo Website at <http://www.hnd.usace.army.mil/techinfo/>. Click on Publications then go to Engineer Pamphlets and select EP 310-1-6a.

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 disposal 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 IPMC 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 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, one set of reproducible mylar drawings 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, one copy of affected Mylars 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 warranted 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 Contractor's 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 (MSDS) 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/efoms/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 may be obtained through the US Army Corps of Engineers TECHINFO Website at <http://www.hnd.usace.army.mil/techinfo/> under publications, in Unified Facilities Criteria UFC 1-300-08.

EXHIBIT 1

SAMPLE

Red Zone Meeting Checklist

Date: _____

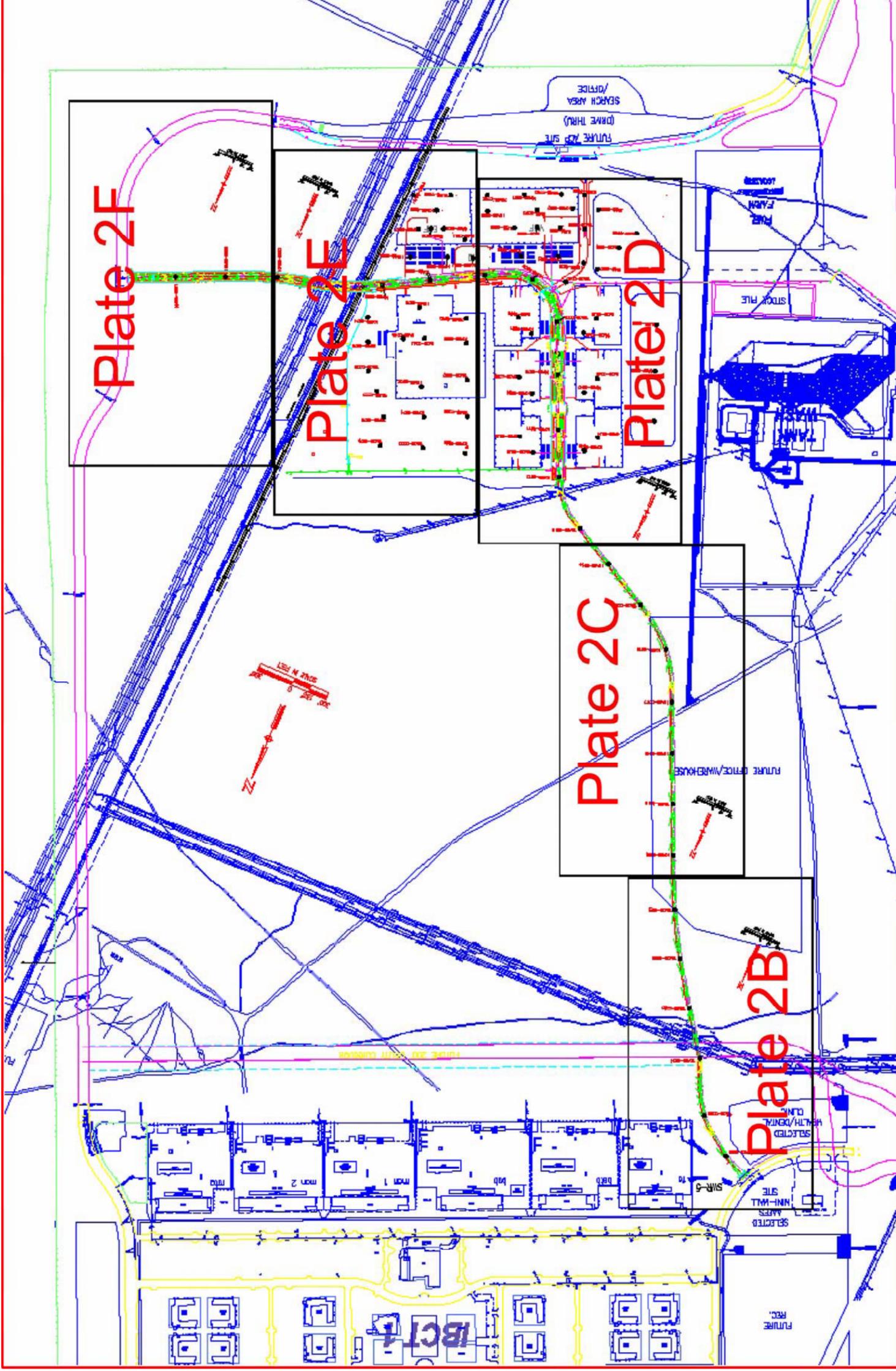
Contract No.		
Description / Location		
Contractor		
Contracting Officer		
Action	Completion Milestone	√
Inspections		
Fire		
Safety		
Pre-final		
Mechanical Test & Balance		
Commissioning		
Landscaping Complete		
Erosion Control		
Beneficial Occupancy Date (BOD)		
Furniture Installation		
Comm Installation		
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



GEOTECHNICAL BORINGS INCLUDED IN THE STUDY.

Utility for Industrial Complex Infrastructure
Fort Bliss, Texas

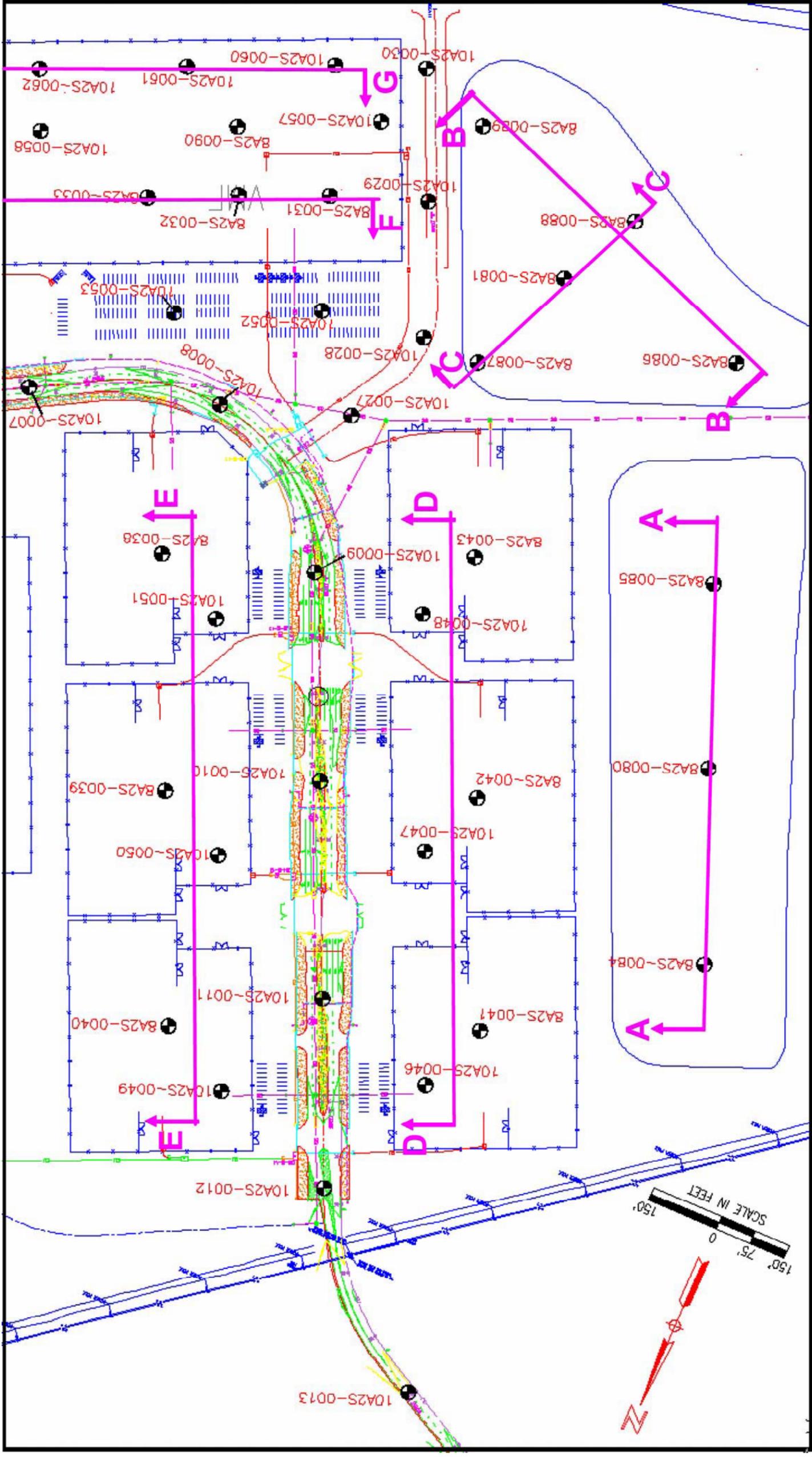
LOCATIONS OF BORINGS

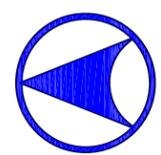
DRAWN: BFM	DATE: 03.03.2011	ARCHANA PROJECT NO: J10-023
CHKD: BKG	DATE: 03.03.2011	SCALE: AS SHOWN

PLATE 2A



Archana
USA, Inc.





Archana
USA, Inc.

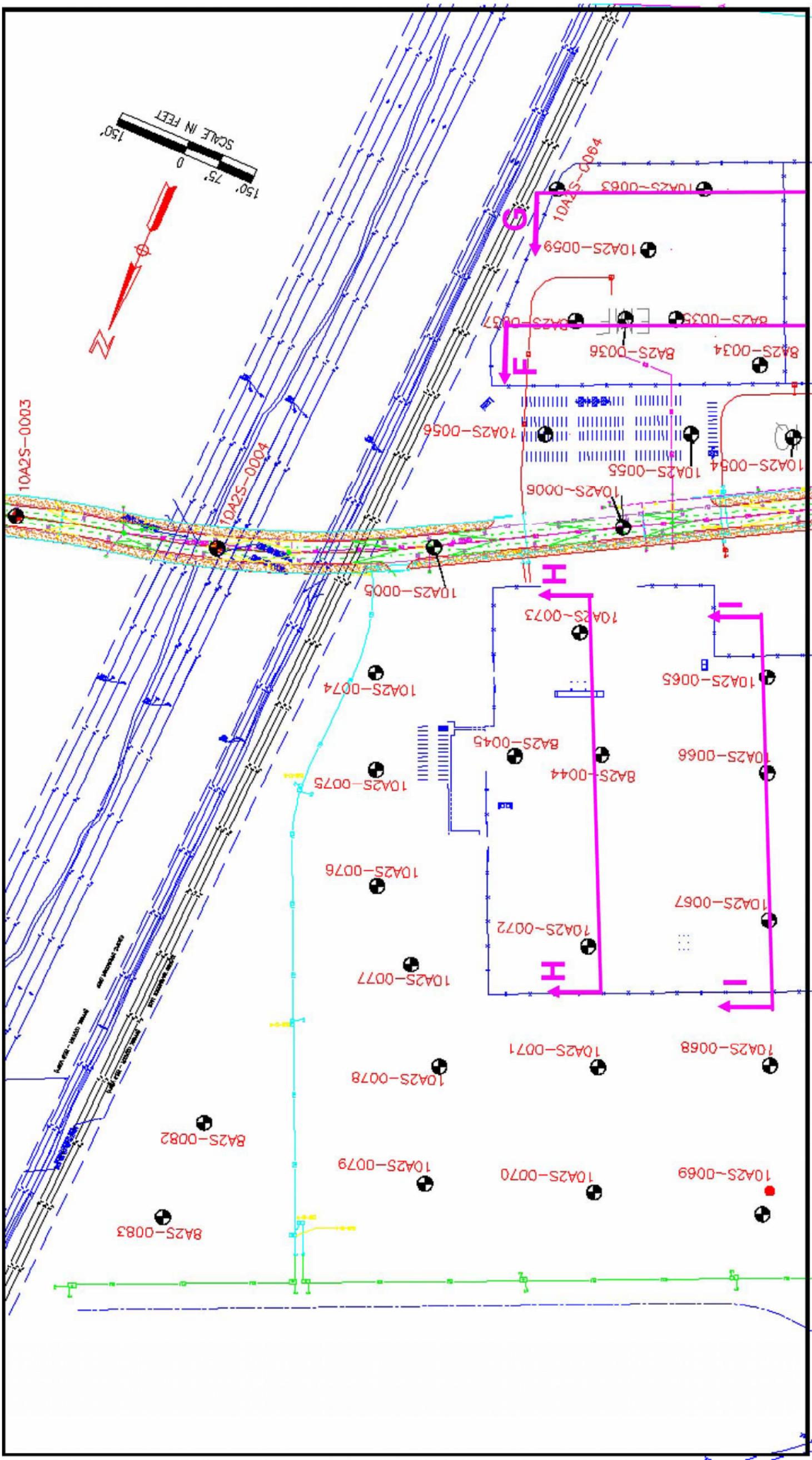
Utility for Industrial Complex Infrastructure
Fort Bliss, Texas

LOCATIONS OF BORINGS

DRAWN: BFM DATE: 03.03.2011 ARCHANA PROJECT NO: J10-023

CHKD: BKG DATE: 03.03.2011 SCALE: AS SHOWN **PLATE 2D**

● GEOTECHNICAL BORINGS INCLUDED IN THE STUDY.

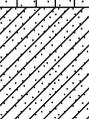
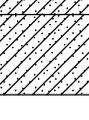


Utility for Industrial Complex Infrastructure Fort Bliss, Texas		ARCHANA PROJECT NO: J10-023
LOCATIONS OF BORINGS		
DRAWN: BFM	DATE: 03.03.2011	ARCHANA PROJECT NO: J10-023
CHKD: BKG	DATE: 03.03.2011	SCALE: AS SHOWN
		PLATE 2E



● GEOTECHNICAL BORINGS INCLUDED IN THE STUDY.

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		
2. LOCATION (Coordinates or Station) N 10,690,345.7 E 439,913.3		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
3. DRILLING AGENCY Raba-Kistner Consultants		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED : 5		
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0006		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		UNDISTURBED : 0		
5. NAME OF DRILLER Derek Duenez		14. TOTAL NUMBER CORE BOXES		0		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER		0.0		
7. THICKNESS OF OVERBURDEN 0.0		16. DATE HOLE STARTED		1/17/2011		
8. DEPTH DRILLED INTO ROCK N/A		16. DATE HOLE COMPLETED		1/17/2011		
9. TOTAL DEPTH OF HOLE 11.5		17. ELEVATION TOP OF HOLE		+3985.3		
		18. TOTAL CORE RECOVERY FOR BORING		N/A %		
		19. GEOLOGIST		Alfredo Martinez, E.I.T		
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3985.3	0.0		(SM) SILTY SAND, brown, medium dense, dry, with some small size gravel	33	1 0.0 2.5	SPT= 5-8-9 No Laboratory Testing
+3982.8	2.5		(SM) SILTY SAND, brown, dense dry, with some small size gravel	33	2 2.5 5.0	SPT= 8-12-10 Water Content (%) = 6.6 % -#200 Sieve = 23.9 PI = NP
+3980.3	5.0		(SM) SILTY SAND, brown, medium dense, dry, with some small size gravel	27	3 5.0 7.5	SPT= 8-10-13 No Laboratory Testing
+3977.8	7.5		(SM) SILTY SAND, brown, dense dry, with some small size gravel	27	4 7.5 10.0	SPT= 16-18-13 Water Content (%) = 4.8 % -#200 Sieve = 24.0 PI = NP
+3975.3	10.0		(SM) SILTY SAND, brown, dense dry, with some small size gravel	27	4 7.5 10.0	SPT= 16-18-13 Water Content (%) = 4.8 % -#200 Sieve = 24.0 PI = NP
+3973.8	11.5		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, medium dense, dry	78	5 10.0 11.5	SPT= 5-9-7 No Laboratory Testing

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		SHEET 1 OF 1 SHEETS	
1. PROJECT Industrial Complex Infrastructure		2. LOCATION (Coordinates or Station) N 10,690,122.5 E 439,531.1		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY Raba-Kistner Consultants		4. HOLE NO. (As shown on drawing title and file number) 10A2S-0007		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 5 UNDISTURBED: 0	
5. NAME OF DRILLER Derek Duenez		6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		14. TOTAL NUMBER CORE BOXES 0		15. ELEVATION GROUND WATER 0.0	
7. THICKNESS OF OVERBURDEN 0.0		8. DEPTH DRILLED INTO ROCK N/A		16. DATE HOLE STARTED 1/17/2011		17. ELEVATION TOP OF HOLE +3989.0	
9. TOTAL DEPTH OF HOLE 11.5		18. TOTAL CORE RECOVERY FOR BORING N/A %		19. GEOLOGIST Alfredo Martinez, E.I.T			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
+3989.0	0.0		(SM) SILTY SAND, brown, loose, dry	53	1 0.0 2.5	SPT= 3-3-5 Water Content (%) = 1.8 % -#200 Sieve = 19.6 PI = NP	
+3986.5	2.5		(SM) SILTY SAND, brown, medium dense, dry, with some caliche	53	2 2.5 5.0	SPT= 18-17-10 No Laboratory Testing	
+3984.0	5.0		(SC) CLAYEY SAND, white, medium dense, dry, with silty sand	50	3 5.0 7.5	SPT= 7-12-14 Water Content (%) = 6.6 % -#200 Sieve = 29.8 PI = 17	
+3981.5	7.5		(SC) CLAYEY SAND, white, medium dense, dry, with silty sand	50	4 7.5 10.0	SPT= 10-18-20 No Laboratory Testing	
+3979.0	10.0		(SC) CLAYEY SAND, brown, very dense, dry	44	5 10.0 11.5	SPT= 18-50/5" Water Content (%) = 6.0 % -#200 Sieve = 19.7 PI = 31	
+3977.5	11.5						

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		
2. LOCATION (Coordinates or Station) N 10,690,029.7 E 439,673.6		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
3. DRILLING AGENCY Raba-Kistner Consultants		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0054		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
5. NAME OF DRILLER Derek Duenez		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
7. THICKNESS OF OVERBURDEN 0.0		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
8. DEPTH DRILLED INTO ROCK N/A		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
9. TOTAL DEPTH OF HOLE 11.5		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
		14. TOTAL NUMBER CORE BOXES 0		15. ELEVATION GROUND WATER 0.0		
		16. DATE HOLE STARTED 1/24/2011		16. DATE HOLE COMPLETED 1/24/2011		
		17. ELEVATION TOP OF HOLE +3989.4		18. TOTAL CORE RECOVERY FOR BORING N/A %		
		19. GEOLOGIST Alfredo Martinez, E.I.T				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3989.4	0.0		(SC) CLAYEY SAND, brown, dense, dry	40	1 0.0 2.5	SPT= 7-8-20 Water Content (%) = 4.3 % -#200 Sieve = 22.0 PI = 13
+3986.9	2.5		(SM) SILTY SAND, brown, medium dense, dry, with some caliche	40	2 2.5 5.0	SPT= 9-13-13 No Laboratory Testing
+3984.4	5.0		(SC) CLAYEY SAND, white, dense, dry, with some silty sand	40	3 5.0 7.5	SPT= 10-12-19 Water Content (%) = 7.3 % -#200 Sieve = 28.8 PI = 22
+3981.9	7.5		(SM) SILTY SAND, brown, dense, dry, with some caliche	40	4 7.5 10.0	SPT= 15-23-26 No Laboratory Testing
+3979.4	10.0		(SC) CLAYEY SAND, brown, very dense, dry	72	5 10.0 11.5	SPT= 15-18-32/5 1/2 Water Content (%) = 9.7 % -#200 Sieve = 46.6 PI = 30
+3977.9	11.5		(SC) CLAYEY SAND, brown, very dense, dry	72	5 10.0 11.5	SPT= 15-18-32/5 1/2 Water Content (%) = 9.7 % -#200 Sieve = 46.6 PI = 30

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		
2. LOCATION (Coordinates or Station) N 10,690,108.1 E 439,867.8		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
3. DRILLING AGENCY Raba-Kistner Consultants		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5		
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0055		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		UNDISTURBED 0		
5. NAME OF DRILLER Derek Duenez		14. TOTAL NUMBER CORE BOXES 0		15. ELEVATION GROUND WATER 0.0		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		16. DATE HOLE STARTED 1/29/2011		COMPLETED 1/29/2011		
7. THICKNESS OF OVERBURDEN 0.0		17. ELEVATION TOP OF HOLE +3989.4		18. TOTAL CORE RECOVERY FOR BORING N/A %		
8. DEPTH DRILLED INTO ROCK N/A		19. GEOLOGIST Alfredo Martinez, E.I.T				
9. TOTAL DEPTH OF HOLE 11.5						
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3989.4	0.0		(SM) SILTY SAND, brown, dense, dry	40	1 0.0 2.5	SPT= 6-9-19 No Laboratory Testing
+3986.9	2.5		(SM) SILTY SAND, brown, dense, dry, with some caliche	50	2 2.5 5.0	SPT= 20-14-18 No Laboratory Testing
+3984.4	5.0		(SM) SILTY SAND, brown, dense, dry, with some caliche	50	3 5.0 7.5	SPT= 15-20-30/5 1/2" No Laboratory Testing
+3981.9	7.5		(SC) CLAYEY SAND, brown, dense, dry	40	4 7.5 10.0	SPT= 8-11-17 No Laboratory Testing
+3979.4	10.0		(SC) CLAYEY SAND, brown, dense, slightly moist	67	5 10.0 11.5	SPT= 13-20-27 No Laboratory Testing
+3977.9	11.5					

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		
2. LOCATION (Coordinates or Station) N 10,690,226.3 E 440,124.2		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
3. DRILLING AGENCY Raba-Kistner Consultants		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0056		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
5. NAME OF DRILLER Derek Duenez		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
7. THICKNESS OF OVERBURDEN 0.0		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
8. DEPTH DRILLED INTO ROCK N/A		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
9. TOTAL DEPTH OF HOLE 11.5		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
		14. TOTAL NUMBER CORE BOXES 0		15. ELEVATION GROUND WATER 0.0		
		16. DATE HOLE STARTED 1/29/2011		16. DATE HOLE COMPLETED 1/29/2011		
		17. ELEVATION TOP OF HOLE +3991.6		18. TOTAL CORE RECOVERY FOR BORING N/A %		
		19. GEOLOGIST Alfredo Martinez, E.I.T				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3991.6	0.0		(SM) SILTY SAND, brown, medium dense, dry	40	1 0.0 2.5	SPT= 4-7-9 Water Content (%) = 4.0 % -#200 Sieve = 16.6 PI = NP
+3989.1	2.5		(SM) SILTY SAND, brown, dense, dry, with some caliche	40	2 2.5 5.0	SPT= 12-14-20 No Laboratory Testing
+3986.6	5.0		(CL) SANDY LEAN CLAY, brown, dense, dry, with some caliche	40	3 5.0 7.5	SPT= 10-18-25 Water Content (%) = 12.6 % -#200 Sieve = 66.1 PI = 31
+3984.1	7.5		(SM) SILTY SAND, brown, dense, dry	40	4 7.5 10.0	SPT= 12-22-21 No Laboratory Testing
+3981.6	10.0		(SM) SILTY SAND, brown, loose, dry	67	5 10.0 11.5	SPT= 3-4-4 Water Content (%) = 5.3 % -#200 Sieve = 30.1 PI = NP
+3980.1	11.5					

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		Page 23 of 27 SHEET 1 OF 1 SHEETS	
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
2. LOCATION (Coordinates or Station) N 10,689,634.6 E 439,719.2		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 5		DISTURBED 5		UNDISTURBED 0	
3. DRILLING AGENCY Raba-Kistner Consultants		14. TOTAL NUMBER CORE BOXES 0		15. ELEVATION GROUND WATER 0.0		16. DATE HOLE STARTED 1/29/2011	
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0058		17. ELEVATION TOP OF HOLE +3991.4		18. TOTAL CORE RECOVERY FOR BORING N/A %		19. GEOLOGIST Alfredo Martinez, E.I.T	
5. NAME OF DRILLER Derek Duenez		18. TOTAL CORE RECOVERY FOR BORING N/A %		19. GEOLOGIST Alfredo Martinez, E.I.T			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		7. THICKNESS OF OVERBURDEN 0.0		8. DEPTH DRILLED INTO ROCK N/A		9. TOTAL DEPTH OF HOLE 11.5	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
+3991.4	0.0		(SM) SILTY SAND, brown, medium dense, dry	53	1 0.0 2.5	SPT= 3-6-7 Water Content (%) = 3.9 % -#200 Sieve = 14.9 PI = NP	
+3988.9	2.5		(SM) SILTY SAND, light brown, medium dense, dry, with some caliche	57	2 2.5 5.0	SPT= 9-14-11 No Laboratory Testing	
+3986.4	5.0		(SC) CLAYEY SAND, light brown, dense, dry, with some caliche	60	3 5.0 7.5	SPT= 12-11-16 Water Content (%) = 7.0 % -#200 Sieve = 28.9 PI = 25	
+3983.9	7.5		(SM) SILTY SAND, light brown, dense, dry, with some caliche	60	4 7.5 10.0	SPT= 14-17-17 No Laboratory Testing	
+3981.4	10.0		(SC) CLAYEY SAND, light brown, medium dense, dry, with some caliche	94	5 10.0 11.5	SPT= 11-15-9 Water Content (%) = 9.0 % -#200 Sieve = 43.1 PI = 21	
+3979.9	11.5						

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		SHEET 1 OF 1 SHEETS				
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75				
2. LOCATION (Coordinates or Station) N 10,689,794.2 E 440,098.8		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5		UNDISTURBED 0				
3. DRILLING AGENCY Raba-Kistner Consultants		14. TOTAL NUMBER CORE BOXES		0		15. ELEVATION GROUND WATER 0.0				
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0059		16. DATE HOLE STARTED		1/29/2011		COMPLETED 1/29/2011				
5. NAME OF DRILLER Derek Duenez		17. ELEVATION TOP OF HOLE		+3993.5		18. TOTAL CORE RECOVERY FOR BORING N/A %				
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		19. GEOLOGIST Alfredo Martinez, E.I.T								
7. THICKNESS OF OVERBURDEN 0.0		18. TOTAL CORE RECOVERY FOR BORING N/A %								
8. DEPTH DRILLED INTO ROCK N/A										
9. TOTAL DEPTH OF HOLE 11.5										
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g				
+3993.5	0.0		(SM) SILTY SAND , brown, medium dense, dry	40	1 0.0 2.5	SPT= 5-9-15 Water Content (%) = 2.5 %-#200 Sieve = 16.3 PI = NP				
+3991.0	2.5						(SM) SILTY SAND , brown, medium dense, dry	40	2 2.5 5.0	SPT= 12-15-9 No Laboratory Testing
+3988.5	5.0		(SC) CLAYEY SAND , brown, dense, dry, with some caliche	40	3 5.0 7.5					SPT= 8-13-20 Water Content (%) = 6.7 %-#200 Sieve = 30.0 PI = 24
+3986.0	7.5					(SC) CLAYEY SAND , brown, very dense, dry, with some caliche	40	4 7.5 10.0	SPT= 23-32-18/2" No Laboratory Testing	
+3983.5	10.0								(SC) CLAYEY SAND , brown, very dense, dry, with some caliche	67
+3982.0	11.5									

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		SHEET 1 OF 1 SHEETS	
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
2. LOCATION (Coordinates or Station) N 10,689,514.6 E 439,766.3		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 5		DISTURBED 5		UNDISTURBED 0	
3. DRILLING AGENCY Raba-Kistner Consultants		14. TOTAL NUMBER CORE BOXES 0		15. ELEVATION GROUND WATER 0.0		16. DATE HOLE STARTED 1/29/2011	
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0062		17. ELEVATION TOP OF HOLE +3991.0		18. TOTAL CORE RECOVERY FOR BORING N/A %		19. GEOLOGIST Alfredo Martinez, E.I.T	
5. NAME OF DRILLER Derek Duenez		18. TOTAL CORE RECOVERY FOR BORING N/A %		19. GEOLOGIST Alfredo Martinez, E.I.T			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		7. THICKNESS OF OVERBURDEN 0.0		8. DEPTH DRILLED INTO ROCK N/A		9. TOTAL DEPTH OF HOLE 11.5	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
+3991.0	0.0		(SC) CLAYEY SAND, light brown, medium dense, dry, with some caliche	57	1 0.0 2.5	SPT= 5-8-14 Water Content (%) = 3.7 % -#200 Sieve = 19.2 PI = 14	
+3988.5	2.5		(SM) SILTY SAND, light brown, medium dense, dry, with some caliche	57	2 2.5 5.0	SPT= 6-6-8 No Laboratory Testing	
+3986.0	5.0		(SC) CLAYEY SAND, light brown, medium dense, dry, with some caliche	43	3 5.0 7.5	SPT= 10-15-16 Water Content (%) = 9.2 % -#200 Sieve = 28.9 PI = 27	
+3983.5	7.5		(CL) LEAN CLAY WITH SAND, brown, dense, moist	60	4 7.5 10.0	SPT= 13-24-22 No Laboratory Testing	
+3981.0	10.0		(CL) LEAN CLAY WITH SAND, brown, dense, moist	100	5 10.0 11.5	SPT= 11-11-14 Water Content (%) = 14.9 % -#200 Sieve = 70.6 PI = 37	
+3979.5	11.5						

DRILLING LOG	DIVISION USACE-Fort Worth	INSTALLATION PN69286, Fort Bliss	SHEET 1 OF 1 SHEETS
1. PROJECT Industrial Complex Infrastructure	10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	12. MANUFACTURER'S DESIGNATION OF DRILL CME 75
2. LOCATION (Coordinates or Station) N 10,689,634.5 E 440,041.4	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 5	DISTURBED 5	UNDISTURBED 0
3. DRILLING AGENCY Raba-Kistner Consultants	14. TOTAL NUMBER CORE BOXES 0	15. ELEVATION GROUND WATER 0.0	
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0063	16. DATE HOLE STARTED 1/18/2011	COMPLETED 1/18/2011	
5. NAME OF DRILLER Derek Duenez	17. ELEVATION TOP OF HOLE +3993.1		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.	18. TOTAL CORE RECOVERY FOR BORING N/A %		
7. THICKNESS OF OVERBURDEN 0.0	19. GEOLOGIST Alfredo Martinez, E.I.T		
8. DEPTH DRILLED INTO ROCK N/A			
9. TOTAL DEPTH OF HOLE 11.5			

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3993.1	0.0		(SM) SILTY SAND, brown, medium dense, slightly moist	50	1 0.0 2.5	SPT= 3-9-10 No Laboratory Testing
+3990.6	2.5		(SM) SILTY SAND, brown, medium dense, slightly moist, with some caliche	60	2 2.5 5.0	SPT= 7-9-10 No Laboratory Testing
+3988.1	5.0		(SM) SILTY SAND, brown, very dense, slightly moist, with some caliche	57	3 5.0 7.5	SPT= 6-35-15/2" No Laboratory Testing
+3985.6	7.5		(SM) SILTY SAND, brown, very dense, slightly moist, with some caliche	60	4 7.5 10.0	SPT= 32-50/6" No Laboratory Testing
+3983.1	10.0		(SM) SILTY SAND, brown, very dense, slightly moist, with some caliche	100	5 10.0 11.5	SPT= 32-50/6" No Laboratory Testing
+3981.6	11.5					

DRILLING LOG	DIVISION USACE-Fort Worth	INSTALLATION PN69286, Fort Bliss	SHEET 1 OF 1 SHEETS
1. PROJECT Industrial Complex Infrastructure	10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	12. MANUFACTURER'S DESIGNATION OF DRILL CME 75
2. LOCATION (Coordinates or Station) N 10,689,754.6 E 440,315.8	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 5	DISTURBED 5	UNDISTURBED 0
3. DRILLING AGENCY Raba-Kistner Consultants	14. TOTAL NUMBER CORE BOXES 0	15. ELEVATION GROUND WATER 0.0	
4. HOLE NO. (As shown on drawing title and file number) 10A2S-0064	16. DATE HOLE STARTED 1/29/2011	COMPLETED 1/29/2011	
5. NAME OF DRILLER Derek Duenez	17. ELEVATION TOP OF HOLE +3994.6		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.	18. TOTAL CORE RECOVERY FOR BORING N/A %		
7. THICKNESS OF OVERBURDEN 0.0	19. GEOLOGIST Alfredo Martinez, E.I.T		
8. DEPTH DRILLED INTO ROCK N/A			
9. TOTAL DEPTH OF HOLE 11.5			

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3994.6	0.0		(SC-SM) SILTY CLAYEY SAND, brown, medium dense, dry	47	1 0.0 2.5	SPT= 4-4-6 Water Content (%) = 4.3 %-#200 Sieve = 18.5 PI = 7
+3992.1	2.5		(SM) SILTY SAND, brown, dense, dry	53	2 2.5 5.0	SPT= 9-15-24 No Laboratory Testing
+3989.6	5.0		(SC) CLAYEY SAND, brown, medium dense, dry	57	3 5.0 7.5	SPT= 14-15-12 Water Content (%) = 6.4 %-#200 Sieve = 16.7 PI = 12
+3987.1	7.5		(SM) SILTY SAND, brown, very dense, dry	53	4 7.5 10.0	SPT= 6-18-32/1" No Laboratory Testing
+3984.6	10.0		(SM) SILTY SAND, brown, dense, dry	100	5 10.0 11.5	SPT= 29-18-12 Water Content (%) = 1.0 %-#200 Sieve = 21.1 PI = NP
+3983.1	11.5					

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		
2. LOCATION (Coordinates or Station) N 10,689,921.9 E 439,793.9		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
3. DRILLING AGENCY Raba-Kistner Consultants		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED : 9		
4. HOLE NO. (As shown on drawing title and file number) 8A2S-0034		14. TOTAL NUMBER CORE BOXES		UNDISTURBED : 0		
5. NAME OF DRILLER Derek Duenez		14. TOTAL NUMBER CORE BOXES		0		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER		0.0		
7. THICKNESS OF OVERBURDEN 0.0		16. DATE HOLE STARTED		1/27/2011		
8. DEPTH DRILLED INTO ROCK N/A		16. DATE HOLE COMPLETED		1/27/2011		
9. TOTAL DEPTH OF HOLE 21.5		17. ELEVATION TOP OF HOLE		+3990.2		
		18. TOTAL CORE RECOVERY FOR BORING		N/A %		
		19. GEOLOGIST		Alfredo Martinez, E.I.T		
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3990.2	0.0		(SM) SILTY SAND, brown, medium dense, dry	60	1 0.0 2.5	SPT= 5-7-8 No Laboratory Testing
+3987.7	2.5		(SC) CLAYEY SAND, brown, dense, dry, with some caliche	60	2 2.5 5.0	SPT= 17-25-20 Water Content (%) = 7.5 % #200 Sieve = 23.4 PI = 14
+3985.2	5.0		(SC) CLAYEY SAND, brown, dense, dry, with some caliche	60	3 5.0 7.5	SPT= 14-21-17 No Laboratory Testing
+3982.7	7.5		(SC) CLAYEY SAND, brown, dense, dry, with some caliche	60	4 7.5 10.0	SPT= 15-20-26 Water Content (%) = 10.2 % #200 Sieve = 38.5 PI = 43
+3980.2	10.0		(SC) CLAYEY SAND, brown, dense, dry, with some caliche	60	5 10.0 12.5	SPT= 12-17-24 No Laboratory Testing
+3977.7	12.5		(SC) CLAYEY SAND, brown, dense, dry, with some caliche	60	6 12.5 15.0	SPT= 9-22-27 Water Content (%) = 6.2 % #200 Sieve = 36.9 PI = 21
+3975.2	15.0		(SM) SILTY SAND, brown, very dense, dry	60	7 15.0 17.5	SPT= 12-36-14/4 1/2" No Laboratory Testing
+3972.7	17.5		(SM) SILTY SAND, brown to multi-color, dense, dry, with some small to medium size gravel	57	8 17.5 20.0	SPT= 10-19-27 Water Content (%) = 3.1 % #200 Sieve = 13.1 PI = NP
+3970.2	20.0		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, very dense, dry, with some small to medium size gravel	83	9 20.0 21.5	SPT= 14-25-25/5" No Laboratory Testing
+3968.7	21.5		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, very dense, dry, with some small to medium size gravel			

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		
2. LOCATION (Coordinates or Station) N 10,689,900.7 E 439,988.0		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
3. DRILLING AGENCY Raba-Kistner Consultants		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 9		
4. HOLE NO. (As shown on drawing title and file number) 8A2S-0035		14. TOTAL NUMBER CORE BOXES 0		UNDISTURBED 0		
5. NAME OF DRILLER Derek Duenez		15. ELEVATION GROUND WATER 0.0		16. DATE HOLE STARTED 1/27/2011		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		17. ELEVATION TOP OF HOLE +3991.1		16. DATE HOLE COMPLETED 1/27/2011		
7. THICKNESS OF OVERBURDEN 0.0		18. TOTAL CORE RECOVERY FOR BORING N/A %		19. GEOLOGIST Alfredo Martinez, E.I.T		
8. DEPTH DRILLED INTO ROCK N/A		9. TOTAL DEPTH OF HOLE 21.5				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3991.1	0.0		(SM) SILTY SAND, brown, medium dense, dry	50	1 0.0 2.5	SPT= 4-8-11 No Laboratory Testing
+3988.6	2.5		(SM) SILTY SAND, brown, dense, dry, with some caliche	53	2 2.5 5.0	SPT= 10-15-18 No Laboratory Testing
+3986.1	5.0		(SM) SILTY SAND, brown, dense, dry, with some caliche	47	3 5.0 7.5	SPT= 14-16-20 No Laboratory Testing
+3983.6	7.5		(SM) SILTY SAND, brown, dense, dry, with some caliche	50	4 7.5 10.0	SPT= 12-18-20 No Laboratory Testing
+3981.1	10.0		(SM) SILTY SAND, brown, dense, dry, with some clay	60	5 10.0 12.5	SPT= 6-8-20 No Laboratory Testing
+3978.6	12.5		(SM) SILTY SAND, brown, dense, dry	60	6 12.5 15.0	SPT= 16-19-16 No Laboratory Testing
+3976.1	15.0		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, dense, dry, with some small to medium size gravel	40	7 15.0 17.5	SPT= 12-25-25/5" No Laboratory Testing
+3973.6	17.5		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, dense, dry, with some small to medium size gravel	47	8 17.5 20.0	SPT= 8-17-33/5 1/2" No Laboratory Testing
+3971.1	20.0		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, very dense, dry, with some small to large size gravel	67	9 20.0 21.5	SPT= 18-30-20/3" No Laboratory Testing
+3969.6	21.5					

DRILLING LOG	DIVISION USACE-Fort Worth	INSTALLATION PN69286, Fort Bliss
1. PROJECT Industrial Complex Infrastructure	10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
2. LOCATION (Coordinates or Station) N 10,689,941.3 E 440,087.2	12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 9 UNDISTURBED: 0
3. DRILLING AGENCY Raba-Kistner Consultants	14. TOTAL NUMBER CORE BOXES 0	15. ELEVATION GROUND WATER 0.0
4. HOLE NO. (As shown on drawing title and file number) 8A2S-0036	16. DATE HOLE STARTED 1/29/2011	17. ELEVATION TOP OF HOLE +3992.1
5. NAME OF DRILLER Derek Duenez	18. TOTAL CORE RECOVERY FOR BORING N/A %	19. GEOLOGIST Alfredo Martinez, E.I.T
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		
7. THICKNESS OF OVERBURDEN 0.0		
8. DEPTH DRILLED INTO ROCK N/A		
9. TOTAL DEPTH OF HOLE 21.5		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3992.1	0.0		(SM) SILTY SAND, brown, medium dense, dry	40	1 0.0 2.5	SPT= 4-7-10 No Laboratory Testing
+3989.6	2.5		(SM) SILTY SAND, brown, medium dense, dry	40	2 2.5 5.0	SPT= 8-12-12 Water Content (%) = 4.9 %-#200 Sieve = 25.0 PI = NP
+3987.1	5.0		(SM) SILTY SAND, brown, very dense, dry	40	3 5.0 7.5	SPT= 12-19-31/5 1/2" No Laboratory Testing
+3984.6	7.5		(ML) SANDY SILT, brown, very dense, dry	50	4 7.5 10.0	SPT= 15-23-16 Water Content (%) = 8.3 %-#200 Sieve = 58.7 PI = NP
+3982.1	10.0		(SM) SILTY SAND, brown, very dense, dry	50	5 10.0 12.5	SPT= 14-28-22/5 1/2" No Laboratory Testing
+3979.6	12.5		(SC) CLAYEY SAND, brown, very dense, dry	57	6 12.5 15.0	SPT= 11-16-20 Water Content (%) = 2.6 %-#200 Sieve = 14.1 PI = 18
+3977.1	15.0		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, very dense, dry, with some small to medium size gravel	47	7 15.0 17.5	SPT= 17-25-25/5 1/2" No Laboratory Testing
+3974.6	17.5		(SC) CLAYEY SAND, brown to multi-color, very dense, dry, with some small to medium size gravel	53	8 17.5 20.0	SPT= 12-25-25/4 1/2" Water Content (%) = 3.3 %-#200 Sieve = 15.9 PI = 41
+3972.1	20.0		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, very dense, dry, with some small to medium size gravel	83	9 20.0 21.5	SPT= 20-37-13/2" No Laboratory Testing
+3970.6	21.5					

DRILLING LOG		DIVISION USACE-Fort Worth		INSTALLATION PN69286, Fort Bliss		
1. PROJECT Industrial Complex Infrastructure		10. SIZE AND TYPE OF BIT 4.25" I.D., H.S. Auger, 2" SPT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		
2. LOCATION (Coordinates or Station) N 10,689,987.4 E 440,178.5		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
3. DRILLING AGENCY Raba-Kistner Consultants		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED : 9		
4. HOLE NO. (As shown on drawing title and file number) 8A2S-0037		14. TOTAL NUMBER CORE BOXES		UNDISTURBED : 0		
5. NAME OF DRILLER Derek Duenez		14. TOTAL NUMBER CORE BOXES		0		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER		0.0		
7. THICKNESS OF OVERBURDEN 0.0		16. DATE HOLE STARTED		1/29/2011		
8. DEPTH DRILLED INTO ROCK N/A		16. DATE HOLE COMPLETED		1/29/2011		
9. TOTAL DEPTH OF HOLE 21.5		17. ELEVATION TOP OF HOLE		+3991.9		
		18. TOTAL CORE RECOVERY FOR BORING		N/A %		
		19. GEOLOGIST		Alfredo Martinez, E.I.T		
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+3991.9	0.0		(SM) SILTY SAND, brown, medium dense, dry	40	1 0.0 2.5	SPT= 6-10-15 No Laboratory Testing
+3989.4	2.5		(SM) SILTY SAND, brown, dense dry, with some caliche	40	2 2.5 5.0	SPT= 13-16-26 No Laboratory Testing
+3986.9	5.0		(SM) SILTY SAND, brown, very dense, dry, with some caliche and clay	50	3 5.0 7.5	SPT= 23-29-21/3" No Laboratory Testing
+3984.4	7.5		(SM) SILTY SAND, brown, dense, dry, with some caliche and clay	40	4 7.5 10.0	SPT= 19-23-23 No Laboratory Testing
+3981.9	10.0		(SC) CLAYEY SAND, brown, dense, dry	40	5 10.0 12.5	SPT= 12-24-26 No Laboratory Testing
+3979.4	12.5		(SC) CLAYEY SAND, brown, dense, dry	30	6 12.5 15.0	SPT= 15-14-19 No Laboratory Testing
+3976.9	15.0		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, dense, dry, with some small to medium size gravel	57	7 15.0 17.5	SPT= 13-20-24 No Laboratory Testing
+3974.4	17.5		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, very dense, dry, with some small to medium size gravel	60	8 17.5 20.0	SPT= 21-25-25/5" No Laboratory Testing
+3971.9	20.0		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, very dense, dry, with some small to medium size gravel	89	9 20.0 21.5	SPT= 20-27-23/5 1/2" No Laboratory Testing
+3970.4	21.5		(SP-SM) POORLY GRADED SAND WITH SILT, brown to multi-color, very dense, dry, with some small to medium size gravel			

APPENDIX B
LIST OF DRAWINGS
NOT USED

APPENDIX C

UTILITY CONNECTIONS

**SEE APPENDIX MM -
INFRASTRUCTURE PACKAGE**

APPENDIX D

RESULTS OF FIRE FLOW TESTS

APPENDIX E

ENVIRONMENTAL INFORMATION

APPENDIX E
ENVIRONMENTAL DOCUMENTS
TABLE OF CONTENTS

- Potable Regulatory Policy (Policy Letter #16)
- Cross Connection Control Manual for Fort Bliss
- Fort Bliss Directorate of Public Works Environmental Division Requirements for Planning, Design and Construction
- * HAZMAT Storage

Potable Regulatory Policy (Policy Letter #16)

REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
HEADQUARTERS, U. S. ARMY GARRISON COMMAND
BUILDING 1 PERSHING ROAD
FORT BLISS, TEXAS 79916-6812

IMSW-BLS-ZA

1 April 2006

POLICY LETTER #16

SUBJECT: Potable Water Regulatory Policy: Plumbing Customer Service Inspections (CSI) and Backflow Prevention Assembly Test Forms

1. **PURPOSE:** The Fort Bliss Water Services Company (FBWS) operates 9 water systems on Post: Fort Bliss Main Post, Biggs Army Air Field, Site Monitor, McGregor/Meyer Range Camp, Dona Ana Range Camp, Oro Grande Range Camp, Hueco Range Camp, SHORAD, and Redeye. FBWS is responsible for protecting the drinking water supply in accordance with State Regulations (Title 30 Texas Administrative Code 290.46(j), New Mexico Administrative Code 20.7.10.400(L)) from contamination or pollution which could result from improper water system plumbing construction or configuration.

2. Effective immediately, Customer Service Inspection certificates shall be completed prior to providing continuous water service to new construction or after significant plumbing renovations on any existing service or any existing service when the FBWS has reason to believe that cross-connections or other potential contaminant hazard exist or after any material improvement, correction, or addition to the water distribution facilities. As unacceptable plumbing practices are discovered, they shall be promptly eliminated to prevent possible contamination of the water supply. Also, any backflow prevention devices installed shall be installed in accordance with the Fort Bliss Cross-Connection Control Manual (FBCCCM), and tested in accordance with the FBCCCM.

3. **RESTRICTIONS:** The following unacceptable practices are prohibited:

a. No direct connection between the public drinking water supply and a potential source of contamination is permitted. Potential sources of contamination shall be isolated from the public water supply in accordance with the FBCCCM.

b. No cross-connection between the public water supply and a private water system is permitted. These potential threats to the public drinking water supply shall be eliminated at the service connection by the installation of an air-gap or a reduced pressure-zone backflow prevention device.

c. No connection which allows water to be returned to the public drinking water supply is permitted.

POLICY LETTER #16

SUBJECT: Potable Water Service Agreement: Plumbing Customer Service Inspections (CSI) and Backflow Test Forms

d. No pipe or pipe fitting which contains more than 8.0% lead may be used for the installation or repair of plumbing at any connection which provides water for human use.

e. No solder or flux which contains more than 0.2% lead can be used for the installation or repair of plumbing at any connection which provides water for human use.

3. This policy applies to work completed on all Fort Bliss facilities whether work is done by contract or in-house. Activities must insure that their contractors/ subcontractors follow this requirement.

4. Inspectors must possess proper credentials and be recognized as capable of conducting a customer service inspection certification by the State of Texas. Customer Service inspections may be performed by the following group members:

a. Plumbing Inspectors and Water Supply Protection Specialists licensed by the Texas State Board of Plumbing Examiners.

b. Customer Service Inspectors licensed by the Texas Commission of Environmental Compliance (TCEQ).

5. Recognized Backflow assembly testers must possess a current license from the TCEQ.

6. Submit completed customer service inspection and/or backflow test forms to the Directorate of Environment (DOE), IMSW-BLS-Z, Bldg 622, Attn: Water Program Manager, Fort Bliss, Texas 79916, or in person at bldg 622 room 111, or by fax at 568-1333. Copies of the FBCCCM are available from the DOE Water Program Manager, office phone number 568-6364. Forms will be maintained by the Directorate of Environment for a minimum of 10 years and be made readily available for review by the State regulatory entity.

- 2 Enclosures
- 1. CSI Certificate
- 2. Backflow Assembly Test Report

ROBERT T. BURNS
 COL, AD
 Commanding

FORT BLISS
CUSTOMER SERVICE INSPECTION CERTIFICATE

Name of PWS: _____ PWS I.D.# _____

Bldg No. or Facility Description: _____

Contract # or Work Order #: _____

Contract issued by: _____ Prime Contractor: _____

Reason for Inspection:

- New construction
Existing service where contaminant hazards are suspected
Major renovation or expansion of distribution facilities

I _____, upon inspection of the private water distribution facilities connected to the aforementioned public water supply (PWS) do hereby certify that, to the best of my knowledge:

Compliance Non-compliance

- 1. No direct connection between the public drinking water supply and a potential source of contamination exists.
2. No cross-connection between the public drinking water supply and a private water system exists.
3. No connection exists which would allow the return of water used for condensing, cooling or industrial processes back to the public water supply.
4. No pipe or pipe fitting which contains more than 8.0% lead exists in private water distribution facilities installed on or after July 1, 1988.
5. No solder or flux which contains more than 0.2% lead exists in private water distribution facilities installed on or after July 1, 1988.

I further certify that the following materials were used in the installation of the private water distribution facilities:

- Service lines Lead Copper PVC Other
Solder Lead Lead Free Solvent Weld Other

Copy of inspector's certification card submitted to DOE. yes no (If no, please attach copy of inspector's certification card.)

I recognize that this document shall become a permanent record of the aforementioned Public Water System and that I am legally responsible for the validity of the information I have provided.

Remarks: _____

Signature of Inspector
Title
Date

Registration Number
Type of Registration

Fort Bliss
Backflow Prevention Assembly Test Report
 ATZC-DOE, Building 622, Fort Bliss, TX 79916
 Phone: (915) 568-1041 Fax: (915) 568-1333

General Information

Area / Range Camp _____ Building Name _____
 Building Number _____ Building Location _____
 Point of Contact _____ Phone _____

Current Assembly Information

Manufacturer _____ Model _____
 Serial No. _____ Size _____ Tag _____
 Type of service: Containment/Domestic
 Containment/Fire System
 Containment/Lawn Irr.
 Isolation

Specific physical location of assembly:

Equipment or system isolated:

Removed Assembly Information

Manufacturer _____
 Model _____
 Size _____
 Serial No. _____

Gauge Information

ID _____
 Manufacturer _____
 Model _____
 Serial No. _____
 Last date of calibration _____

Test Results

Status Pass Fail

RP

CV1 AR _____
 RV _____
 CV2 Tight? Yes No
 CV1 CR _____
 CV2 _____
 Buffer _____

DC

CV1 _____
 CV2 _____

PVB SVB

_____ AIV _____
 _____ CV _____

Additional Requirements

Yes N/A
 Thermal Expansion Control Present? No Unknown
 (Containment domestic only)
 Requirements made known? Yes No N/A
 Adequate Freeze Protection Present? Yes No N/A
 Requirements made known? Yes No N/A

Comments or Repairs made:

Test Type Initial Annual Repair Relocate

The backflow prevention assembly detailed on this report has been tested and maintained as required and is certified to be operating within acceptable parameters. I also certify that I tested this assembly and the test results are true.

Technician ID _____ Name _____ Phone _____
 Signature _____ Time of Test _____ Date _____
 Firm _____ Address _____ City _____ State _____ Zip _____

Cross Connection Control Manual for Fort Bliss

United States Army Air Defense Artillery Center Fort Bliss, Texas

Cross-Connection Control Manual



Cross-Connection Control Manual

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ACRONYMS and ABBREVIATIONS

AG	Air Gap
ANSI	American National Standards Institute
ASSE	American Society of Sanitary Engineers
AVB	Atmospheric Vacuum Breaker
DC	Double Creek Valve Assembly
FCCCHR	Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California
NMED	New Mexico Environment Department
PVB	Pressure Vacuum Breaker
RP	Reduced Pressure Principle Assembly
SVB	Spill-Resistant Pressure Vacuum Breaker
TCEQ	Texas Commission on Environmental Quality
UPC	Uniform Plumbing Code

INTRODUCTION

Congress passed the 1974 Safe Drinking Water Act (SDWA), Public Law 93-523, to protect public drinking water supplies from harmful contaminants. Because Ft. Bliss is located in New Mexico and Texas, the Texas Commission on Environmental Quality (TCEQ) and the New Mexico Environment Department (NMED) are responsible for implementing the standards of the SDWA within their respective states. The primary function of Ft. Bliss as a water purveyor is to provide safe drinking water. As a result, they may incur liability for the quality of water provided. The TCEQ and the NMED prohibit connections to the public water supply where a contamination hazard exists, unless the public water supply is protected by approved backflow prevention methods, devices, or assemblies.

Ft. Bliss has established and will provide for a Cross-Connection Control Program pursuant to Title 30, Texas Administrative Code, Chapter 290, Public Drinking Water; the Texas Health and Safety Code, Chapter 341, Minimum Standards of Sanitation and Health Protection Measures; and the New Mexico Environment Department, Title 20 Environmental Protection, Chapter 7, Wastewater and Water Supply Facilities. This Program safeguards the Ft. Bliss water distribution system from contamination by containing hazards at the service connection and/or within premises served by the Ft. Bliss water distribution system and by the installation, testing, and maintenance of backflow prevention methods, devices, or assemblies.

This manual is intended to augment the Ft. Bliss Cross-Connection Control Program and to serve as the minimum standard for implementing the Program. The manual adheres to the standards in the latest editions of The Manual for Cross-Connection Control by the Foundation for Cross-Connection Control and Hydraulic Research (FCCCHR) at the University of Southern California and the Uniform Plumbing Code (UPC). Included in the manual are technical specifications and standards to define proper backflow prevention assembly applications, installation details and criteria, test procedures, care of test equipment, and test report forms. The manual assigns or clarifies responsibilities of the Cross-Connection Control Program Manager, the backflow prevention technician, and private sector contractors.

Because Ft. Bliss must comply with the regulations of New Mexico and Texas, the provisions of this manual are applicable to both states. Wherever a provision of a state occurs that does not apply to the other state, the provision shall be noted as such.

No manual can remain current indefinitely. All holders of this manual should anticipate additions, deletions, and amendments. The Ft. Bliss Cross-Connection Control Program Manager will make available subsequent changes.

DEFINITIONS**Approved Backflow Prevention Assembly**

An assembly that has been manufactured in full compliance with the American Water Works Association standards C510 and C511 and appears on the most current List of Approved Backflow Prevention Assemblies, published by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.

Auxiliary Water System

Any water supply on or available to the premises other than the Ft. Bliss water distribution system. These auxiliary waters are not under the sanitary control of Ft. Bliss and may include water from another public water supplier, wells, used or reclaimed water, or industrial fluids.

Backflow

The unintended or undesirable reversal of the normal water flow caused by either backsiphonage or backpressure.

Backflow Prevention Methods, Devices, and Assemblies

The types of backflow prevention methods, devices, and assemblies shall be based on the existing or potential degree of hazard, and backflow condition. The definitions for each type of backflow prevention method, device, or assembly listed below are contained in subsequent sections of this manual. The types are as follows:

Air gap	Method
Atmospheric vacuum breaker	Device
Double check valve	Assembly
Pressure vacuum breaker	Assembly
Reduced pressure principle	Assembly
Spill-resistant pressure vacuum breaker	Assembly

The definitions for each type of backflow prevention method, device, or assembly listed above are contained in subsequent sections of this manual

Backflow Prevention Technician

A person deemed knowledgeable and competent in the installation, testing, maintenance, and repair of backflow prevention assemblies as determined by successful completion of a training course approved by the Cross-Connection Control Program Manager.

DEFINITIONS**Backpressure**

A form of backflow due to an increase of system pressure that is greater than supply pressure.

Backsiphonage

A form of backflow due to negative or decreased pressure in the water supply system.

Containment Cross-Connection Control

Provides protection of the water distribution system from the backflow of contaminants. This is accomplished by the installation of an air gap or an approved backflow prevention assembly at the water service connection. Containment cross-connection control does not provide protection to the occupants of the premises, but shall be considered as additional backflow protection and shall not negate the use of backflow prevention on internal hazards within a premises potable water system.

Contamination

The presence of any foreign substance (organic, inorganic, radiological, or biological) in water that tends to degrade its quality to constitute a health hazard or impair the usefulness of the potable water system.

Continuous Pressure

A point in the potable water system that may be subjected to operating pressure for more than twelve hours in a twenty-four hour period.

Cross Connection

A point in the potable water system that is connected directly, or has the potential of being connected, to a source of non-potable substance through which contaminants may enter the potable water system under any condition.

Cross Connection — Controlled

A cross connection with an approved backflow prevention method, device, or assembly properly installed and maintained so that it will continuously afford protection commensurate with the degree of hazard.

Cross-Connection Control Program Manager

The person designated to administer the Cross-Connection Control Program and who is currently recognized as a backflow prevention assembly technician.

Ft. Bliss

A publicly owned water and sewer agency located in and serving the people of Ft. Bliss.

Health Hazard

An actual or potential threat of contamination if introduced into the potable water system that may cause death, injury, illness or spread of disease.

Isolation Cross-Connection Control

Provides protection to the occupants of a premises by the installation of approved backflow prevention methods, devices, or assemblies at each cross connection within the premises' potable water system.

Non-Health Hazard

An actual or potential threat of pollution if introduced into the potable water system that would constitute a nuisance, inconvenience, or be aesthetically objectionable.

Pollution

The presence of any foreign substance in the potable water system that tends to degrade its quality but not constitute a health hazard or impair the usefulness of the water.

Premises Potable Water System

Those parts of the premises or other areas beyond the water service connections that are utilized in conveying potable water to points of use.

System Hazard

An actual or imminent threat of contamination to the water distribution system presenting a danger to public health.

Water Distribution System

The network of conduits used for the delivery of potable water from the source to the water service connection.

Water Service Connection

The point of connection to the water distribution system carrying potable water to the building, other points of use, or distribution on the property.

Cross-Connection Control Program Manager

The Directorate of the Environment is responsible for the sanitary control of the Ft. Bliss water distribution system and the premises potable water system.

A member of the Directorate of the Environment shall be designated as the Cross-Connection Control Program Manager. The manager is responsible for all administrative duties and for maintaining an aggressive cross-connection control program within the Ft. Bliss water distribution system and all premises potable water systems.

The manager's responsibilities include but are not limited to:

1. Administration and enforcement of all the provisions of the cross-connection control program.
2. The prevention of contaminants from entering a premises potable water system by the use of backflow prevention methods, devices, and assemblies installed at each cross connection within the premises potable water system.
3. The prevention of contaminants originating within a premises potable water system from entering the Ft. Bliss water distribution system by the use of backflow prevention methods and assemblies installed at each water service connection.
4. The prevention of contaminants from entering the City of El Paso's water distribution system from the Ft. Bliss water distribution system by the use of backflow prevention methods and assemblies installed at each water service connection to Ft. Bliss.
5. The completion of a detailed cross-connection control survey of the entire water distribution system and all premises potable water systems every five years.
6. Affirm that all testing performed at Ft. Bliss meets the requirements of this manual. This is accomplished by reviewing test reports. The Cross-Connection Control Program Manager also may select a percentage of tests to witness or confirm by testing after the technician.
7. Ensure that all certified backflow prevention technicians are properly certified in New Mexico and Texas.
8. Review plumbing plans and inspect plumbing systems as they are installed for compliance with the cross-connection control program.
9. Inspect installations of backflow prevention methods, devices, and assemblies for compliance with this manual installed by Ft. Bliss personnel or by private sector contractors.
10. Require unacceptable plumbing practices to be promptly eliminated to prevent actual or potential contamination of the potable water system.

RESPONSIBILITIES

11. Establish an annual schedule of inspecting and testing all backflow prevention methods, devices, and assemblies.
12. Keep accurate records of installations, tests, inspections, and repairs made to backflow prevention assemblies for a minimum period of three years.

Backflow Prevention Technician

The Backflow Prevention Technician is responsible for safeguarding the Ft. Bliss water distribution system and all premises potable water systems. The technician's responsibilities include but is not limited to:

1. Register with the Cross-Connection Control Program Manager prior to testing backflow prevention assemblies within the jurisdiction of the Cross-Connection Control Program Manager. Each technician shall be issued an identification number that must appear on all backflow prevention assembly test report forms.
2. Submit reports of assembly testing and repairs to the Cross-Connection Control Program Manager within one week from the time the test was conducted. Testing of backflow prevention assemblies shall not be considered complete unless a satisfactory test report has been received by the Cross-Connection Control Program Manager
3. Inform the Cross-Connection Control Program Manager if any existing backflow prevention assembly is not installed commensurate with the degree of hazard, pressure conditions, or if the assembly is not installed in its required orientation.
4. Shall not alter the design or operation of backflow prevention methods, devices, and assemblies.
5. Maintain training requirements in New Mexico and Texas. New Mexico follows the FCCCHR policy whereby training requirements are renewed every three years. The TCEQ tester recognition is indefinite and does not require renewal. In order for technicians to be able test assemblies throughout Ft. Bliss, their training shall be renewed every three years.

Ft. Bliss Personnel and Private Sector Contractors

1. Ft. Bliss personnel and private sector contractors shall fully comply with the Ft. Bliss Cross-Connection Control Program. They are responsible for installing backflow prevention methods, devices, and assemblies in their required orientation, and in accordance with the proper degree of hazard and pressure condition as indicated in this manual.
2. Ft. Bliss personnel and private sector contractors shall notify the Cross-Connection Control Program Manager that backflow prevention methods, devices, and assemblies have been properly installed and are ready for inspection and testing. They shall be responsible for all parts and labor needed to prepare the assembly for its acceptance test.

RESPONSIBILITIES

3. Newly installed assemblies shall not be placed into service until an acceptance test has been performed indicating satisfactory results.

INFORMATION MANAGEMENT

The Cross-Connection Control Program Manager shall utilize an information management system consisting of two databases — Survey and Testing.

Survey Database

1. The Cross-Connection Control Program Manager shall complete a detailed cross-connection control survey of the entire water distribution system and all premises potable water systems every five years. This will be accomplished by surveying twenty percent of all premises every year.
2. The survey shall be performed by experienced cross-connection control inspectors and shall include inspection of all exposed and visibly accessible potable water piping, water consuming equipment, lawn irrigation systems, and fire protection systems.
3. Cross-connection control inspectors shall use a survey form similar to the one shown on page 10.
4. The survey findings shall be documented into a cross-connection control Survey Information Management Database. The survey database shall produce reports that will include the location and identification of water uses, adequacy of existing protection, and corrective actions. The report will include the size and type of backflow prevention methods, devices, or assemblies needed, and a prioritized list of findings.

The survey database also shall produce water conservation reports listing the location and identification of all applicable plumbing fixtures and flow rates.

5. All of the items in the survey that require corrective action are considered a health hazard and shall be corrected as soon as possible. The following prioritized list shall be followed in planning corrective actions:

Priority 1 — Contamination imminent

Where conditions or activities exist in which the introduction of a contaminant to the premises potable water system or the water distribution system is imminent.

Priority 2 — Contamination potential

Where conditions or activities exist in which there is a potential for the introduction of a contaminant to the premises potable water system or the water distribution system.

Priority 3 — No action required

Where cross connections are under control by the presence of an approved backflow prevention method, device, or assembly and there is no imminent or potential threat of contamination to the premises potable water system or the water distribution system.

INFORMATION MANAGEMENT**Priority 4 — Installation correction**

Where cross connections are under control by the presence of an approved backflow prevention method, device, or assembly; however, the installation may not be installed in full compliance with the UPC or FCCCHR and shall require corrective action.

Priority 5 — Piping system note

Where a portion of the piping system does not present a threat of contamination to the premises potable water system or the water distribution system but may be a concern such as piping leaks or safety hazards.

6. The survey shall include inspection of plumbing fixtures for water conservation compliance. The maximum water consumption flow rates and quantities for plumbing fixtures shall be in accordance with TCEQ, rule 290.252 and UPC, section 402.0. The following table describes the fixtures and maximum flow rates:

Maximum Flow Rates and Consumption for Plumbing Fixtures	
Plumbing Fixture	Maximum Flow Rate or Quantity
Water closet	1.6 gallons per flush
Urinal	1.0 gallons per flush
Shower head	2.5 gallons per minute
Sink, lavatory faucet, faucet aerator	2.2 gallons per minute
Faucet serving transient public	0.25 gallons per use & self-closing valve
Drinking fountain	Operated by self-closing valve
Emergency shower/eye wash	None

I

INFORMATION MANAGEMENT**Testing Database**

1. The Cross-Connection Control Program Manager is responsible for all backflow prevention assembly testing within the jurisdiction of the Directorate of the Environment.
2. All backflow prevention assemblies shall be tested for proper operation by backflow prevention technicians registered with the Cross-Connection Control Program Manager.
3. Backflow prevention technicians shall use the test report form shown on page 17. The form may be recreated from the testing database
4. All backflow prevention assembly test reports — pass or fail — shall be entered into the Testing Information Management Database. The testing database shall produce individual and summary reports. The reports shall include relevant information such as area, building, assembly, test findings, repairs, thermal expansion measures, adequacy of freeze protection, test equipment used, and technician identification.
5. The testing database shall incorporate automated defaults for ensuring proper testing information. Test reports shall default to "Fail" until proper test findings are entered. The database also shall track annual and past due tests.

TESTING PROCEDURES**Preparation for Testing Backflow Prevention Assemblies**

Prior to testing backflow prevention assemblies the backflow prevention technician shall:

1. Notify affected onsite personnel that the water service will be shut off during backflow prevention assembly testing.
2. Notify the authority having jurisdiction over fire protection systems, and any alarm-monitoring agency, that the water supply to the fire protection system will be shut off during the test procedure.
3. Examine the area for safety hazards, water leaks, or relief valve discharging.
4. Determine that the backflow prevention assembly is installed commensurate with the degree of hazard, pressure conditions, and required orientation.
5. Check that the assembly is the correct size and has the essential components for testing such as resilient seated, full ported shutoff valves and test ports.
6. Note the manufacturer, model, serial number, size, application, and physical location.

Backflow Prevention Assembly Testing

1. The Cross-Connection Control Program Manager is responsible for all backflow prevention assembly testing within the jurisdiction of the Directorate of the Environment.
2. All backflow prevention assemblies shall be tested for proper operation by backflow prevention technicians registered with the Cross-Connection Control Program Manager.
3. Testing shall take place at the time of installation, repair, or relocation and at least on an annual schedule thereafter or more often when required by the Cross-Connection Control Program Manager.
4. A copy of the test report indicating satisfactory operation of the backflow prevention assembly, and any repairs, shall be forwarded to the Cross-Connection Control Program Manager within one week from the time the test was completed.
5. Assemblies that fail the operational test shall be repaired, overhauled, and retested immediately by a recognized backflow prevention technician. Testing of the assemblies shall not be considered complete until a test report certifying that the assembly is operating correctly has been received by the Cross-Connection Control Program Manager.
6. Upon the completion of a satisfactory test, the backflow prevention technician shall attach a laminated tag to the assembly with the following information on one side:

TESTING PROCEDURES

"Directorate of the Environment, ATZC-DOE, Building 622, Fort Bliss, TX 79916, Phone: (915) 568-6364, Fax: (915) 568-1333"

The reverse side of the tag shall indicate the assembly's manufacturer, model, serial number, size, and tag number. The applicable values of check valves No. 1 & 2, relief valve, air inlet valve, check valve, and the test date shall also be indicated.

7. Testing of backflow prevention assemblies shall be in accordance with Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. The following steps shall be used when testing reduced pressure principal backflow prevention assemblies:

Reduced Pressure Principle

1. Determine the apparent static pressure drop across check valve No. 1 in the direction of flow.
2. Determine that the differential pressure relief valve operates to maintain the zone between the two check valves at least 2.0 psi less than supply pressure.
3. Determine that check valve No. 2 closes tight in reverse flow.
4. Determine that the confirmed static pressure drop across check valve No. 1 is at least 3.0 psi greater than the relief valve opening point.
5. Determine that the static pressure drop across check valve No. 2 is at least 1.0 psid.
6. Determine that the comparison of the two readings of check valve No. 1 (1 and 4) is within 1.0 psid.

Double Check Valve

1. Determine that the static pressure drop across check valve No. 1 is at least 1.0 psid.
2. Determine that the static pressure drop across check valve No. 2 is at least 1.0 psid.

Pressure Vacuum Breakers

1. Determine that the pressure in the body when the air inlet valve opens is at least 1.0 psi.
2. Determine that the static pressure drop across the check valve is at least 1.0 psid.

Spill-Resistant Pressure Vacuum Breakers

1. Determine that the pressure in the body when the air inlet valve opens is at least 1.0 psi.
2. Determine that the differential pressure of the check valve in the direction of flow shall be at least 1.0 psid.

Note: For the SVB to operate correctly, the check valve must have a greater value than the air inlet valve.

Test Equipment Calibration

1. Backflow prevention assembly test equipment shall be calibrated annually in accordance with ANSI and ASSE 1064 standards by a qualified calibration facility.
2. The test equipment manufacturer, model, serial number, and last date of calibration shall be recorded on the backflow prevention assembly test report form.

Maintenance and Repair

To maintain backflow prevention assemblies in proper operating condition, the technician shall adhere to the following:

1. Test assemblies in accordance with this manual.
2. Use currently calibrated testing equipment.
3. Consult manufacturer's repair/maintenance manuals.
4. Observe general safety procedures.
5. Use only manufacturer's replacement parts.
6. Be prepared to repair assembly at time of testing by maintaining an inventory of replacement parts.
7. Avoid flipping rubber check valve discs. Flipping shall be considered a temporary measure only to enable continuation of water service until a new replacement disc is installed.
8. Retest assembly for proper operation immediately following repair.
9. Slowly repressurize assembly when returning assembly to normal operating condition.

Cross-Connection Control Manual

TEST REPORT FORM

<p>Fort Bliss 0710020</p> <p>Backflow Prevention Assembly Test Report</p> <p>ATZC-DOE, Building 622, Fort Bliss, TX 79916</p> <p>Phone: (915) 568-1041 Fax: (915) 568-1333</p>			
General Information			
Area / Range Camp _____		Building Name _____	
Building Number _____		Building Location _____	
Point of Contact _____		Phone _____	
Current Assembly Information		Removed Assembly Information	
Manufacturer _____ Model _____		Manufacturer _____	
Serial No. _____ Size _____ Tag _____		Model _____	
Type of service: <input type="checkbox"/> Containment/Domestic <input type="checkbox"/> Containment/Fire System <input type="checkbox"/> Containment/Lawn Irr. <input type="checkbox"/> Isolation		Size _____	
Specific physical location of assembly: _____		Serial No. _____	
Equipment or system isolated: _____		Gauge Information ID _____	
		Manufacturer _____	
		Model _____	
		Serial No. _____	
		Last date of calibration _____	
Test Results Status <input type="checkbox"/> Pass <input type="checkbox"/> Fail		Additional Requirements <input type="checkbox"/> Yes <input type="checkbox"/> N/A	
		Thermal Expansion Control Present? <input type="checkbox"/> No <input type="checkbox"/> Unknown (Containment domestic only)	
		Requirements made known? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
		Adequate Freeze Protection Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
		Requirements made known? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
		Comments or Repairs made: _____	
		Test Type <input type="checkbox"/> Initial <input type="checkbox"/> Annual <input type="checkbox"/> Repair <input type="checkbox"/> Relocate	
<p>The backflow prevention assembly detailed on this report has been tested and maintained as required and is certified to be operating within acceptable parameters.</p> <p>I also certify that I tested this assembly and the test results are true.</p>			
Technician ID _____		Name _____	
		Phone _____	
Signature _____		Time of Test _____	
		Date _____	
Firm _____		Address _____	
		City _____	
		State _____	
		Zip _____	

This form may be recreated from the Testing Database

Cross-Connection Control Manual**BACKFLOW PREVENTION METHODS, DEVICES, AND ASSEMBLIES**

Backflow Prevention Method, Device, and Assembly Application Table						
	Hazards			Pressures		
	Sewage	Health	Non-health	Back-Pressure	Back-Siphonage	Continuous Pressure
AG	Yes	Yes	Yes	Yes	Yes	Yes
AVB	No	Yes	Yes	No	Yes	No
DC	No	No	Yes	Yes	Yes	Yes
PVB	No	Yes	Yes	No	Yes	Yes
RP	No	Yes	Yes	Yes	Yes	Yes
SVB	No	Yes	Yes	No	Yes	Yes

AG	Air gap
AVB	Atmospheric vacuum breaker
DC	Double check valve assembly
PVB	Pressure vacuum breaker assembly
RP	Reduced pressure principle assembly
SVB	Spill-Resistant pressure vacuum breaker assembly

Backflow prevention methods, devices, and assemblies shall be installed and maintained in accordance with the proper degree of hazard, pressure condition, and orientation.

The AVB, PVB, SVB, and RP shall be used where health hazard matters are concerned. The DC shall only be used in non-health applications where convenience such as not draining the premises potable water system is the concern.

CONTAINMENT CONTROL REQUIREMENTS**Containment Cross-Connection Control**

1. No water service connection shall be permitted to any premises handling substances deleterious or hazardous to the public health without an air gap separation or an approved backflow prevention assembly installed at the water service connection.
2. Table "Minimum Containment Requirements" shows typical installations that require backflow prevention assemblies at the water service connections of the premises. This table may be supplemented by the Cross-Connection Control Program Manager upon the discovery of a potential hazard to the public water supply.

The table does not indicate use of the double check valve assembly (DC) in containment applications. The use of a DC must be restricted to non-health use only. The Cross-Connection Control Program Manager may allow the use of existing DCs on potable water supplies serving fire protection systems if the hydraulic design of the system cannot accommodate the pressure loss of a RP. Once performance of the water distribution system is upgraded existing fire protection systems shall be fitted with RPs.

3. All approved backflow prevention methods, devices, and assemblies shall be installed in their required orientation, in accordance with the proper degree of hazard and pressure condition as indicated in this manual.
4. Premises considered to pose a threat of contamination to the water distribution system shall be subject to a water use inspection. The Directorate of the Environment or its representatives shall have the right of entry to any land or buildings at reasonable times to make water use examinations or inspections. If cross connections are discovered during the premises water use survey that could result in the backflow of contaminants into the public water supply, Ft. Bliss shall immediately implement appropriate corrective actions.
5. At any premises where contamination hazards exist and there is adequate isolation cross-connection control in effect, the Cross-Connection Control Program Manager may determine that an air gap separation or an approved backflow prevention assembly may not be required at the water service connection.

Cross-Connection Control Manual**CONTAINMENT CONTROL REQUIREMENTS**

This table is not an all-inclusive list and may be supplemented by the Cross-Connection Control Manager.

Backflow prevention methods, devices, and assemblies shall be installed and maintained in accordance with the proper degree of hazard, pressure condition, and orientation.

Typical premises or water uses that require containment control:	Method or assembly
Agricultural	AG or RP
Aircraft, missile plant	AG or RP
Animal grooming, processing, feedlot	AG or RP
Automotive repair, plant	AG or RP
Auxiliary water supply	AG or RP
Beverage processing	AG or RP
Cannery, packing house, rendering plant	AG or RP
Car washing	AG or RP
Chemical manufacturing	AG or RP
Clinic	AG or RP
Cold storage facility	AG or RP
Commercial laundry	AG or RP
Complex piping system	AG or RP
Construction water service point	AG or RP
Cooling system	AG or RP
Dairy, product processing	AG or RP
Dental office, laboratory	AG or RP
Docks, dockside facility	AG or RP
Dye plant	AG or RP
Fire protection system	AG or RP
Food processing plant	AG or RP
Garment finisher	AG or RP
Green house	AG or RP
Heating system	AG or RP
Hospital, mortuary, funeral home	AG or RP
Industrial system	AG or RP
Laundry	AG or RP

Cross-Connection Control Manual

Typical premises or water uses that require containment control:	Method or assembly
Lawn irrigation system	AG or RP
Lease space (shopping center, warehouse)	AG or RP
Manufacturing natural or synthetic rubber	AG or RP
Medical, surgical	AG or RP
Metal finishing, molding, forming, plating	AG or RP
Microchip fabrication	AG or RP
More than one connection to the public water supply	AG or RP
Nursing, convalescent home	AG or RP
Paper processing	AG or RP
Petroleum processing, storage	AG or RP
Photographic processing	AG or RP
Plastic injection	AG or RP
Power plant	AG or RP
Radiator shop	AG or RP
Radioactive material	AG or RP
Ready mix concrete	AG or RP
Reclaimed potable water system	AG or RP
Sand, gravel plant	AG or RP
School, laboratory	AG or RP
Sewage lift station, treatment plant	AG or RP
Slaughter house	AG or RP
Steam generating	AG or RP
Tall buildings	AG or RP
Taxidermy	AG or RP
Temporary service	AG or RP
Toxic substance	AG or RP
Uncontrolled cross connections	AG or RP
Veterinary	AG or RP
Water Storage vehicle	AG or RP
Water treatment	AG or RP
Well	AG or RP
Where inspection is restricted	AG or RP

ISOLATION CONTROL REQUIREMENTS**Isolation Cross-Connection Control**

1. No installation of any water operated equipment that may cause contamination of the premises potable water system shall be permitted unless it is equipped with an approved backflow prevention method, device, or assembly.
2. Requirements for backflow prevention methods, devices, and assemblies installed within the premises potable water system are for the safety and protection of the occupants of the premises.
3. In addition to performing cross-connection control surveys, the Cross-Connection Control Program Manager shall conduct inspections in response to water quality complaints to determine compliance with the provisions of the Cross-Connection Control Program. In the event cross connections require isolation control, the Cross-Connection Control Program Manager shall have approved backflow prevention methods, devices, and assemblies installed at specific locations within the premises potable water system.
4. Mandatory isolation cross-connection control requirements are shown in the table, "Minimum Isolation Cross-Connection Control Requirements" on page 21. This table is not an all-inclusive list of hazards that may be found and may be supplemented by the Cross-Connection Control Manager.
5. All approved backflow prevention methods, devices, and assemblies shall be installed in their required orientation, in accordance with the proper degree of hazard, and pressure condition as indicated in this manual.

Cross-Connection Control Manual**ISOLATION CONTROL REQUIREMENTS**

This table is not an all-inclusive list and may be supplemented by the Cross-Connection Control Manager.

Backflow prevention methods, devices, and assemblies shall be installed and maintained in accordance with the proper degree of hazard, pressure condition, and orientation.

Typical water uses that require isolation control:	Method, device, or type of assembly					
	AG	RP	DC	PVB	SVB	AVB
Air conditioning system	Yes	Yes	No	Yes	Yes	Yes
Air washer	Yes	Yes	No	Yes	Yes	Yes
Aspirator	Yes	Yes	No	Yes	Yes	Yes
Autoclave	Yes	Yes	No	No	No	No
Auxiliary water supply	Yes	Yes	No	No	No	No
Bedpan washer	Yes	Yes	No	Yes	Yes	Yes
Boiler	Yes	Yes	No	No	No	No
Carbonation equipment	Yes	Yes	No	No	No	No
Chemical dispenser	Yes	Yes	No	Yes	Yes	Yes
Chilled potable water system	Yes	Yes	No	No	No	No
Chiller	Yes	Yes	No	No	No	No
Compressors (water cooled)	Yes	Yes	No	No	No	No
Cooling tower	Yes	Yes	No	No	No	No
Cuspidor	Yes	Yes	No	Yes	Yes	Yes
Decorative pond	Yes	Yes	No	Yes	Yes	Yes
Degreasing equipment	Yes	Yes	No	No	No	No
Drinking fountain	Yes	Yes	No	No	No	No
Evaporative cooler	Yes	Yes	No	Yes	Yes	Yes
Faucet with pull-out spout	Yes	Yes	No	Yes	Yes	Yes
Fire protection system	Yes	Yes	No	No	No	No
Fountains	Yes	Yes	No	Yes	Yes	Yes
Garbage disposal	Yes	Yes	No	Yes	Yes	Yes
Domestic heat exchanger	Yes	No	No	No	No	No
Heating system	Yes	Yes	No	No	No	No
Hose bibb	Yes	Yes	No	Yes	Yes	Yes
Hydrant (wall, yard)	Yes	Yes	No	Yes	Yes	Yes

Cross-Connection Control Manual**ISOLATION CONTROL REQUIREMENTS**

Typical water uses that require isolation control:	Method, device, or type of assembly					
	AG	RP	DC	PVB	SVB	AVB
Industrial fluid	Yes	Yes	No	Yes	Yes	Yes
Kitchen equipment	Yes	Yes	No	Yes	Yes	Yes
Laboratory equipment	Yes	Yes	No	Yes	Yes	Yes
Lawn irrigation system	Yes	Yes	No	Yes	Yes	Yes
Medical equipment	Yes	Yes	No	Yes	Yes	Yes
Non-potable potable water system	Yes	Yes	No	No	No	No
Non-pressure vessel	Yes	Yes	No	Yes	Yes	Yes
Photo processing equipment	Yes	Yes	No	Yes	Yes	Yes
Pressure vessel	Yes	Yes	No	No	No	No
Receptors such as tanks, vats, sumps	Yes	Yes	No	Yes	Yes	Yes
Reclaimed water	Yes	Yes	No	No	No	No
Sewer, pump, ejector	Yes	Yes	No	No	No	No
Shampoo basin	Yes	Yes	No	Yes	Yes	Yes
Shower with hose	Yes	Yes	No	Yes	Yes	Yes
Sink (hand, janitor, dish, etc.)	Yes	Yes	No	No	No	No
Solar water heating equipment	Yes	Yes	No	No	No	No
Sterilizer	Yes	Yes	No	No	No	No
Swimming pool	Yes	Yes	No	Yes	Yes	Yes
Trap primer	Yes	Yes	No	No	No	No
Tub	Yes	Yes	No	Yes	Yes	Yes
Urinal	Yes	Yes	No	Yes	Yes	Yes
Water closet	Yes	Yes	No	Yes	Yes	Yes
Water closet flushometer tank	Yes	Yes	No	Yes	Yes	Yes
Water cooled equipment	Yes	Yes	No	Yes	Yes	Yes
Watering trough	Yes	Yes	No	Yes	Yes	Yes

GENERAL REQUIREMENTS**Auxiliary Water Systems and/or Wells**

Premises having auxiliary water systems and/or wells that are connected to the water distribution system shall have the following options:

1. Permanently abandon use of the auxiliary water system and/or well by "plugging the well" in accordance with the Directorate of the Environment, or
2. Completely and permanently, sever the auxiliary water system and/or well from the potable water system in accordance with the Directorate of the Environment and install an air gap or a reduced pressure principle backflow prevention assembly at the water service connection.

Backflow Prevention Assembly Enclosures

1. Backflow prevention assemblies may be installed indoors provided provisions for drainage and accessibility for testing and maintenance are met.
2. Backflow prevention assemblies installed outdoors shall meet the following requirements:
 - a. Color (color shall be appealing to Fort Bliss's overall color scheme).
 - b. Durability (ability to withstand weather extremes, wind, sand, temperature change and remain exceptionally tough).
 - c. Vandal Protection: (ability to withstand hits, kicks, etc... without denting or cracking, intruder resistant and tagging resistant)
 - d. UV Protection (prevent discolorations of fabrics or breakdown of materials)
 - e. Vector Resistant (does not provide a habit for poisons vectors such as black widow, brown recluse, scorpions, rattle snakes, etc.).
 - f. Design (adequate drainage, protect from freezing, easily accessible for testing, maintenance, and repair).
3. Enclosures must be installed and maintained so that backflow prevention assemblies are safely accessible for testing, maintenance, and repair.

Carbonators

1. Water supplies to carbonators shall be provided with a reduced pressure backflow prevention assembly.
2. There shall be no copper piping between the assembly and carbonator equipment.

Chemical Dispensers

1. Water supplies to chemical dispensers shall be provided with an air gap, reduced pressure backflow prevention assembly, or a spill resistant pressure vacuum breaker assembly.

GENERAL REQUIREMENTS

2. Chemical dispensers shall be supplied directly from the premises potable water system.
3. Chemical dispensers shall not be supplied from other fixtures such as janitor sink faucets.

Construction Water Service

1. The Cross-Connection Control Program Manager shall designate a hydrant or stand pipe to assist contractors during construction.
2. A water meter and a reduced pressure backflow prevention assembly shall be maintained at all times of operation at the hydrant or stand pipe.

Fire Protection Systems

1. Fire protection systems are systems of pipes and equipment used exclusively to supply water for extinguishing fire. Potable water supplies serving new and existing fire protection systems, including but not limited to standpipes and automatic sprinkler systems, shall be protected with an air gap or a reduced pressure principle assembly.
2. Whenever a backflow prevention assembly is installed in the potable water supply to a new fire protection system, the hydraulic design of the system shall account for the pressure drop through the assembly.
3. Whenever a backflow prevention assembly is retrofitted in the potable water supply to an existing fire protection system, the hydraulic design of the system shall be checked to verify that there is sufficient water pressure available for satisfactory operation of the system.
4. The hydraulic design calculations for new and existing fire protection systems shall be submitted to the Cross-Connection Control Program Manager for approval prior to the installation.

Heat Exchangers

1. Heat exchangers used for domestic water heat transfer shall be double walled.
2. Single wall heat exchanges shall be prohibited and removed from operation as per UPC.

Labeling

1. To prevent sanitary fixtures from being connected to non-potable waters, and for safety and sanitation, the UPC requires that each plumbing fixture be provided with potable water.
2. In all buildings where potable water and non-potable water systems are installed, each system shall be clearly identified. Labels designating the liquid

GENERAL REQUIREMENTS

or gas being conveyed and the direction of flow will be colored coded as follows:

Potable water — green background with white lettering.

Nonpotable water — yellow background with black lettering.

3. The labeling shall occur every twenty feet and at least once per room, and shall be visible from floor level.
4. Each outlet and hose bibb in the nonpotable system shall be posted: "CAUTION: NONPOTABLE WATER, DO NOT DRINK"

Lawn Irrigation Systems

1. A person may not sell, design, consult, install, maintain, alter, repair, or service an irrigation in Texas unless the person is a licensed irrigator by the TCEQ. A person who is licensed as an installer may only connect an irrigation system to a water supply while being under the direct supervision of a licensed irrigator.
2. The premises potable water system shall be protected from lawn irrigation systems with an approved atmospheric vacuum breaker, pressure vacuum breaker, spill-resistant pressure vacuum breaker, or reduced pressure assembly installed commensurate with the device's/assembly's pressure condition and required orientation.
3. The water distribution system shall be protected from lawn irrigation systems with an approved pressure vacuum breaker, spill-resistant pressure vacuum breaker, or reduced pressure assembly installed commensurate with the assembly's pressure condition and required orientation.

Make up Water to Boilers and Chillers

1. Make up water connections to steam and hot water boilers shall be provided with a reduced pressure backflow prevention assembly.
2. The assembly shall be located in the inlet piping to the boiler's pressure reducing valve.

New Water Service Connections

The Cross-Connection Control Manager shall review all requests for new water service connections to determine if containment cross-connection control is needed. If it is determined that a containment backflow prevention assembly is required, the assembly must be installed, inspected and tested for proper operation before water service is established.

GENERAL REQUIREMENTS**Parallel Installations**

1. Parallel installations of two or more backflow prevention assemblies of the same type is an effective means of insuring that uninterrupted water service is maintained during testing or repair, and is strongly recommended when such continuity is desired. Parallel installations shall be in accordance with the "Parallel Installation Table" on page 26.
2. The design and plan of implementation for parallel installations shall be submitted to the Cross-Connection Control Program Manager for approval prior to the installation.
3. Sites with service lines 10" or less shall utilize at least one line-sized assembly.
4. Where two line-sized assemblies are installed in parallel, one of the assemblies shall remain closed.
5. Sites with service lines 12" or larger shall utilize assemblies sized in accordance with the "Parallel Installation — Rated Flow Table" on page 12. The combined flow capacity of the parallel assemblies shall equal or exceed the flow capacity of the service line. For example: The combined flow capacity of two 8" assemblies (2 x 1600 gpm = 3200 gpm) would be sufficient on a 12" water service line (3000 gpm).
6. During testing and repair of parallel assemblies, the flow demand shall be reduced to match the flow rate of the remaining "on line" assembly. When a parallel assembly is left closed during normal operation, it shall be tested for proper operation before the main assembly is tested.
7. Where three parallel assemblies are sized in accordance with the "Parallel Installation — Rated Flow Table", one of the assemblies shall remain closed.

Parallel Installation Table		
Application	Service lines 10" and less	Service lines 12" and larger
Site can tolerate interruption of water service.	1 line sized BFP	2 rated flow sized BFPs in parallel
Site cannot tolerate interruption of water service, but can operate with reduced flow.	1 line sized BFP and one smaller in parallel to match reduced flow demand	2 rated flow sized BFPs in parallel
Site cannot tolerate interruption of water service or reduced flow.	2 line sized BFPs in parallel	3 rated flow sized BFPs in parallel

GENERAL REQUIREMENTS

Parallel Installation - Rated Flow	
Size of assembly or service line	Rated flow (gpm)
2-1/2	225
3	320
4	500
6	1000
8	1600
10	2300
12	3000
14	3700
16	4400

Tenant and Lease Facilities

1. Tenant and lease facilities such as fast food restaurants, service stations, snack bars, and sites used or managed by other than Ft. Bliss personnel, are considered to be premises having potable water systems that are impractical to ascertain whether or not proper isolation cross-connection control exists. Tenant / Lease facilities will require containment cross-connection control.
2. The Cross-Connection Control Manager shall maintain jurisdiction of containment backflow prevention assemblies on tenant and lease facilities and shall be included in the annual testing schedule.

Thermal Expansion

1. The installation of "non-return devices" such as backflow prevention assemblies, check valves, dual check valves, pressure reducing or pressure regulating valves, and water softeners between the water service connection and the domestic water heater may create a "closed domestic potable water system" preventing pressure relief through the building supply.
2. A UPC listed thermal expansion tank shall be installed between the "non return device" and the water storage tank heated by indirect means and heat input limited to 200,000 Btu/hr, water temperature limited to 210° F, and water capacity that does not exceed 120 gallons.
3. A thermal expansion tank shall be provided in accordance with ASME Code, Section VIII, Division 1, on boilers operating at pressures not exceeding 160 psig and water temperatures not exceeding 210° F when either of the following limitations is exceeded: heat input of 200,000 Btu/hr; or nominal

GENERAL REQUIREMENTS

water-containing capacity of 120 gallons (Texas Department of Licensing and Regulation, 16 Texas Administrative Code, Chapter 65). The thermal expansion tank shall be located on the cold water supply, the tank's air pressure matched to the system water pressure, and sized to total water heater capacity and supply pressure.

4. The backflow prevention technician shall indicate on the backflow prevention assembly test report form if the requirements for thermal expansion control are met.

Water Closets and Urinals

1. Water closet and urinal flushometer valves shall be equipped with an UPC listed atmospheric vacuum breaker.
2. The critical level of the vacuum breaker shall be at least six inches above the flood level rim of a water closet or the highest part of the urinal.
3. Water closet and urinal tanks shall be equipped with a UPC listed ball cock.

Water Treatment Units

Waste or discharge from reverse osmosis or other types of water treatment units shall enter the drainage system through an air gap.

GENERAL REQUIREMENTS

Defined

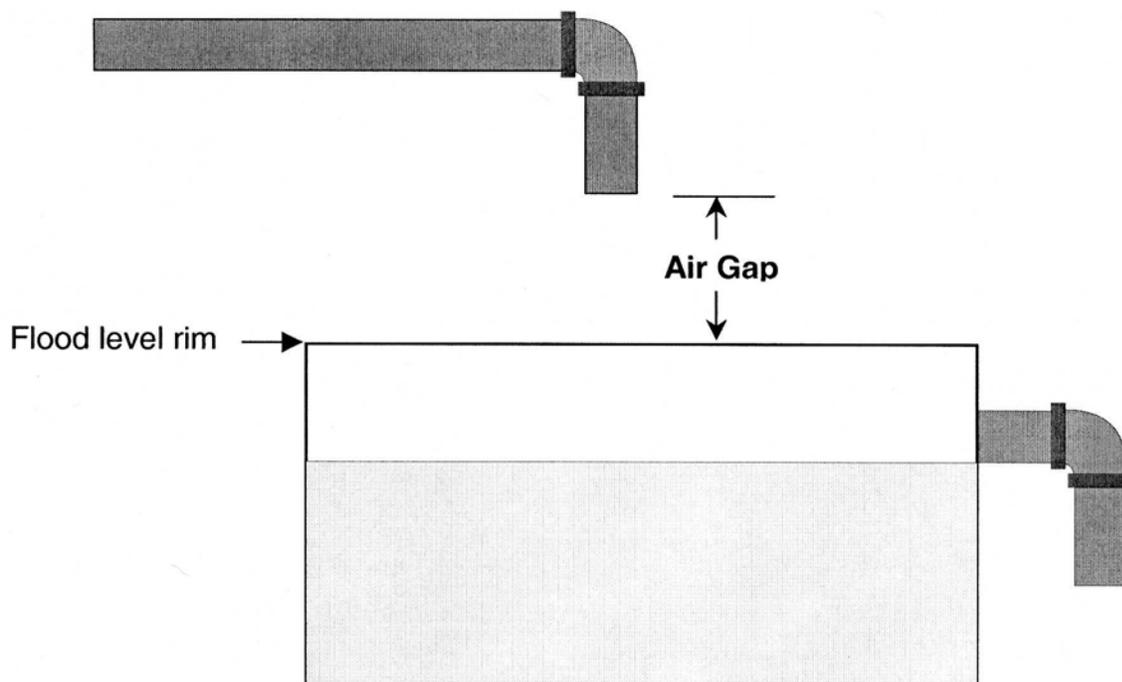
An air-gap is the unobstructed vertical distance through the free atmosphere between the discharge end of a potable water supply pipe and the flood level rim of an open or non-pressure vessel

Installation Requirements

1. The air gap must be at least twice the diameter of the water supply outlet above the flood level rim of a non-vessel or one inch, whichever is greater.
2. The air gap shall be installed with adequate access and clearance for inspection and located outside any enclosure or hooded area containing fumes that are toxic, poisonous, or corrosive.
3. A permanent platform is necessary whenever the air gap is installed more than five feet above floor or grade. The platform must be within five feet of the lowest part of the assembly and must meet all applicable safety standards and codes.

Inspection Requirements

Air gaps shall be inspected at the time of installation. In conjunction with testing backflow prevention assemblies at a particular site, or other activities, the technician shall inspect all air gaps to verify that the required vertical distance is maintained and that there is no hose connected to it. The air gap may be inspected more often when required by the Cross-Connection Control Program Manager.



Cross-Connection Control Manual
ATMOSPHERIC VACUUM BREAKER**Defined**

An atmospheric vacuum breaker consists of a float check, check seat, and an air inlet port. The AVB shall protect against health hazards under backsiphonage conditions only.

Installation Requirements

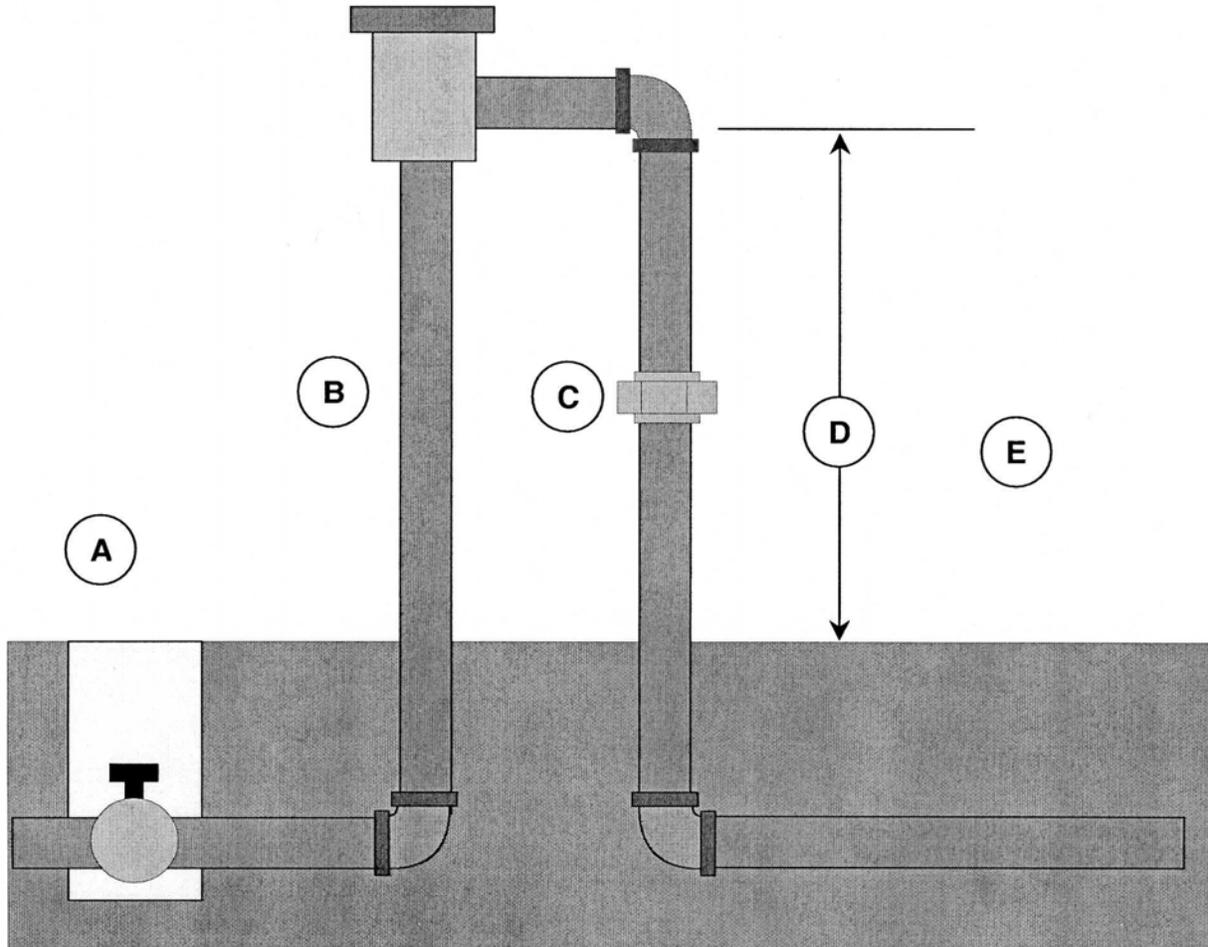
1. The AVB shall be used in isolation applications only. It shall not be used in containment applications.
2. The AVB shall be installed between 6" and 60" above grade, floor, or platform and at a minimum of 6" above the highest point of the device's outlet piping. The installation shall include unions.
3. There shall be no valves in the outlet piping of the AVB.
4. There shall be adequate drainage provisions to accommodate water discharge from flushing and operation.
5. Whenever the AVB is insulated, the insulation must be easy to remove in order to facilitate inspection and repair.
6. AVBs must be installed horizontal and plumb.
7. Immediately after installation and before service is restored, the device must be thoroughly flushed. This is accomplished by completely removing the float check and opening the inlet shut-off valve to flush debris that may foul the device.
8. The size of the AVB shall not be less than the size of the water supply piping.
9. The AVB shall be installed in accordance with the device's operating pressure and temperature rating.
10. The AVB shall be installed with adequate access and clearance for testing, maintenance, and repairs and outside any enclosure or hooded area containing fumes that are toxic, poisonous, or corrosive.
11. A permanent platform is necessary whenever the device is installed more than five feet above floor or grade. The platform must be within five feet of the lowest part of the device and must meet all applicable safety standards and codes.
12. The AVB shall be installed in accordance with the manufacturer's flow rate specifications. The flow rates and pressure loss due to increasing or decreasing flow rates will vary from one manufacturer to another.

Inspection Requirements

The AVB shall be inspected at the time of installation and on an annual schedule thereafter or more often when required by the Cross-Connection Control Program Manager.

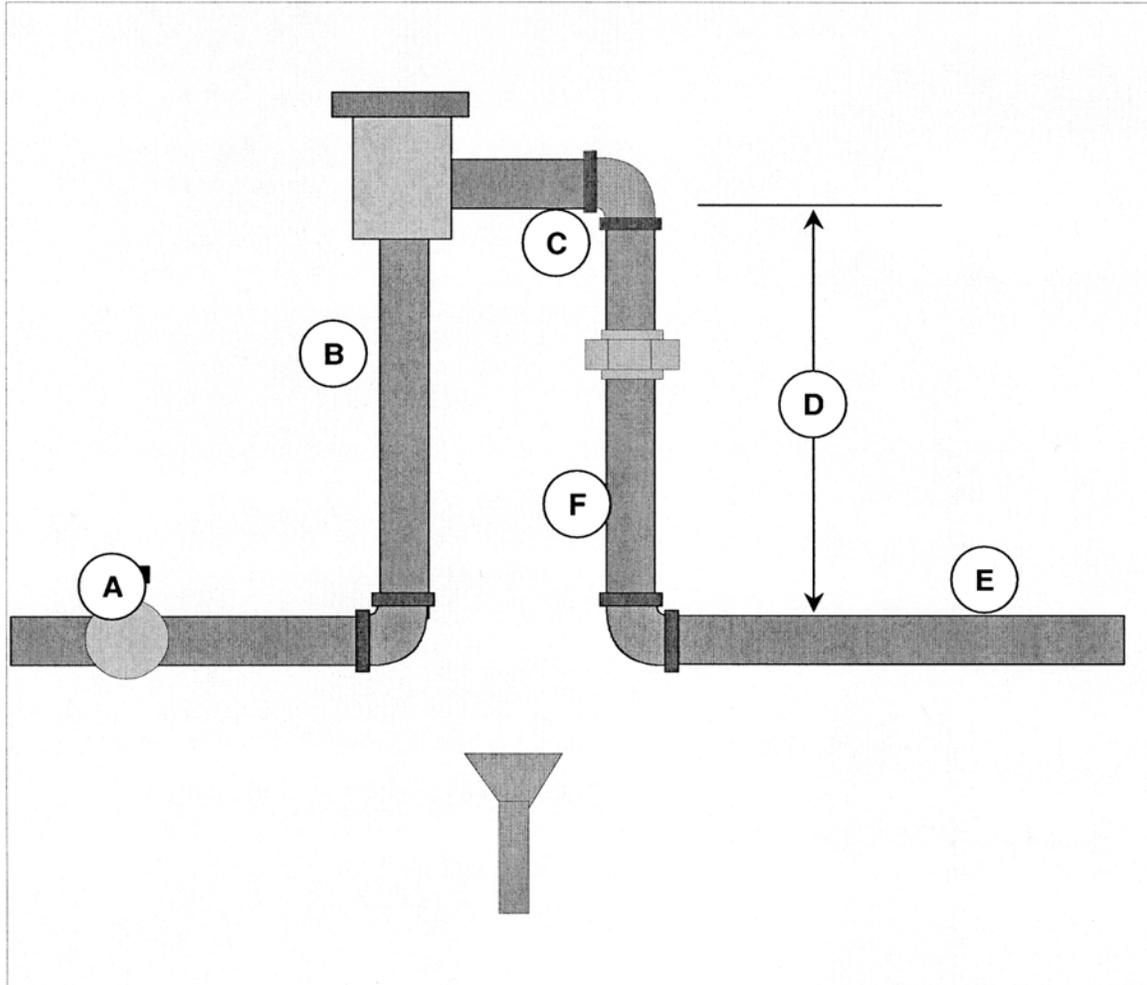
Cross-Connection Control Manual

ATMOSPHERIC VACUUM BREAKER



Outdoor Isolation Installation	
A	Shut off valve
B	Service line — cement lined ductile iron, copper, or galvanized piping
C	Union — above grade
D	Minimum 6" above grade and all outlet piping. Installations more than 60" above grade or floor require a permanent platform.
E	No valves allowed in outlet piping

Cross-Connection Control Manual
ATMOSPHERIC VACUUM BREAKER



Outdoor Isolation Installation	
A	Shut off valve
B	Service line — cement lined ductile iron, copper, or galvanized piping
C	Union
D	Minimum 6" above grade and all outlet piping. Installations more than 60" above grade or floor require a permanent platform.
E	No valves allowed in outlet piping
F	Provide adequate drainage

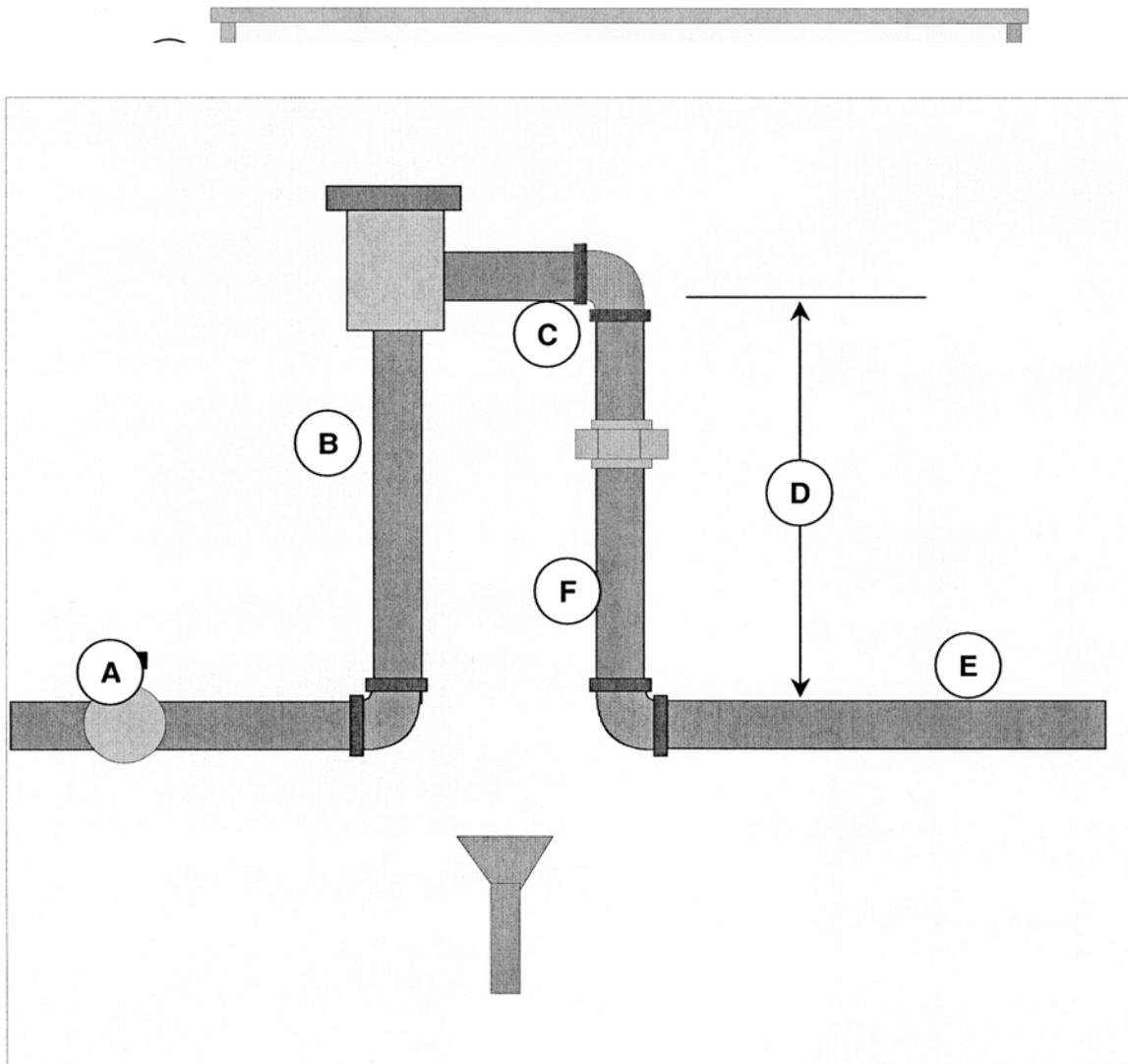
DOUBLE CHECK VALVE ASSEMBLY**Double Check Valve Assembly Defined**

A double check valve backflow prevention assembly consists of two independently acting internally loaded check valves, four properly located resilient seated test ports, and two resilient seated isolation valves at each end of the assembly.

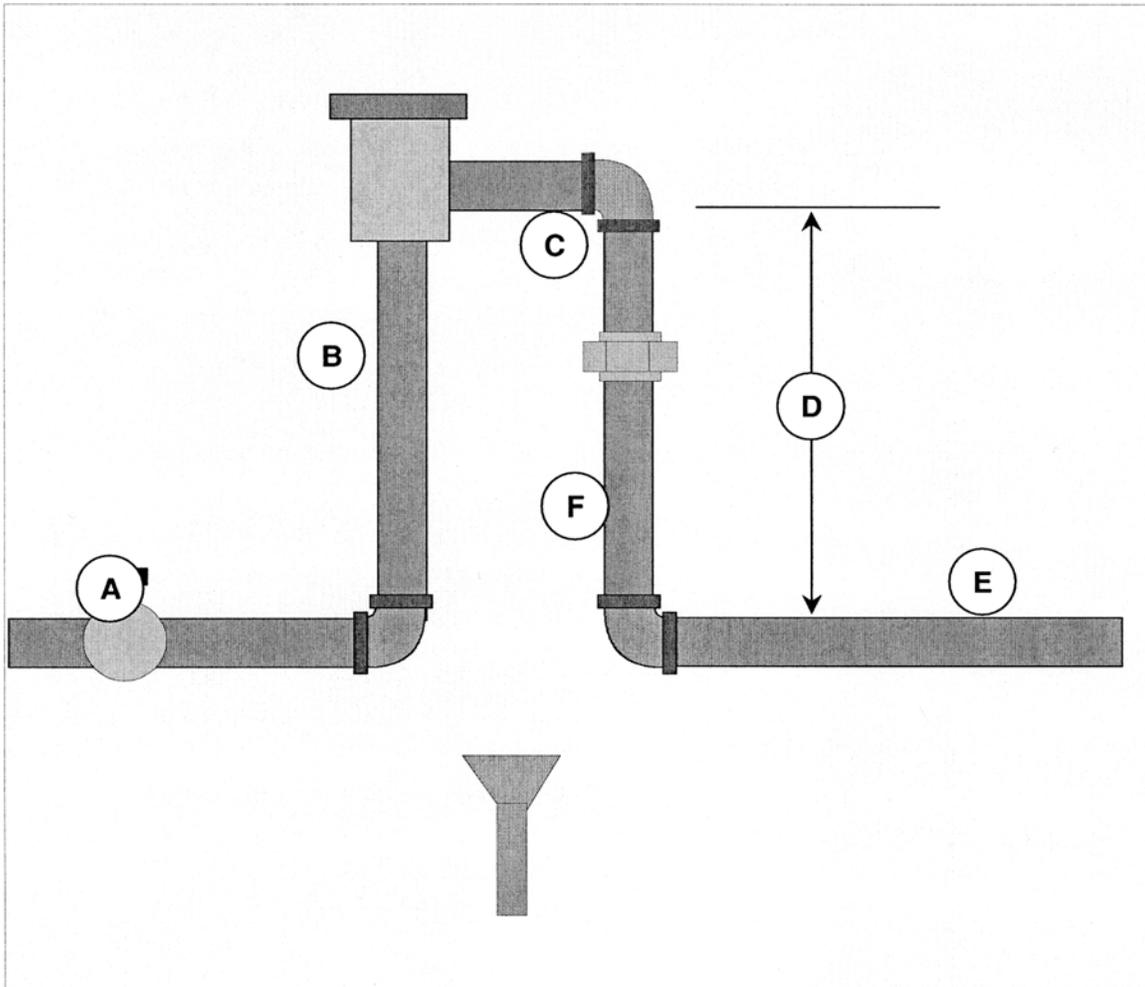
Installation Requirements

1. The DC must be installed between 12" and 36" above grade from the lowest part of the assembly for outdoor installations, and between 12" and 60" above floor or grade from the lowest part of the assembly for indoor installations.
2. The DC shall not be subjected to flooding. There shall be adequate drainage provisions to accommodate water discharge from flushing and testing.
3. Whenever the DC is insulated, the insulation must be easy to remove in order to facilitate testing and repair.
4. DCs must be installed horizontal and plumb unless specifically noted in the "List of Approved Backflow Prevention Assemblies" published by FCCCHR.
5. Thermal expansion and/or water hammer in the outlet piping of the assembly can cause excessive pressure (backpressure). A water hammer arrestor, thermal expansion tank, resilient seated check valve, or surge suppresser installed in the outlet piping is recommended to avoid damage to the piping system and the assembly.
6. Assemblies 2-1/2" and larger must be adequately supported.
7. Immediately after installation and before the assembly is tested or service is restored, the assembly must be thoroughly flushed. This is accomplished by completely removing the No. 1 check valve and opening the No. 1 shut-off valve to flush debris that may foul the assembly.
8. The size of the DC shall not be less than the size of the water supply piping.
9. The DC shall be installed in accordance with the assembly's operating pressure and temperature rating
10. The DC shall be installed with adequate access and clearance for testing, maintenance, and repairs and outside any enclosure or hooded area containing fumes that are toxic, poisonous, or corrosive.
11. A permanent platform is necessary whenever the assembly is installed more than five feet above floor or grade. The platform must be within five feet of the lowest part of the assembly and must meet all applicable safety standards and codes.
12. The DC shall be installed in accordance with the manufacturer's flow rate specifications. The flow rates and pressure loss due to increasing or decreasing flow rates will vary from one manufacturer to another.

Cross-Connection Control Manual
DOUBLE CHECK VALVE ASSEMBLY



Outdoor Installation	
A	Shutoff valve and valve box
B	Thrust blocking
C	Service line — cement line ductile iron, copper, or galvanized piping
D	Sleeve with insulation (typical)
E	4" concrete slab (3000 psi, reinforced w/1/2 rebar & 4" mesh, scored)
F	12" minimum / 36" maximum from lowest part of assembly
G	Metal supports on assemblies 2½" and greater (typical)
H	Unions or flanges — above grade (typical)



Indoor Installations	
A	Service line — cement lined ductile iron, copper, or galvanized piping
B	Sleeve with insulation (typical)
C	12" minimum / 36" maximum from lowest part of assembly
D	Metal supports
E	Unions or flanges
F	Provide adequate drainage

Defined

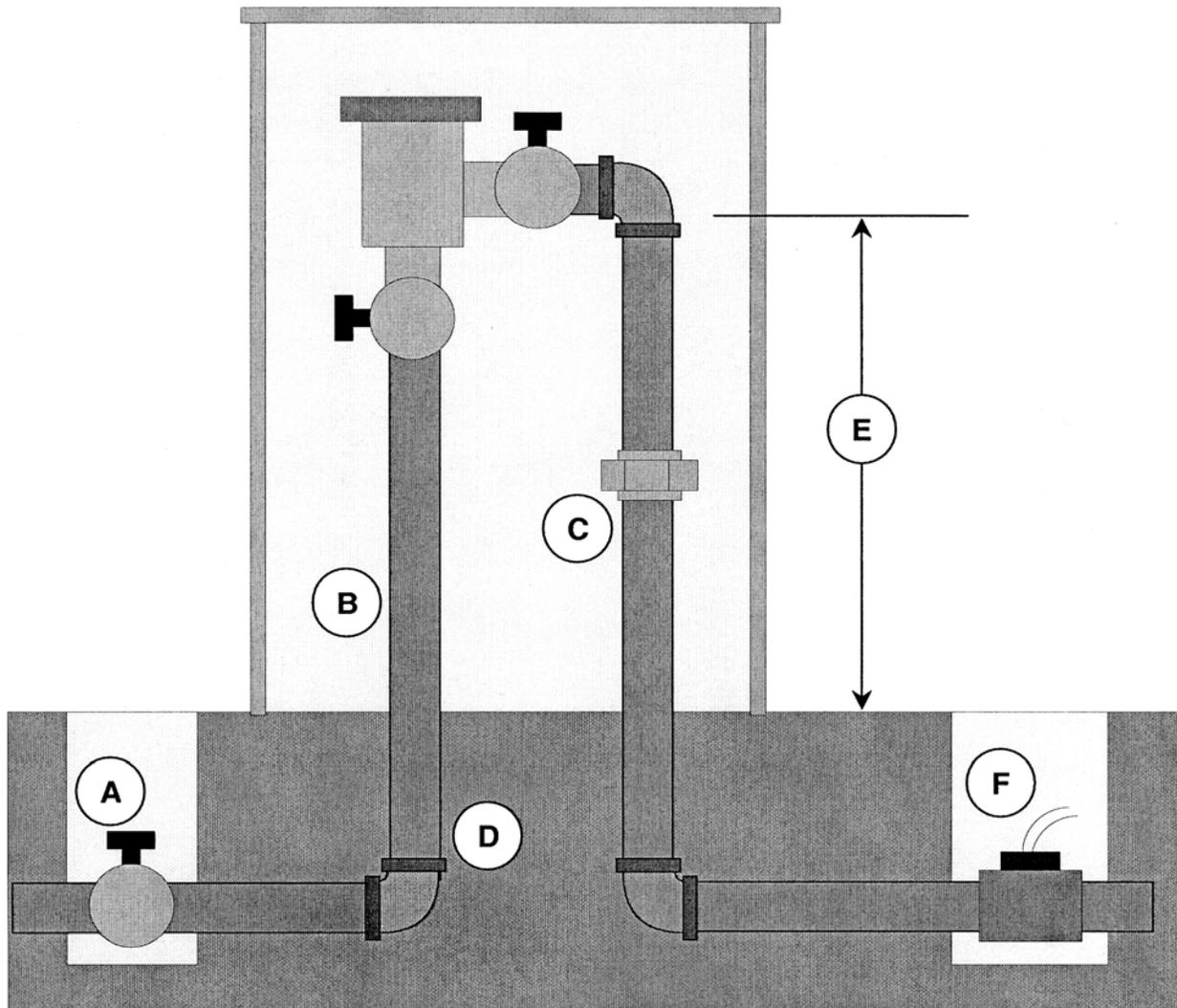
A pressure vacuum breaker assembly consists of an independently operating internally loaded check valve and an independently operating loaded air inlet valve on the discharge side of the check valve. The assembly shall be equipped with two properly located resilient seated test ports and two resilient seated isolation valves at each end of the assembly.

Installation Requirements

1. The PVB shall be installed between 12" and 60" above grade, floor, or platform and at a minimum of 12" above the highest point of the assembly's outlet piping. The assembly installation shall include unions.
2. There shall be adequate drainage provisions to accommodate water discharge from flushing and testing.
3. Whenever the PVB is insulated, the insulation must be easy to remove in order to facilitate testing and repair.
4. PVBs must be installed horizontal and plumb.
5. Immediately after installation and before the assembly is tested or service is restored, the assembly must be thoroughly flushed. This is accomplished by completely removing the air inlet valve and the check valve and opening the No. 1 shut-off valve to flush debris that may foul the assembly.
6. The size of the PVB shall not be less than the size of the water supply piping.
7. The PVB shall be installed in accordance with the assembly's operating pressure and temperature rating.
8. The PVB shall be installed with adequate access and clearance for testing, maintenance, and repairs and outside any enclosure or hooded area containing fumes that are toxic, poisonous, or corrosive.
9. A permanent platform is necessary whenever the assembly is installed more than five feet above floor or grade. The platform must be within five feet of the lowest part of the assembly and must meet all applicable safety standards and codes.
10. The PVB shall be installed in accordance with the manufacturer's flow rate specifications. The flow rates and pressure loss due to increasing or decreasing flow rates will vary from one manufacturer to another.
11. In containment applications, the PVB shall only be used for dedicated lawn irrigation systems such as parks, medians, and golf courses.

Cross-Connection Control Manual

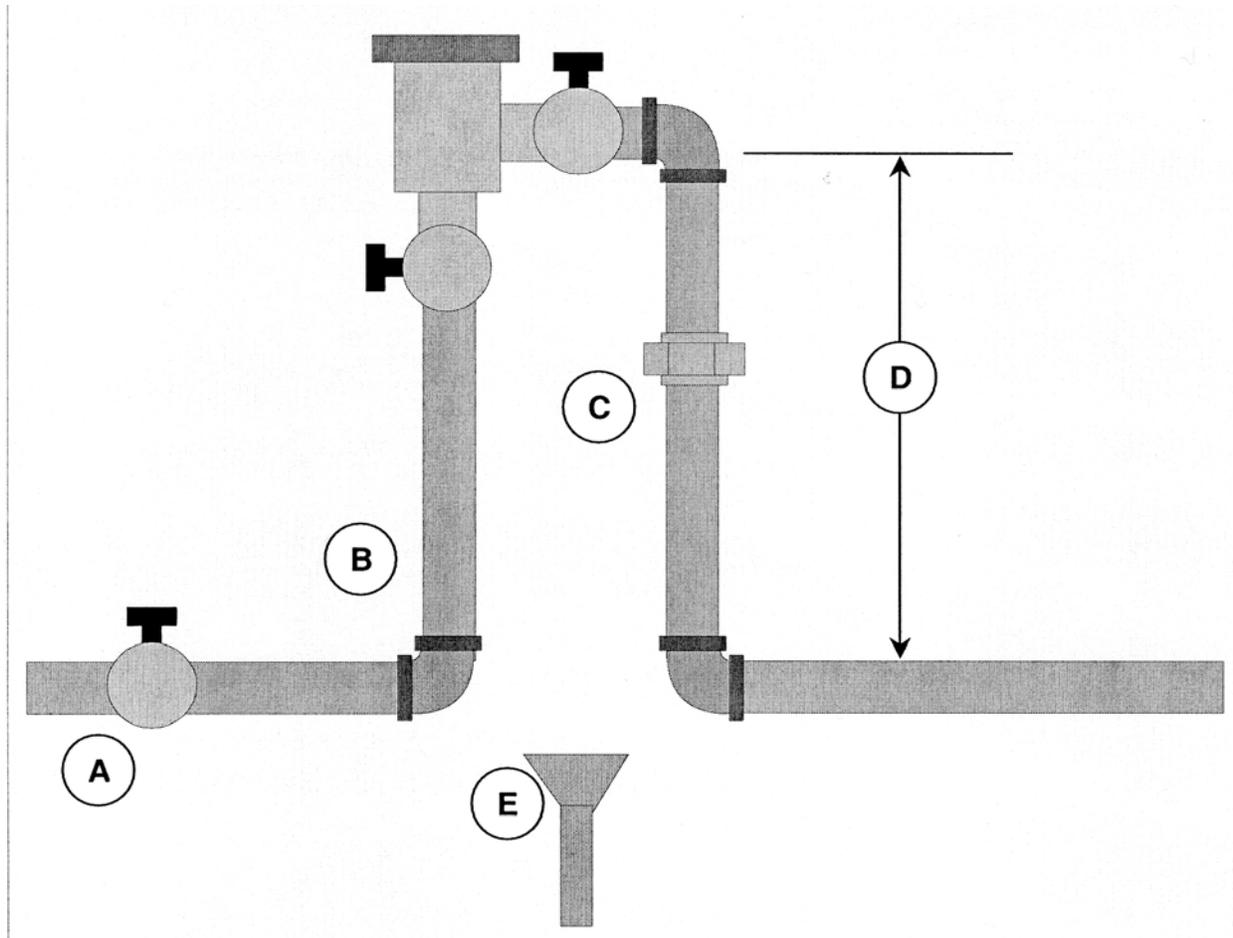
PRESSURE VACUUM BREAKER



Outdoor Installations	
A	Shut off valve
B	Service line — cement lined ductile iron, copper, or galvanized piping
C	Union — above grade
D	Protective enclosure
E	Minimum 12" above grade and all outlet piping. Installations more than 60" above grade or floor require a permanent platform
F	Master or zone valve — if applicable

Cross-Connection Control Manual

PRESSURE VACUUM BREAKER



Indoor Installation	
A	Shut off valve
B	Service line — cement lined ductile iron, copper, or galvanized piping
C	Union
D	Minimum 12" above all outlet piping. Installations more than 60" above grade or floor require a permanent platform
E	Provide adequate drainage

REDUCED PRESSURE PRINCIPLE ASSEMBLY**Defined**

A reduced pressure principle backflow prevention assembly consists of two independently acting internally loaded check valves and a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and below the first check valve. The assembly shall be equipped with two properly located resilient seated test ports, and two resilient seated isolation valves at each end of the assembly.

Installation Requirements

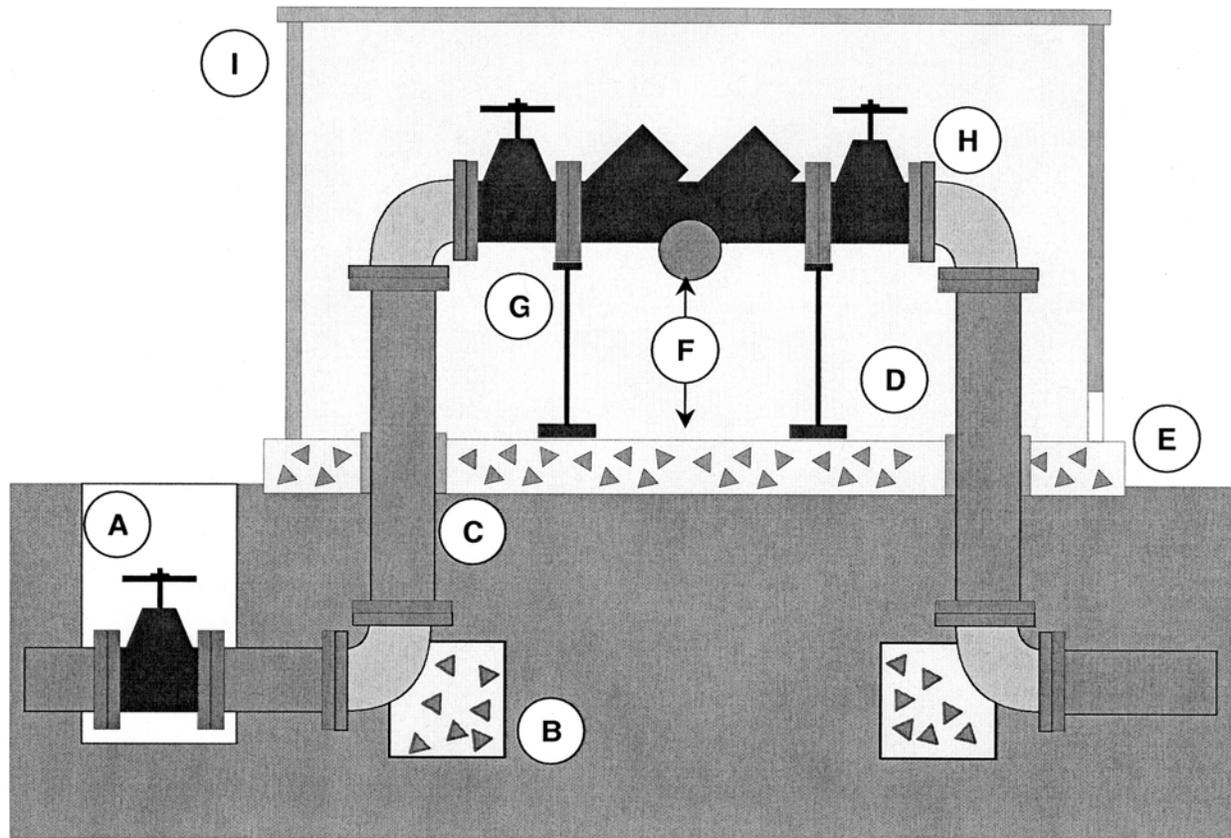
1. The RP must be installed between 12" and 36" above grade from the lowest part of the assembly for containment installations, and between 12" and 60" above floor or grade from the lowest part of the assembly for isolation installations. The assembly shall not be subjected to flooding.
2. Drainage requirements for the RP must be hydraulically calculated to handle the maximum relief valve discharge rate; see "Relief Valve Discharge Rates" chart on page 43. Most manufacturers' air-gap drains are designed to only handle occasional "spitting" from the relief valve and will not accommodate a full discharge. An approved air-gap separation at the relief valve is required.
3. RPs must be installed in locations where intermittent and continuous discharge from the relief valve will not be objectionable.
4. Whenever the RP is insulated, precautions must be taken to prevent blockage of the relief valve opening and access to components. The insulation must be easy to remove in order to facilitate testing and repair.
5. RPs must be installed horizontal and plumb unless specifically noted in the "List of Approved Backflow Prevention Assemblies" published by the FCCCHR.
6. Thermal expansion and/or water hammer in the outlet piping of the assembly can cause excessive pressure. A water hammer arrestor, thermal expansion tank, spring-loaded resilient seated check valve, or surge suppresser installed in the outlet piping is recommended to avoid damage to the piping system and the assembly.
7. Fluctuating inlet pressure may cause intermittent discharge of the relief valve and eventual fouling of the assembly. In a static condition, the zone between the two check valves must be maintained at least 2.0 psi below the supply pressure. A resilient seated check valve installed in the inlet piping of the RP is recommended to maintain constant pressure of the zone during water supply pressure fluctuations.
8. Assemblies 2-1/2" and larger must be adequately supported.
9. Immediately after installation and before the assembly is tested or service is restored, the assembly must be thoroughly flushed. This is accomplished by

REDUCED PRESSURE PRINCIPLE ASSEMBLY

completely removing the No. 1 check valve and opening the No. 1 shut-off valve to flush debris that may foul the assembly.

10. The size of the RP shall not be less than the size of the water supply piping.
11. The RP shall be installed in accordance with the assembly's operating pressure and temperature rating.
12. The RP shall be installed with adequate access and clearance for testing, maintenance, and repairs and outside any enclosure or hooded area containing fumes that are toxic, poisonous, or corrosive.
13. A permanent platform is necessary whenever the assembly is installed more than five feet above floor or grade. The platform must be within five feet of the lowest part of the assembly and must meet all applicable safety standards and codes.
14. The RP shall be installed in accordance with the manufacturer's flow rate specifications. The flow rates and pressure loss due to increasing or decreasing flow rates will vary from one manufacturer to another.

REDUCED PRESSURE PRINCIPLE ASSEMBLY

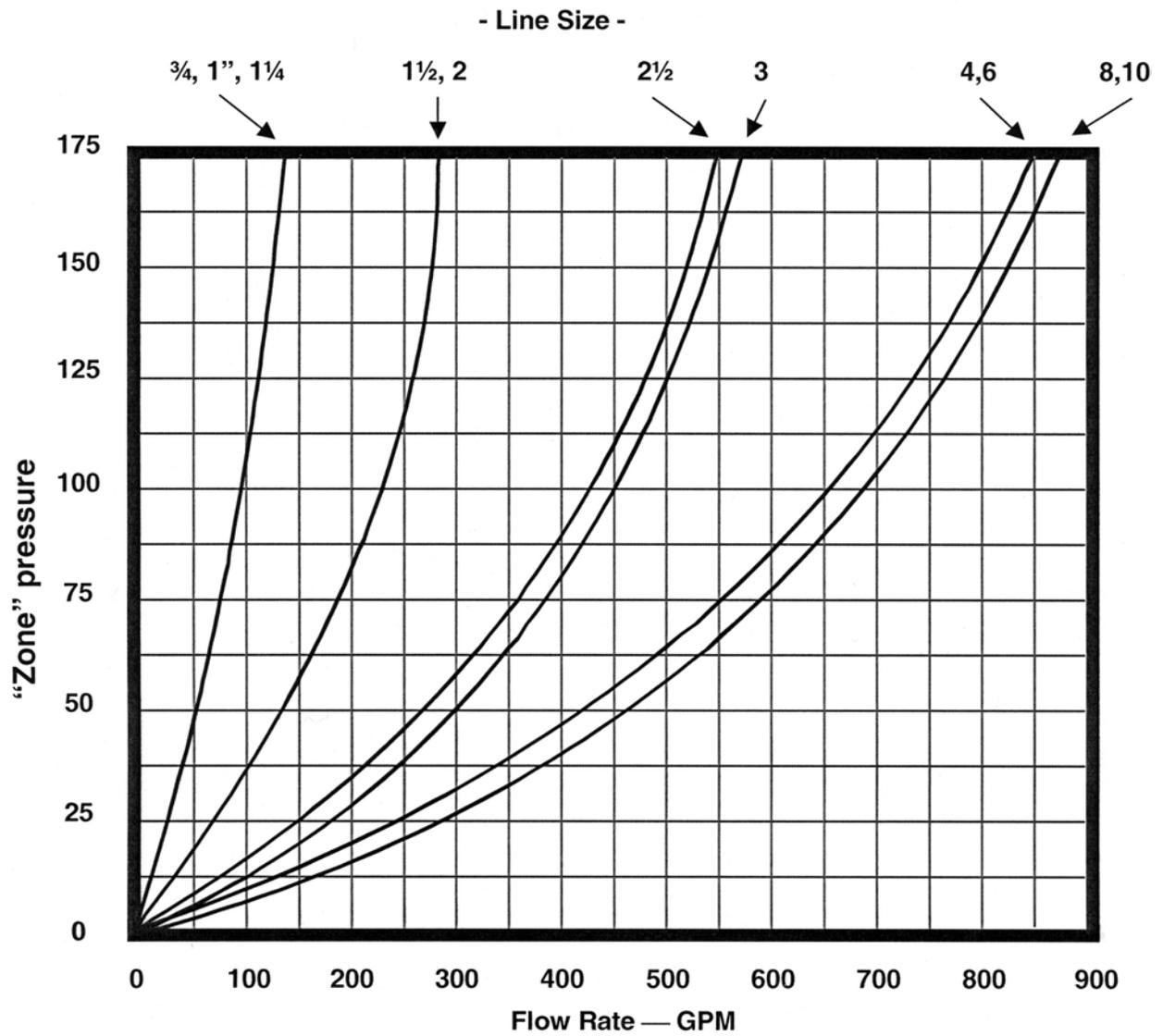


Outdoor Installations	
A	Shutoff valve and valve box
B	Thrust blocking
C	Service line — cement lined ductile iron, copper, or galvanized piping
D	Sleeve with insulation (typical)
E	4" concrete slab (3000 psi, reinforced w/1/2" rebar & 4" mesh, scored)
F	12" minimum / 36" maximum from lowest part of assembly
G	Metal supports on assemblies 2½" and greater (typical)
H	Unions or flanges — above grade (typical)
I	Protective enclosure with drain (see "Relief Valve Discharge Rates" page 43)

Cross-Connection Control Manual

REDUCED PRESSURE PRINCIPLE ASSEMBLY

Relief Valve Discharge Rates



Flow Rate	Drain Size	Flow Rate	Drain Size
55	2	350	5
112	3	450	6
170	4	760	8

SPILL-RESISTANT PRESSURE VACUUM ASSEMBLY**Defined**

A spill-resistant pressure vacuum breaker assembly consists of an independently operating internally loaded check valve and an independently operating loaded air inlet valve on the discharge side of the check valve. The assembly shall be equipped with one properly located resilient seated test port and vent valve and two resilient seated isolation valves at each end of the assembly.

Installation Requirements

1. The SVB is intended for indoor installations.
2. The installation requirements for the SVB are the same as the requirements for the PVB.

Education and Training

The Cross-Connection Control Program Manager will establish and maintain cross-connection control education and training for Ft Bliss personnel. Continuous education and training of personnel is essential to insure that people involved in every part of the program have current information. Examples of continuous education and training are as follows:

1. Contractor orientation on acceptable new construction practices. This is applicable to all crafts prior to beginning work.
2. Awareness workshops for Ft. Bliss personnel such as engineers, inspectors, designers, janitorial, and all crafts.
3. Manufacturer hands on training on the use of product used at Ft. Bliss.
4. Forty-hour certification courses repeated every three years.
5. Distribution of printed material for building occupants.

SEVERABILITY / VIOLATIONS**Severability**

If any provision, section, subsection, sentence, clause, or phrase of this manual, or the application of same to a given set of circumstances, is for any reason held to be invalid, the validity of the remaining portions of the manual shall not be affected.

Violations

The following shall be grounds for the discontinuance of water service:

- Removal or bypassing of any backflow prevention method, device, or assembly;
- Falsification of test reports;
- Obtaining water from a fire hydrant in violation of cross-connection control requirements;
- Connecting a fire protection system to a premises potable water system;
- Allowing uncontrolled cross connections to exist; or
- Failure to cooperate in the installation, maintenance, testing or inspection of backflow prevention assemblies as required by this guidance. Water service shall not be restored until such conditions are corrected.

Discontinuance of water service may be immediate, and without written notice, whenever, in the judgment of the Cross-Connection Control Program Manager, such action is necessary to protect the safety of the premises or the purity of the water distribution system.

Cross-Connection Control Manual

APPROVAL

Approved this ____ day of _____, 2001

By _____

REFERENCES and WORKS CITED

- 16 Texas Administrative Code, Chapter 65. Administrative Rules of the Texas Department of Licensing and Regulation.
- City of Albuquerque, Cross Connection Prevention and Control Ordinance. Albuquerque. 1995.
- El Paso Water Utilities Public Service Board. Cross-Connection Control Program, Manual of Procedures. El Paso. 1996.
- Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California. Manual of Cross-Connection Control. 9th ed. Los Angeles, 1993.
- International Association of Plumbing and Mechanical Officials. Uniform Plumbing Code. 2000 ed. Walnut, 1999.
- Lower Valley Water District, Cross-Connection Control Program, Manual of Procedures. Socorro. 1999.
- New Mexico Environment Department, Title 20 Environmental Protection, Chapter 7. Wastewater and Water Supply Facilities.
- Texas Administrative Code. Chapter 290, Public Drinking Water.
- Texas Health and Safety Code, Chapter 341. Minimum Standards of Sanitation and Health Protection Measures.

Revision Number: 4

Revision Date: 30 March 2009

**Fort Bliss Directorate of Public Works Environmental Division
Requirements for Planning, Design, and Construction**



PURPOSE

This document provides guidance on environmental requirements, policies, and general concerns based upon previous experiences pertaining to the Fort Bliss Army Installation. The purpose of this document is to ensure that all information gaps regarding environmental issues associated with proposed construction projects are closed. The information contained herein serves as an environmental reference for project stakeholders throughout all phases of construction-related activities (conceptual, proposal phase, design, and construction). Topics addressed are derived from a combination of feedback provided for NEPA project document reviews, and information communicated to stakeholders at construction-related project meetings by Directorate of Public Works-Environmental Division (DPW-E) staff. This is a living document, and as such, all information is subject to change as policies are revised, legal requirements change, and new environmental impacts are identified.

Note: All construction activities need to be reviewed by DPW-E prior to any ground disturbance to ensure there are no environmental issues, including historic properties.

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AIR QUALITY

Refrigeration (Comfort Cooling/Dining Facilities/Cold Storage)

The use of non-ODC (ozone depleting compounds) shall be used in any refrigeration unit. Class II ODC will be phased out starting 2020 and use of non-ODC will meet phase out deadline and requirements under Clean Air Act, Title VI (40 CRF 82).

ARCHEOLOGY

Archeological sites, artifacts, and historic buildings on Fort Bliss are protected by Federal law and Army regulations. Surface collection, excavation, or willful destruction of archeological sites and artifacts (arrowheads, pottery, bottles, etc.) is subject to criminal penalties including fines and incarceration. Disturbing human graves or remains is strictly protected by law. Willful excavation or disturbance of human burials is subject to criminal penalties including fines and incarceration. In the event of inadvertent discovery of archeological sites, artifacts, or human remains, cease work and contact DPW-E Archeology staff.

ASBESTOS

Asbestos Management Requirements

IAW 40 CFR 61 NESHAP, an asbestos survey is required to determine if regulated asbestos containing material (RACM) in excess of the regulatory thresholds will be disturbed. In the event that RACM will be removed above the regulatory thresholds, a 10- day notice to the State will be required to be submitted. All demolitions will require the 10-day notification regardless of whether a building contains asbestos. Asbestos disposal requires a Hazardous Waste Manifest for tracking purposes. Hazardous Waste Manifests for asbestos will be signed by the Asbestos Contractor as the Generator's Representative. In addition, asbestos must be disposed of by the contractor at an off-post approved landfill that accepts asbestos-containing material at the contractor's expense. All other regulated and hazardous wastes must be properly handled, stored, and disposed of in accordance with local, state, and federal laws and regulations.

LEAD

Lead Management Requirements

Prior to building demolition, a Toxicity Characteristic Leaching Procedure (TCLP) sample for lead shall be sampled and analyzed in accordance with EPA's SW 846 procedure. If the sample is determined to be above the TCLP threshold, the lead-containing material must be disposed of by the contractor at an off-post approved landfill that accepts lead-containing material at the contractor's expense. In the event that building material will be segregated, the waste stream will be identified and a TCLP sample shall be analyzed for Lead IAW EPA's SW 846 procedure. Only non lead-containing material may be offered for reuse.

Whole building demolition debris

Consists of all building components (painted and non-painted) to include wood, brick, cement (foundations), plaster, drywall, etc. that are torn down during demolition and collected for disposal. Waste characterization is based on analyses of samples that are "representative" of the waste. Therefore, proportionate quantities of the various structural components can be obtained (e.g., by coring or drilling through the materials) and combined for analyses in accordance with the TCLP requirements.

Partial Demolition (Building Renovation)

May consist of a variety of components (painted and non-painted) such as those in whole building demolition debris, but does not entail entire building/structure. Same sampling procedures as discussed above may be used. A second option involves careful predetermination and characterization of the individual components to allow for special waste handling and segregation procedures during the operations. Careful segregation is more feasible for renovations/partial demolitions than for whole building demolition and may reduce the volume of hazardous waste. Where segregation is not practical for a particular operation the overall "representative" sample approach should be used. A cost analyses may be beneficial to determine waste management practices

EPAS

The Army's Environmental Performance Assessment System (EPAS) program is administered through the DPW-E Multimedia Compliance Branch. The goal of this program is to administer environmental compliance audits objectively and comprehensively, provide professional and technically correct audits, and foster environmental responsibility in all personnel who can affect the environment at Fort Bliss. EPAS staff will coordinate with the appropriate construction project personnel to schedule audits.

HAZARDOUS MATERIAL

Definition

Any item or chemical which is a "health hazard" or "physical hazard" as defined by the Occupational Safety and Health Act (OSHA) in 29 CFR 1910.1200, which includes the following:

- (1) Chemicals which are carcinogens, toxic, or highly toxic agents, reproductive toxins; irritants, corrosives, sensitizers, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucus membranes.
- (2) Chemicals which are combustible liquids, compressed gases, explosives, flammable liquids, flammable solids, organic peroxides, oxidizers, pyrophorics, unstable (reactive) or water-reactive.

(3) Chemicals which in the course of normal handling, use, or storage operations may produce or release dusts, gases, fumes, vapors, mists or smoke which have any of the above characteristics.

(4) Any item or chemical which is reportable or potentially reportable or notifiable as inventory under the requirements of the Hazardous Chemical Reporting (40 CFR 370), or as an environmental release under the reporting requirements of the Toxic Chemical Release Reporting: Community Right To Know (40 CFR 372), which include chemicals with special characteristics which in the opinion of the manufacturer can cause harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other receptacles).

(5) Any item or chemical which, when being transported or moved, is a risk to public safety or an environmental hazard and is regulated as such by one or more of the following:

- (a) Department of Transportation Hazardous Materials Regulations (49 CFR 100–180).
- (b) International Maritime Dangerous Goods Code of the International Maritime Organization.
- (c) Dangerous Goods Regulations of the International Air Transport Association.
- (d) Technical Instructions of the International Civil Aviation Organization.
- (e) U.S. Air Force Joint Manual, Preparing Hazardous Materials for Military Air Shipments (AFJMAN 24–204).

Hazardous Material Storage-Interior

Any maintenance bay (Tactical Equipment Maintenance Facility (TEMF)) or other facility containing hazardous materials must allocate (in design documents) space for hazardous material storage areas (in accordance with compatibility of materials being stored). Specifically, the inside of the facility must contain a designated area for flammable lockers, and secondary containment for hazardous materials being used. Fluid distribution rooms within TEMFs require secondary containment for all hazardous materials (e.g., petroleum, oil, lubricant, and antifreeze products). Floor drains within fluid distribution rooms are not permitted.

Hazardous Material Storage-Exterior

The outside of the facility must contain a designated area for a self-contained Hazstore building (with segregated compartments to provide for storage of incompatible materials such as acids, caustics, reactive metals, reactive organic compounds, flammable solvents, and oxidizers) or buildings depending on quantities used. This area must also be able to be accessed by a 10K forklift. Hazardous material is always separated from hazardous waste and for this reason, Hazstore buildings should be considered discrete requirements for each media (materials and waste).

Best Management Practices (BMPs) for storm water require that secondary containment be provided to preclude rain flows from carrying hazardous material contaminants.

Roofs are BMPs that are usually built over these secondary containment areas to preclude evacuation of rain waters after each event from containment area. Unroofed areas have valves that allow rain water release from containments but are problematic because units leave valves open continuously to avoid opening and closing the valves after rain events. These areas are usually secured by fencing by the unit to protect costly materials for accountability reasons.

HAZARDOUS WASTE

Definition

A waste identified in Section 3, Part 261, Title 40, Code of Federal Regulations (40 CFR 261.3) or applicable foreign law, rule, or regulation.

Hazardous Waste Generation-Contractor

Hazardous waste generated incidental to the execution of service or construction contracts should be disposed of by the contractor performing the basic contract, at the contractor's expense, using the installation's generator identification number on the manifest. Such actions must be coordinated with the installation environmental coordinator and documented in writing.

Hazardous Waste Storage

Definition

As defined in 40 CFR 260.10, the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

Description

Storage of hazardous waste requires control, segregation of compatibles, and secondary containment. HazStor buildings are preferred by DPW-E because they set a standard for storage and send a clear message that hazardous waste is highly regulated. Non-compliance with hazardous waste storage regulations results in expensive fines (\$15,000/day). HazStor buildings are weather tight, have ramps, secondary containment, shelving, and barriers to separate incompatibles. Although HazStor buildings are not required, their characteristics must be incorporated into all hazardous waste storage designs. Any new construction designs should include ramping (drums are heavy), material incompatibility (physical barriers), secondary containment, control, and proper signage. Two HazStor modulares (12'x24'); one being 3-compartments, and one being a single compartment is sufficient for each side of the current 2-sided motorpools.

HISTORICAL ARCHITECTURE

DPW-E maintains a list of buildings that require review under Section 106 of the National Historic Preservation Act prior to expenditure of funds for modification, repair,

renovation, or other change to the interior or exterior, including landscape. New construction and exterior renovations to existing facilities not on the list also requires review if the facility is within the viewshed. Contact DPW-E prior to starting work on any project involving new construction or changes to existing facilities or landscapes.

LANDSCAPING (AT ANY BUILDING)

Implementing the following recommendations will promote long term success resulting in water conservation, reduction in expenditures, and fewer maintenance needs.

(1) Use species from the “Top 10 Trees for Fort Bliss Landscape Projects” poster (copies available upon request). Tree selections include Honey Mesquite (*Prosopis glandulosa* var. *glandulosa*), Chinese Pistache (*Pistacia chinensis*), Western Soapberry (*Sapindus drummondii*), Honey Locust (*Gleditsia triacantha* var. *inermis*), Desert Willow (*Chilopsis linearis*), Afghan Pine (*Pinus eldarica*), and Escarpment Live Oak (*Quercus fusiformis*). These species are “water smart” plants, have fewer pests (if any), and once established, require little of no fertilization and will increase the chances for long term landscape success. These trees are either native or adaptable to the arid environment of Fort Bliss.

(2) An exhaustive list of low-water use trees, shrubs, and other plant options for our region can be consulted on species lists prepared by El Paso County, Texas. The Environmental Division has copies of these lists as well.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

All construction actions must undergo NEPA analysis prior to project ground-breaking. NEPA reviews may include project designs, specifications, and plans. A complete description of the action should be presented at the time of the generation of the 1391. The Fort Bliss NEPA Team will review and then generate a Tab J for the project that may include NEPA documentation. If the proposed action has been reviewed in previous documentation, that documentation must be supplied. If the project is part of a wider action or if project descriptions indicate a potential for significant action or for not meeting the screening criteria as set forth in 32 CFR 651.29, then the Tab J will not include the requisite NEPA documentation. Funding for separate NEPA analysis will then need to be obtained by you or the proponent through the proper funding process. This NEPA documentation can be at the level of an Environmental Assessment (EA) or an Environmental Impact Statement (EIS), so early planning is essential. The NEPA Coordinator, with concurrence of the NEPA Board, can assist in determining the level of analysis required, generating the proper documentation, and if possible, in changing the proposed action to one that will require a lower level of environmental review.

PESTICIDES

Pesticides are chemicals designed to kill a variety of pests, pose a health risk if mishandled, and are highly regulated. Only certified applicators that are coordinated with the Installation Pest Management Program (IPMP) are allowed to handle and apply

pesticides at Fort Bliss. Technicians are not approved to apply pesticides on the installation.

All contracts involving pesticide applications must be coordinated with the Installation Pest Management Coordinator (IPMC) at DPW-E. The types and amounts of pesticides used on the installation must be recorded and submitted to the IPMC using the IPMP formats.

PETROLEUM STORAGE TANKS

Automated Used POL Collection Systems

In the past, automated, pneumatic used oil and used antifreeze collection systems have been installed in several TAC shops. These systems have had numerous problems and have not worked well for Fort Bliss.

These systems are high maintenance and very expensive to repair. Common problems include but are not limited to:

- (1) The system continues to pump used oil/antifreeze into the Aboveground Storage Tank (AST) until it overflows or squirts fluid out thru the tank vent.
- (2) The collection sump overflows because the sensor in the sump does not trigger the pump. The expense to replace the pressure sensor device alone was \$5,000 at one site.
- (3) The underground lines get plugged-up from the debris in the used oil and antifreeze.
- (4) The underground lines need to be tightness tested annually and if they fail, the floor must be torn up to repair them. Cathodic protection is required for steel POL lines buried in concrete but these lines do not have it. All POL lines need to be installed aboveground to avoid these issues.

Automated systems are over-engineered and rely too heavily on mechanical devices that fail. There needs to be human involvement in the disposal of these used POL fluids to prevent spills and releases to the environment. In summary, these systems are too automated, resulting in lack of attention toward environmental issues.

The design plans usually refer to the used oil and antifreeze as “waste” oil and “waste” antifreeze. When the systems are installed, the word “waste oil” or “waste antifreeze” is usually painted on the tanks and piping. When a state or federal regulator sees the word “waste oil” he assumes that the oil is hazardous and contains solvents or other constituents besides oil. Therefore, label all used oil above ground oil tanks as “USED OIL”, and used antifreeze labeled as “USED ANTIFREEZE”.

Even if an AST has an automatic tank monitor (like a Veeder Root brand ATG), it should also have a visual gauge on the tank so that personnel can easily check the fluid level at a glance. This helps to prevent overfills and spills of used POL. If this gauge is a Morrison Clock Gauge, ensure that the gauge has a marking to indicate the capacity for the tank. Many people do not know how to read a clock gauge so they cannot tell when it is full. A simpler gauge that shows ¼, ½, ¾, Full is preferable.

Petroleum Storage Tanks

- (1) The used oil and antifreeze collection systems that have been installed in several motor pools at Fort Bliss are not well designed and have not worked well. They require frequent, expensive repairs and they also cause frequent overflows of their aboveground storage tanks. A better design is needed. Perhaps the best plan would be a simpler one where the soldiers empty the used POL into an AST by hand.
- (2) If fuel tankers are to be parked at motor pools, they need to have a secondary containment that will hold the contents of the largest tanker in the containment plus about 10% for rainwater. The containment needs to have a lockable drain on the low side to remove rainwater.
- (3) Underground Storage Tanks (USTs) are highly regulated and environmentally risky. ASTs make more sense.
- (4) Underground piping is an additional environmental burden. They need to be cathodically protected to prevent corrosion and they need to be tested for leaks annually. Try to avoid installing underground piping for POL.
- (5) Aboveground POL tanks should have double-wall construction, spill/overflow protection, and a release monitoring system (automatic tank gauge with alarm). The alarm should be located where someone can hear it. These tanks are the object of continuous fill/pump operations. A staircase adjacent to the tanks to make it safer for additions of fluids is appropriate. Currently, heavy 5 gallon containers are raised over the head making it unsafe and also more risky for spills. Secondary containment berms around the tanks are a good idea; spills can be contained in a limited area and easily cleaned up.
- (6) Aboveground POL tanks need to be located on a concrete pad. Even double-wall ASTs are prone to overfills and spillage so they need to be situated on a paved surface to avoid expensive cleanups of contaminated soil.

STORM WATER

Guidance for Construction Storm Water Pollution Prevention Plans (SWP3's) & Permits

Spills - All potentially polluting material should be labeled and stored in original containers where possible and be sealed or covered to prevent contact with storm water or storm water runoff. MSDS's of all materials must be maintained on site. A list of these materials should also be included in the SWP3. All spills or releases of hazardous waste, materials, fuels, oils or lubricants should be reported to Fort Bliss Fire Department (915) 568-1117 or (915) 568-5283. The Fire Department will notify other Fort Bliss entities including Environmental Division which will notify regulatory authorities if reportable quantity thresholds are exceeded.

Storage Tanks - Storage of liquid materials, including fuels, requires impervious secondary containment equal to 110% of stored capacity. A spill response kit shall be maintained at each fuel storage and dispensing location. Drip pans or other temporary containments shall be used during fuel transfers to prevent leaks at the most vulnerable locations; for example hose couplings and beneath the nozzle at the point of transfer to the vehicle. Any rain water accumulated in secondary

containments must be considered contaminated if oil or oil sheen is visible. Disposal of contaminated rain water must be coordinated with the installation the Petroleum Storage Tank Manager (915) 568-6959 or Storm Water Manager (915) 568-0794.

Disposing of hyper chlorinated water - During disinfection of newly installed waterlines, chlorinated water to be discharged to the environment (or storm water conveyance system) shall be neutralized to achieve a maximum residual chlorine concentration of 4 parts per million, in accordance with AWWA standard C651.

Construction Water Service - The Fort Bliss Water Services Company ((915) 569-5360) shall designate a hydrant or stand pipe to assist contractors during construction. A water meter and an approved backflow prevention assembly shall be maintained at all times of operation at the hydrant or standpipe. The water fill area shall be designed and maintained to insure that water does not accumulate causing a vector attractant or erosion. All backflow prevention assemblies shall be tested for proper operation by a backflow prevention technician registered with the Cross-Connection Control Program Manager (CCCM). Contact the CCCM at (915) 569-5359 to schedule testing. Testing shall take place at the time of installation, repair, or relocation and at least on an annual schedule thereafter or more often when required by the Cross-Connection Control Program Manager.

Hazardous Waste – Construction Site Operators must contact the Environmental Division, Hazardous Waste Program Manager for installation policies and guidance on hazardous waste management prior to accumulation of any HW waste at their sites. The Construction Site Operator is responsible for complying with state/federal hazardous waste management regulations, installation permit provisions, and installation HW Management Plan and SOPs and must provide the HW Program Manager with their waste transporter and disposal facility EPA identification numbers. Hazardous waste generated as result of construction or other activities on Fort Bliss property must be disposed of under authority of the Fort Bliss permit number and manifests must be signed by an authorized Fort Bliss Representative. Review and signature of the manifest must be scheduled with the Hazardous Waste Program Manager at (915) 569-6393 or (915) 568-7041.

Solid Waste / Recycling - The Fort Bliss landfill is only accessible to those contractors with a permit issued by the Directorate of Public Works, Building 777. All military construction, renovation and demolition projects shall include contract performance requirements for a 50% minimum diversion of construction and demolition (C&D) waste by weight, from landfill disposal. Contract specifications will include submission of a contractor's C&D Waste Management Plan prior to the start of site clearance. All weight tickets for materials resold, recycled or reused will be reported to the Environmental Division, solid waste program manager.

Air / Dust Control - Water shall be applied at all construction/demolition sites to include unpaved roads for egress and ingress, staging and storage areas, stockpiles and debris piles, and parking lots for employees and workers. Dust shall be controlled during earth work, grading, and related activities that can create dust. All open-bed trucks shall have a cover or tarp to control dust when handling or hauling earth, aggregate or debris. Crushed rock, gravel or crushed asphalt can be used or applied on in-plant or on-site roads, staging areas, and or park areas to minimize water usage and control dust.

Waste Water - No foreign items, construction debris, chemicals, oils, etc., shall be introduced into the sanitary sewer collection system. Storm water runoff shall be directed away from the sanitary sewer collection system and storm water shall not be disposed into the sanitary collection system. State licensed temporary toilet facilities (i.e. Porta Potties) shall be utilized. There shall be no temporary toilet vaults or septic tanks installed without proper authorization from ENVIRONMENTAL DIVISION.

Document Submission Requirements - A copy of the completed SWP3 including planned start and stop dates, completed NOI and copy of actual construction general permit to should be provided to:

Directorate of Public Works

Master Planning

Attn: IMWE-BLS-PWM (Bldg. 777)

Pleasanton & Chaffee Roads

Fort Bliss, TX 79916

(915) 568-2757, 5949, or 5933

The City of El Paso and Fort Bliss storm water conveyance systems are interconnected. As a result, a courtesy copy should also be provided for informational purposes to the City of El Paso,

Kareem Dallo, P.E. or Ziad Al-Dasouqi, P.E.

Development Services Department

City Hall, 5th floor

2-Civic Center Plaza

El Paso TX 79901

Off: (915) 541-4788

Additional Information - Question regarding storm water pollution prevention plans on Fort Bliss should be directed to Mr. Kelly Blough, Multimedia Compliance Branch, Construction Storm Water Program Manager, Environmental Division, Attn: IMWE-BLS-PWE (Bldg 622), Pleasonton & Taylor Roads, Fort Bliss, TX 79916, (915) 568-0794 (kelly.blough@us.army.mil) or Mr. Jack Lady (915) 568-0558 (jack.lady@us.army.mil).

Summary of Fort Bliss – Texas Construction Permitting Requirements

Area of Soil Disturbance	Regulatory Requirements
Less than 1 acre	Construction SWP3 and notice to state not required.
1 to less than 5 acres	Construction SWP3 is likely required though some short duration projects may qualify for waiver. SWP3 or waiver request must be coordinated through Environmental Division.
5 acres and greater	Construction SWP3 is required and must be coordinated through Environmental Division. NOI form and fee must be submitted to Texas Commission on Environmental Quality.

SWP3 = Storm Water Pollution Prevention Plan – Document following Texas Commission on Environmental Quality approved format that details the project and efforts to prevent migration of pollutants from construction site.

NOI = Notice of Intent – Texas Commission on Environmental Quality form that a construction site operator submits to the state in order to receive construction site permit coverage.

Summary of Fort Bliss – New Mexico Construction Permitting Requirements

Area of Soil Disturbance	Regulatory Requirements
Less than 1 acre	Construction SWP3 and notice of intent not required.
1 to less than 5 acres	Construction SWP3 is likely required though some short duration projects may qualify for waiver. SWP3 or waiver request must be coordinated through Environmental Division.
5 acres and greater	Construction SWP3 is required and must be coordinated through Environmental Division. NOI form and fee must be submitted to US Environmental Protection Agency Region VI.

SWP3 = Storm Water Pollution Prevention Plan – Document following USEPA region VI approved format that details the project and efforts to prevent migration of pollutants from construction site.

NOI = Notice of Intent – Federal form that a construction site operator submits to the USEPA Region VI in order to receive construction site permit coverage.

SOLID WASTE MANAGEMENT & RECYCLING

Construction Waste Management-Reporting Landfill Diversion

Army policy dated Feb. 06, 2006 states that all military construction, renovation, and demolition projects shall include contract performance requirements for a 50% minimum diversion of construction and demolition waste by weight, from landfill disposal. Contract specifications shall include submission of a contractor's C&D Waste Management Plan. Plan & diversion weights shall be submitted to the Solid Waste Program Manager, Directorate of Public Works-Environmental Division.

Recycling

Fort Bliss has single-stream recycling. This means that all recyclables will go into one container; no segregating. Papers (white, bagged shredded paper, magazines, cardboard, colored paper, newspapers), plastics (#1 and #2) and metal (tin & aluminum cans) all go into any blue recycling container (no more separating). Blue, deskside recycling containers are available by calling the Recycling Center at 568-1537. If your building has custodial service, the custodians will empty your recycling desk-side bin once a week. If you do not have custodial service, personnel will need to empty their recycling desk-side bins into the new outdoor recycling dumpster.

Any building that has a trash dumpster outside will also have a recycling dumpster. Architects-engineers (A-E) need to remember to include space outdoors for a recycling dumpster. Dining facilities need to include space for a roll-off because they generate lots of recyclables.

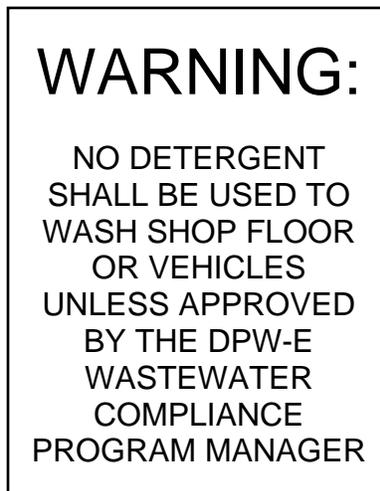
The dimensions for a recycling dumpster are 6 ft. wide X 5.5 ft deep X 6 ft. tall. The dimensions for roll-off are 22' 2" long X 7'7" wide X 6'6" tall.

WASTEWATER

Vehicle Maintenance Facilities and other repair facilities requiring washracks will have Oil Water Separators (OWS). All shop drains to the sewer systems will be placed so that they will not receive pollutants from repair activities. Repair activities (welding, painting, battery shops, grinding areas, etc.) will not produce waste streams that will find their way into the sewer drains.

OWS Signage

Proper OWS signage must also be included as described below:



(1) The oil/water separator (OWS) sign shall be approximately 2'-6" high by 2'-0" wide and white in color. Message lettering shall be all caps in black Helvetica and a minimum of 1-1/2" high. "WARNING" lettering shall be all caps in black Helvetica and a minimum of 3" high.

(2) The Contractor shall provide a minimum of two (2) signs per building for small and medium TEMFs and four (4) signs per building for large and extra large TEMFs. There shall be no less than one (1) sign centrally located per every four repair bays (eight repair work areas) and with no less than one (1) sign per side of building.

(3) Sign shall be permanently secured to the wall or structure with the bottom of sign at approximately 4'-0" above finished floor near the floor trench drains.

Dining Facilities/Kitchens must have grease traps and associated equipment to comply with local Fats, Oils, and Greases (FOG) requirements per El Paso Water Utilities Rule #15.

El Paso Water Utilities Public Service Board (PSB) Rule No. 9, together with applicable provisions of Rules and Regulations No. 1, No. 5, No. 6, and No. 15 set forth the uniform requirements for the discharge by any person of wastewater into El Paso's wastewater system.

Rule No. 9 states that no user shall discharge or cause to be discharged into El Paso's wastewater system any pollutant or wastewater except in conformity with Rule No. 9, the requirements of the act, the General Pretreatment Regulations in 40 C.F.R. Part 403, and applicable state laws. Rule No. 9 lists prohibited discharges, local pollutant limits, pre-treatment requirements, permitting requirements, permit conditions, reporting and monitoring requirements. Any discharges into the wastewater system must first be cleared by the Fort Bliss DPW-E.

Vehicle washing will be performed on approved wash racks where drains discharge through an Oil Water Separator. Washing that generates pollutants that exceed local wastewater limits and prohibited discharge standards must have appropriate controls to remove those pollutants prior to entering the sewer system. Vehicles that are excessively dirty (large amounts of mud or excessive amount of greases and oils) must be washed at the Central Wash Vehicle Facility to prevent from overloading the smaller motor pool wash racks.

Septic Tank and Leach Field Systems that are required because of the lack of connection to the sanitary sewer will only receive domestic type wastewater. No industrial or industrial like wastewater discharges (wash racks, defueling stations, OWS, etc) may be disposed into the septic tank. Septic Tanks, holding tanks and leach fields will not be authorized if a sanitary sewer tie-in is nearby. Septic tanks do not require a permit in the New Mexico Ranges but must be built to New Mexico standards.

WATER QUALITY

Potable Water Regulatory Policy

The Fort Bliss Water Services Company (FBWS) operates 9 water systems on Post: Fort Bliss Main Post, Biggs Army Air Field, Site Monitor, McGregor/Meyer Range Camp, Dona Ana Range Camp, Oro Grande Range Camp, Hueco Range Camp, SHORAD, and Redeye. The Directorate of Public Works (DPW) operates the Brigade Combat Team Facilities (BCTs) aka: East Biggs Water System, and the Combined Aviation Brigade Area (CAB) water system which is part of the Biggs AAF water system. DPW and FBWS are responsible for protecting the drinking water supply in accordance with State Regulations (Title 30 Texas Administrative Code 290.46(j), New Mexico Administrative Code 20.7.10.400(L)) from contamination or pollution which could result from improper water system plumbing construction or configuration. This policy only applies to the areas of the water system under the purview of the DPW. FBWS is responsible for their own policy for areas under their purview. Therefore, construction projects requiring potable water from the FBWS owned water system must be coordinated through FBWS, otherwise the following is applicable:

Customer Service Inspection certificates shall be completed prior to providing continuous water service to new construction or after significant plumbing renovations on any existing service or any existing service when the DPW has reason to believe that cross-connections or other potential contaminant hazard exist or after any material improvement, correction, or addition to the water distribution facilities which are under their respective purview. As unacceptable plumbing practices are discovered, they shall be promptly eliminated to prevent possible contamination of the water supply. Also, any backflow prevention devices installed shall be installed in accordance with the Fort Bliss Cross-Connection Control Manual (FBCCCM), and tested in accordance with the FBCCCM. Copies of the FBCCCM are available from the DPW-E Water Quality Manager.

The following practices are prohibited:

- (1) No direct connection between the public drinking water supply and a potential source of contamination is permitted. Potential sources of contamination shall be isolated from the public water supply in accordance with the FBCCCM.
- (2) No cross-connection between the public water supply and a private water system is permitted. These potential threats to the public drinking water supply shall be eliminated at the service connection by the installation of an air-gap or a reduced pressure-zone backflow prevention device.
- (3) No connection which allows water to be returned to the public drinking water supply is permitted.
- (4) No pipe or pipe fitting which contains more than 8.0% lead may be used for the installation or repair of plumbing at any connection which provides water for human use.
- (5) No solder or flux which contains more than 0.2% lead can be used for the installation or repair of plumbing at any connection which provides water for human use.

This policy applies to work completed on all Fort Bliss facilities whether work is done by contract or in-house. Activities must insure that their contractors/subcontractors follow this requirement.

Inspectors must possess proper credentials and be recognized as capable of conducting a customer service inspection certification by the State of Texas. Customer Service inspections may be performed by the following group members:

- (1) Plumbing Inspectors and Water Supply Protection Specialists licensed by the Texas State Board of Plumbing Examiners.
- (2) Customer Service Inspectors licensed by the Texas Commission of Environmental Compliance (TCEQ).

Recognized Backflow assembly testers must possess a current license from the TCEQ.

Submit completed customer service inspection and/or backflow test forms to:

Directorate of Public Works Environmental Division (DPW-E)

IMWE-BLS-PWE

Bldg 622

Attn: Water Quality Manager

Fort Bliss, Texas 79916

Completed forms may also be submitted in person at Building 622, or by fax at 568-1333. Forms will be maintained by the DPW-E for a minimum of 10 years and be made readily available for review by the State regulatory entity.

Lawn Irrigation

A person may not sell, design, consult, install, maintain, alter, repair, or service irrigation in the state of Texas unless the person is licensed by the Texas Commission on Environmental Quality (TCEQ). A person who is licensed as an installer may only connect an irrigation system to a water supply while being under the direct supervision of a licensed irrigator.

POINTS OF CONTACT

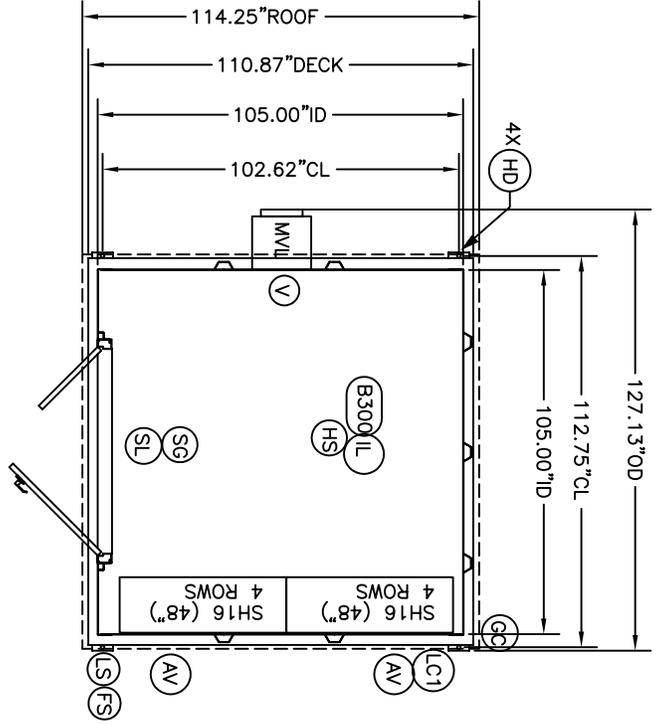
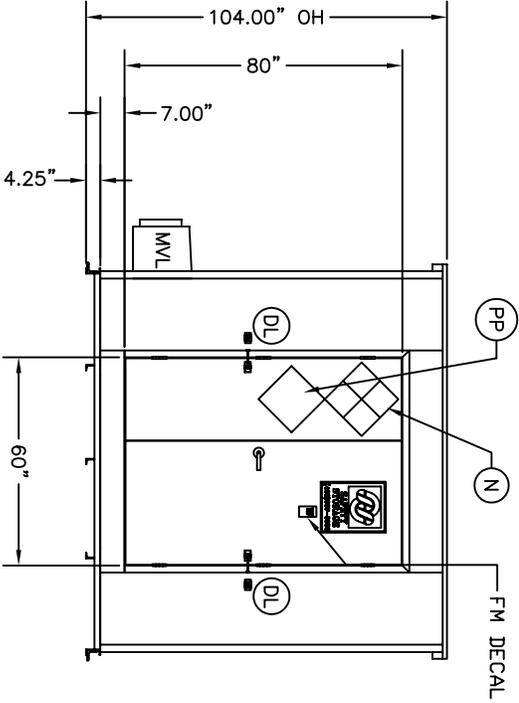
Air Quality 915-568-5724
Archeology 915-568-6746/6999
Asbestos/Lead Paint 915-568-0931
EPAS 915-568-7578/569-6297
Hazardous Materials 915-568-6989
Hazardous Waste 915-568-7041
Historical Architecture 915-568-3134/7464
Landscaping 915-568-6977
NEPA 915-568-3908
Pesticides 915-568-6977
Storage Tanks 915-568-6959
Storm Water 915-568-0794
Solid Waste Management & Recycling 915-568-5724
Wastewater/Water Quality 915-568-0558

Hazardous Materials Storage Facility

Attached are typical Hazardous Materials Storage Facilities currently used at Ft. Bliss. Inclusion of this information does not preclude the contractor from proposing another type of structure that meets the RFP requirements.

SAFETY STORAGE
2301 BERT DUNE
HOLLISTER, CA 95033
PHONE: (408)337-5925
FAX: (408)337-7493

MODEL 1010S



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LEGEND	
AV:	AIR INLET VENT
B300:	LIGHT, 300 WATT LAMP UPGRADE
DL:	DOOR LATCH
FS:	FAN SWITCH (NON-EXPLOSION PROOF)
GC:	GROUNDING CONNECTION
HD:	HOLD-DOWN BRACKET
HS:	HEAT SENSOR
IL:	INTERIOR LIGHT FIXTURE (EXPLOSION PROOF)
LC1:	LOAD CENTER
LS:	LIGHT SWITCH (NON-EXPLOSION PROOF)
MV/L:	MECHANICAL VENTILATOR, LOW MOUNT 600 CFM (EXPLOSION PROOF)
N:	NFPA 704M RATING SIGN
PP:	PERMANENT D.O.T. PLACARD
SG:	STEEL FLOOR GRATING (GALVANIZED)
SH16:	SHELVING, 16" WITH 1" LIP
SL:	SUMP LINER (HDPE)
V:	VENT

CUSTOM COLOR
EXTERIOR

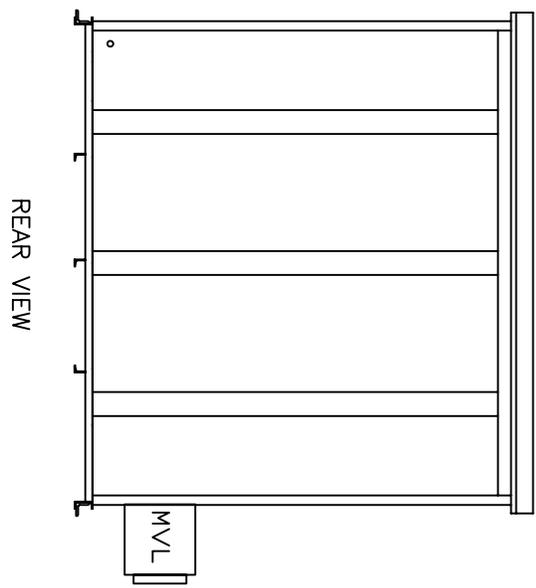
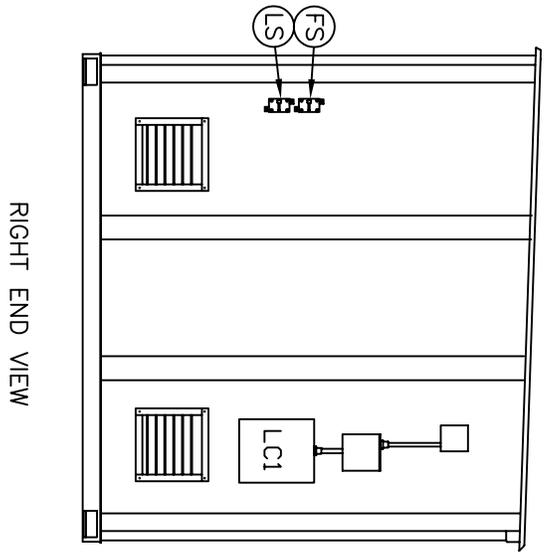
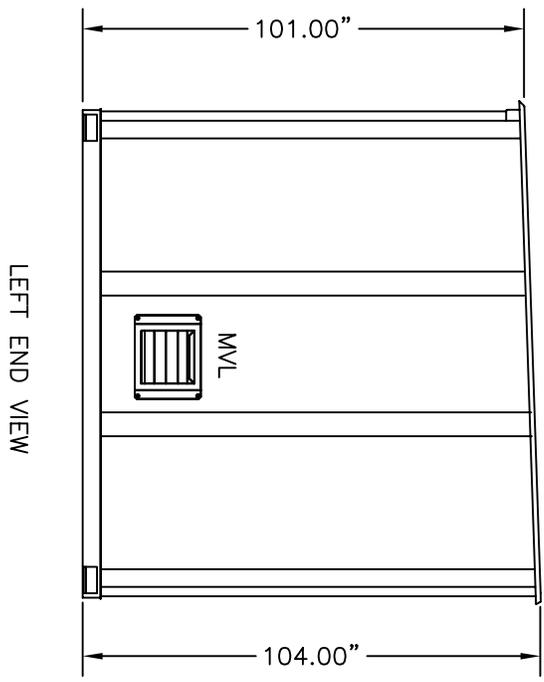
- NOTES:
- ONE (1) DOUBLE 60"W x 80"H NR DOOR
 - PAINT SPECIFICATION:
PRIMER COAT - EPOXY (EXTERIOR & INTERIOR)
FINISH COAT - POLYURETHANE (EXTERIOR & INTERIOR)
COLOR - STANDARD WHITE (INTERIOR)
COLOR - CUSTOM TBD (EXTERIOR)
 - TOTAL 16" WIDE ADJUSTABLE STAINLESS STEEL SHELVING = 32'
 - 240/120V, 1 PHASE

SIGNATURE _____

NUMBER: MR-4683
CUSTOMER: FORT BLISS
DATE: 4/27/06 PREPARED BY: HJE
SALES #: _____ PAGE 1 OF 2

SAFETY STORAGE
 2301 BERT DUNE
 HOLLISTER, CA 95023
 PHONE: (408)337-5995
 FAX: (408)337-7403

MODEL 1010S



CUSTOM COLOR
EXTERIOR

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SIGNATURE _____

NUMBER: MR-4683
 CUSTOMER: FORT BLISS
 DATE: 4/27/06 PREPARED BY: HJE
 SALES #: _____ PAGE 2 OF 2

Cage Code 47484		DUNS: 148223068	
Page	Item Number	Quantity	Description:
			CHEMICAL STORAGE LOCKERS
FN-5	1010S	1	Model 1010 S Nominal Dimensions: (LxWxH): 10' x 10' x 9' Steel Floor Grating with 500 psf uniform load capacity, One (1) Steel Double Door , Two (2) Air Inlet Vents
FN-11	B,24,a	32 Loneal foot	16 inch wide Shelving – stainless steel with 1 inch spill containment lip
FN-11	B,29	100 sq. ft.	Sump Liner
FN-13	D,8,a	1	Explosionproof Electromechanical Exhaust Ventilation System
FN-15	D,17,a	1	Lights – Interior Explosionproof with Non EP Exterior Light Switch
FN-15	D,17,l	1	300w light bulb upgrade
FN-16	D,23,a	1	Load Center
FN-25	M,6,a	1	Custom exterior paint color
FN-13	D,8,l	1	Heat sensor – used for fan shut down

***Please note that the buyer is responsible for off-loading, arming the Fire Suppression System, and installation of the locker.**

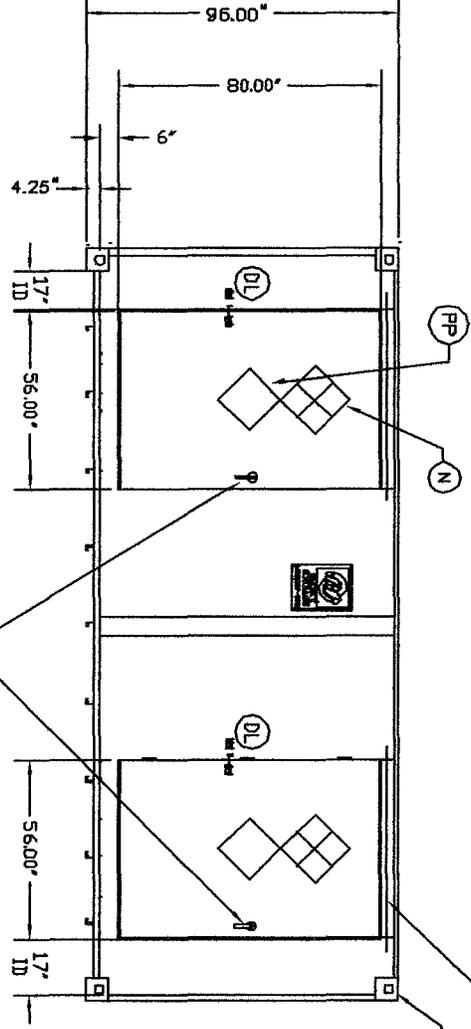
DRAWING NO. TR9233

SAFETY STORAGE
 1807 BY SAFETY STORAGE, INC.
 1807 BY SAFETY STORAGE, INC.
 1807 BY SAFETY STORAGE, INC.

20150

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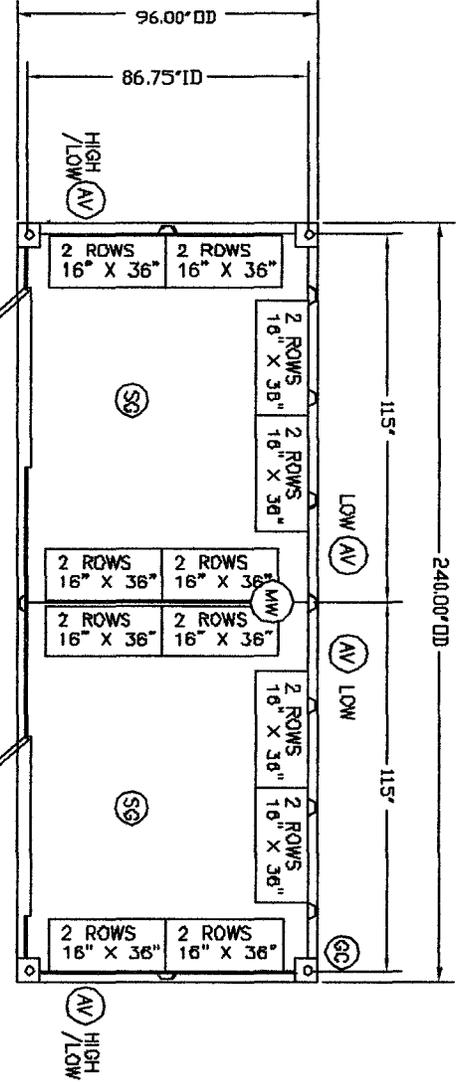


RAIN GUARD
2X

ISD CORNERS
TOP & BOTTOM

NOTES:

1. TWO (2) 56"W x 80"H STEEL DOORS
2. PAINT SPECIFICATION:
 PRIMER COAT- EPOXY (EXTERIOR & INTERIOR)
 FINISH COAT- POLYURETHANE (EXTERIOR & INTERIOR)
 CUSTOM COLOR- RT 8205 (EXTERIOR & INTERIOR)
3. TOTAL 18" WIDE ADJUSTABLE STAINLESS STEEL SHELVEING = 72"
4. SLOPED ROOF (1-1/2") WITH NO OVERHANG
5. ISO CORNERS (TOP & BOTTOM) W/NO HOLDDOWNS
6. REMOVABLE RAIN GUARDS OVER DOORS



LEGEND

- AV: AIR INLET VENT
- DL: DOOR LATCH
- GC: GROUNDING CONNECTION
- MW: FULL HEIGHT METAL WALL
- N: NFPA 704M RATING SIGN
- PP: PERMANENT D.O.T. PLACARD
- SG: STEEL FLOOR GRATING (GALVANIZED)

CUSTOM COLOR

SIGNATURE

NUMBER: [REDACTED]
 CUSTOMER: FORT SILL
 DATE: 7/24/03 PREPARED BY: HJE
 SALES #: [REDACTED] PAGE 1 OF 2

TR 10975

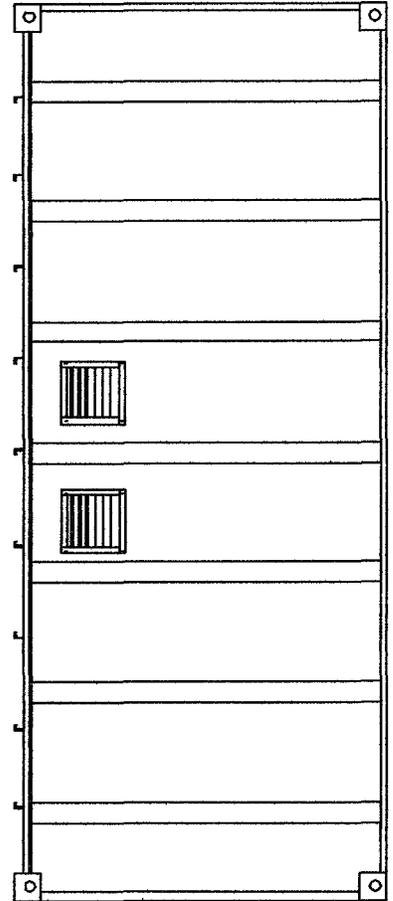
DRAWING NO. TR923.32

SAFETY STORAGE
1800 WEST 10TH
FORT SILL, OKLAHOMA 73401-5000
PHONE (405) 951-7200
FAX (405) 951-7200

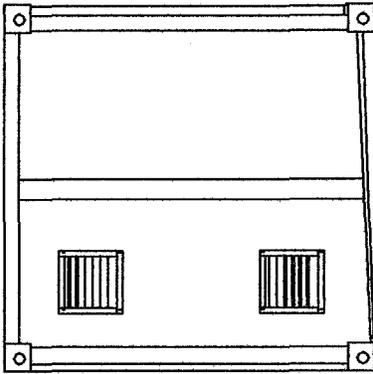
MODEL

20150

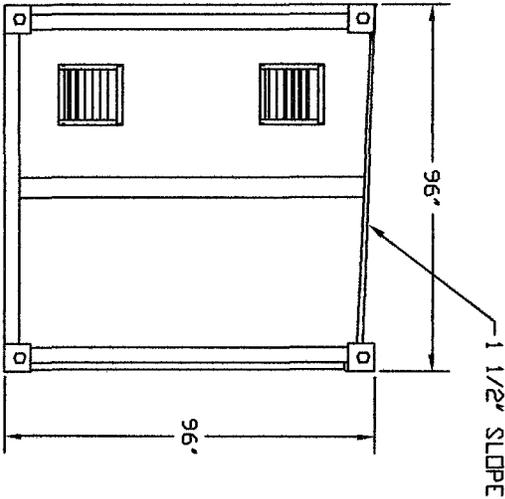
CUSTOM COLOR



REAR VIEW



LEFT END VIEW



RIGHT END VIEW

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SIGNATURE

NUMBER:

CUSTOMER: FORT SILL

DATE: 7/24/03 PREPARED BY: HJF

SALES #: PAGE 2 OF 2

TR 10975

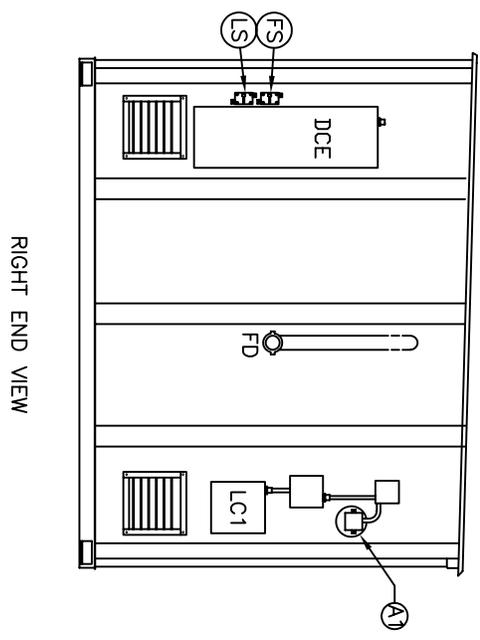
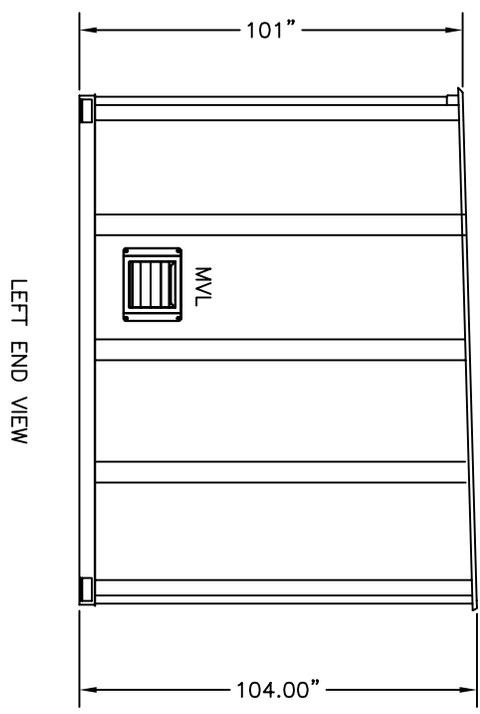
SAFETY STORAGE
 2301 BERT LANE
 HOLLISTER, CA 95023
 PHONE: (408)337-5995
 FAX: (408)337-7403

MODEL 3412FSE

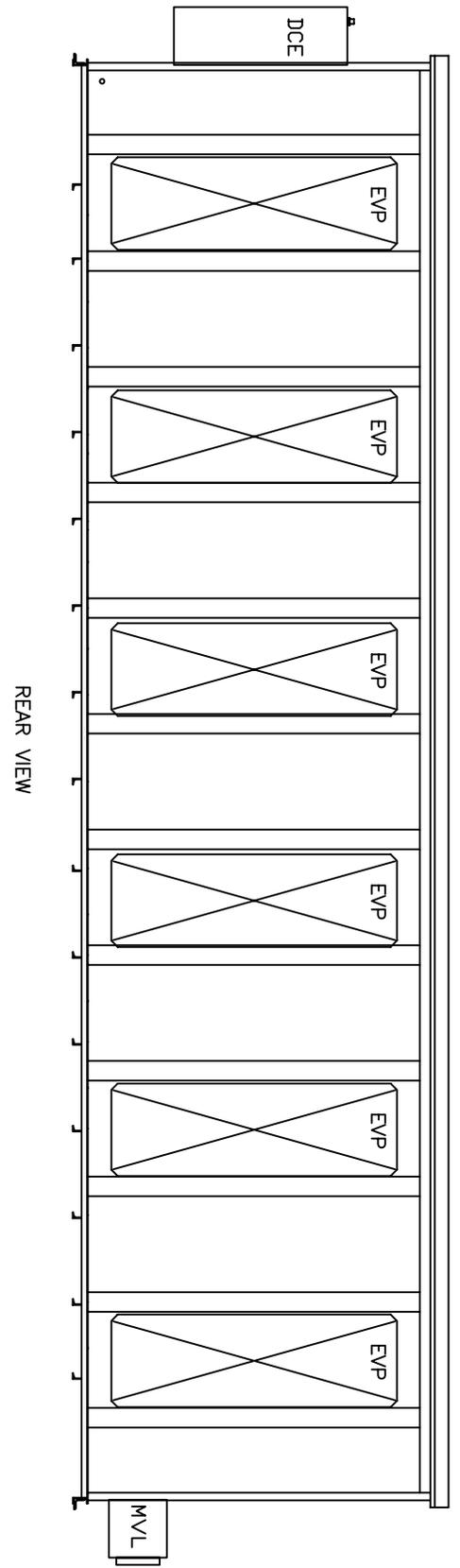
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NUMBER: MR-4684
 CUSTOMER: FORT BLISS
 DATE: 4/27/06 PREPARED BY: HJE
 SALES #: _____
 SIGNATURE _____
 PAGE 2 OF 2



CUSTOM COLOR
 EXTERIOR



APPENDIX F

CONCEPTUAL AESTHETIC CONSIDERATIONS

(PROVIDED UNDER SEPARATE COVER)

APPENDIX G

GIS DATA

NOT USED

APPENDIX H

EXTERIOR SIGNAGE

Exterior Signage

All signs will either be pre-manufactured from materials meeting or exceeding the EPA required minimum recycled content or fabricated by DPW. Low quality and “homemade” signs are prohibited.

Locate signs where they are visible and unobstructed.

All signs use Helvetica. Exceptions to be approved by DPW.

Traffic signs will follow guidelines in the Federal Highway Administration’s “Standard Alphabets for Highway Signs and Pavement Markings” standards.

Sign Mounting and Location

Locate identification signs typically at building entrances and/or other parts of the building visible from the main access street. Building signs should be visible from the main circulation paths to the building (vehicular or pedestrian).

Place building and/or facility identification signs within the first 20 percent of the distance closest to the road between the road and the building. These signs shall be placed so as not to obscure any other identification, information or vehicular regulatory signs.

The minimum distance between sign and driveway or intersection should normally be 100 feet.

Mounting Signs on Buildings.

No sign may be mounted on the outside of the door, except small signs (one square foot or less) that indicate required use of an alternate entrance.

No sign may be attached or mounted to roofs and parapets.

No sign shall be painted or applied directly onto the surface of a building.

No permanent signs shall obstruct any window, door, fire escape, ladder, or opening intended for light, air, or egress.

No sign shall interrupt the vertical and horizontal features of the façade.

No sign may be attached to utility poles except for pole identification or warning.

Sign Descriptions:

Building Number: 30-inch by 10-inch reflective white metal panel with 8-inch black Helvetica Regular letters.

Identification Signs shall be per Technical Manual (TM) 5-807-10, Signage. Type B and Type C shall be brown metal mounted on brown metal posts. Colors shall be white letters and numbers on standard brown background. Include the Building Number and Street address such as "2475 Defense Av".

No Smoking Signs

Provide and install No Smoking Signs (as shown in Figure 1) at all exterior doors.

Provide and Install "DESIGNATED SMOKING AREA" signs at Designated Smoking Areas. Designated Smoking Areas are to be located no less than 50 feet from any point of ingress / egress or any outside air intake.

(Figure 1 follows on next page.)

NO SMOKING



**Except in
Designated
Smoking Areas**

Sign should be posted *ONLY* at entrance(s) to Department of the Army owned or controlled buildings/facilities.

DA FORM 5560, APR 2007

APD v1.00

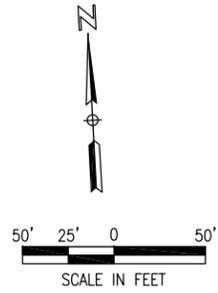
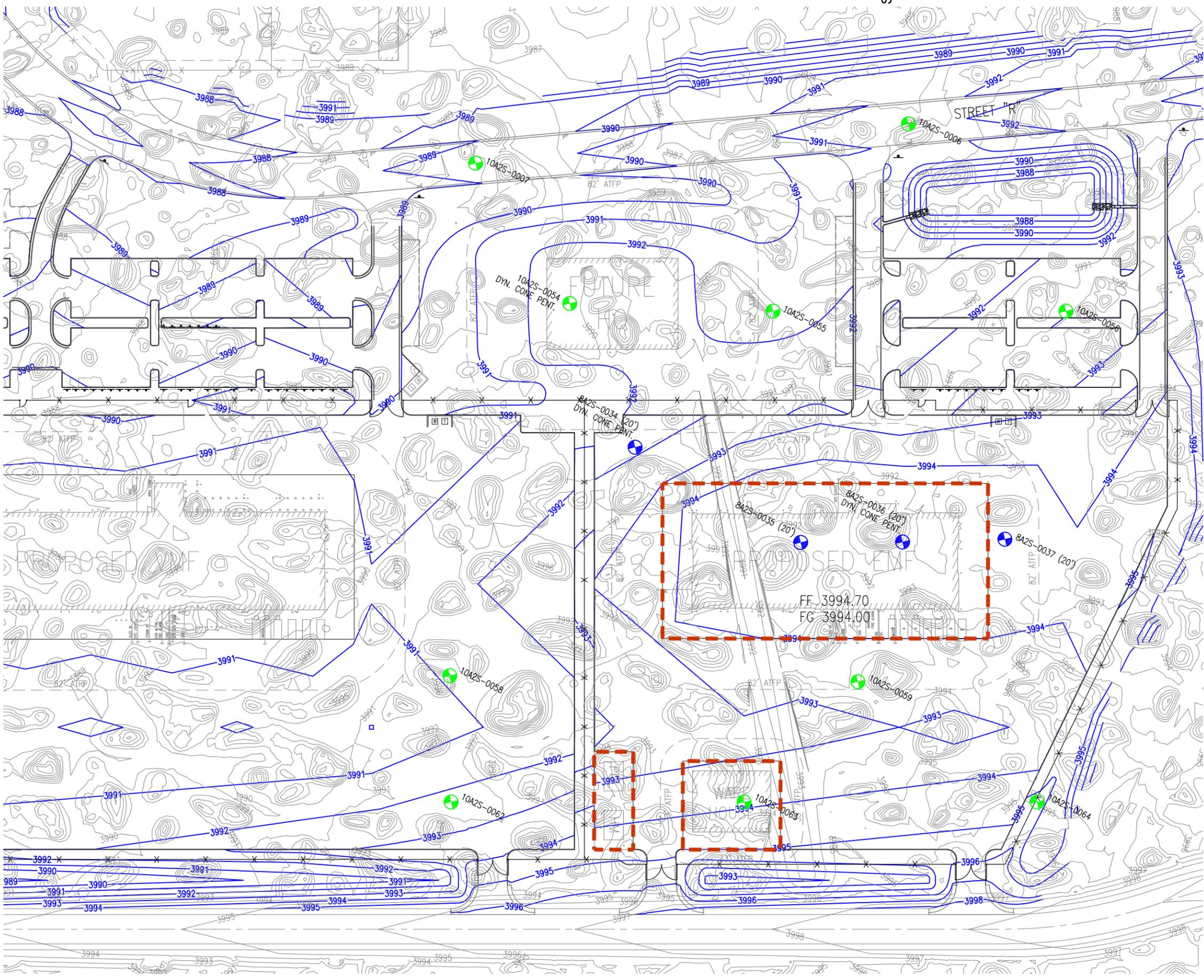
APPENDIX I

ACCEPTABLE PLANTS LIST

NOT USED – NO REQUIREMENTS

APPENDIX J DRAWINGS

Section:



LEGEND:

- XXA2S-XX BORE HOLE POINT NUMBER AND APPROXIMATE LOCATION
- 10 FT IN DEPTH (TOTAL 10)
- 20 FT IN DEPTH (TOTAL 4)
- 3936 EXISTING CONTOUR
- 3936 PROPOSED CONTOUR
- FF FINISHED FLOOR ELEVATION
- FG FINISHED GROUND ELEVATION
- AREA OF WORK

NOTES:

1. THE TOP ELEVATION INDICATED IN THE BORING LOGS IS BASED UPON THE EXISTING CONTOURS.

SERIALS: 09/09/2011 2:18PM H:\PROJ\REFERRALS\BTL\REF-B\COMMODITY\TIMES\DWG_PROJ\DOCS\REF_EXHIBIT\2011-0906_DWG_REF_APPENDIX\REF2028

INDUSTRIAL COMPLEX FACILITIES
FORT BLISS, TEXAS
REF EXHIBIT - B
GEOTECHNICAL BORE LOCATIONS

DATE: SEPTEMBER 6, 2011
HUITT-ZOLLARS

Sheet reference number:
EX-B

APPENDIX K
LIFE CYCLE COST ANALYSIS
UTILITY RATES

REPLY TO:
ATTENTION OF:

DEPARTMENT OF THE ARMY
 US ARMY INSTALLATION MANAGEMENT COMMAND
 HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT BLISS
 1 PERSHING ROAD
 FORT BLISS, TX 79916-3803

JAN 27 2011

IMWE-BLS-PWB

MEMORANDUM FOR All Fort Bliss Utilities Customers

SUBJECT: Revised 2011 Utility Sales Rates

1. Effective 1 January 2011, new utility rates will be in effect in accordance with HQ USACE Installation Support Division Policies, and Technical Note Number 420-41 (Revision 1).
2. The new rates are listed below. Category "A" represents the rates for sales to Federal Government and Non-Appropriated Fund (NAF) activities. Category "B" represents the rates for sales to private or commercial organizations. The following rates shown are for metered facilities.

	Unit	A	B
Electricity	KWh	\$0.095	\$0.098
Natural Gas	CCF	\$0.781	\$0.804
Water	KGal	\$1.430	\$1.473
Sewage	KGal	\$2.254	\$2.322
Propane	Gal	\$2.861	\$2.947
Steam	KLb	\$25.40	\$26.19

3. The following rates apply to unmetered facilities whose cost will be based on square footage.

	Unit	A	B
Electricity	SF/mo	\$0.271	\$0.279
Natural Gas	SF/mo	\$0.014	\$0.014
Water	SF/mo	\$0.0067	\$0.0069
Sewage	SF/mo	\$0.0078	\$0.0080
Propane	SF/mo	\$0.160	\$0.165

4. Point of Contact for this action is Mr. Eulalio Rodriguez, General Engineer, Business Operation Integration Division, Directorate of Public Works, (915) 568-5465, email Eulalio.rodriquez@us.army.mil.

ALFREDO J. RIERA, P.E.
 Director of Public Works

APPENDIX L

LEED PROJECT CREDIT GUIDANCE

APPENDIX L

LEED Project Credit Guidance (MAY 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		
<u>WATER EFFICIENCY</u>				
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).
EQ1	Outdoor Air Delivery Monitoring			
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



LEED 2009 for New Construction and Major Renovations

Project Checklist

EMF

27-Jul-11

2	8	3	9
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Possible Points: 26

Y	DB	Y	GOV	N	? DB	? GOV	d/C	Prereq	Activity	Points
1							C	1	Construction Activity Pollution Prevention	1
		1					d	1	Site Selection	5
		1					d	2	Development Density and Community Connectivity	1
							d	3	Brownfield Redevelopment	6
1							d	4.1	Alternative Transportation—Public Transportation Access	1
							d	4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	3
		3					d	4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	2
		2					d	4.4	Alternative Transportation—Parking Capacity	1
							C	5.1	Site Development—Protect or Restore Habitat	1
							d	5.2	Site Development—Maximize Open Space	1
		1					d	6.1	Stormwater Design—Quantity Control	1
		1					d	6.2	Stormwater Design—Quality Control	1
							C	7.1	Heat Island Effect—Non-roof	1
1							d	7.2	Heat Island Effect—Roof	1
		1					d	8	Light Pollution Reduction	1

Notes:

2	2	0	0	0
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Possible Points: 10

Y	DB	Y	GOV	N	? DB	? GOV	d/C	Prereq	Activity	Points
2		2					d	1	Water Use Reduction—20% Reduction	2 to 4
							d	1	Water Efficient Landscaping	2
									Reduce by 50%	4
									No Potable Water Use or Irrigation	2
							d	2	Innovative Wastewater Technologies	2 to 4
2							d	3	Water Use Reduction	2
									Reduce by 30%	3
									Reduce by 35%	4
									Reduce by 40%	

Notes:

19	0	4	0	0
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Y DB Y GOV N ? DB ? GOV

Y				
Y				
Y				
15				

Energy and Atmosphere Possible Points: 35

Req	Prereq	Description	Points
C	Prereq 1	Fundamental Commissioning of Building Energy Systems	1 to 19
d	Prereq 2	Minimum Energy Performance	1
d	Prereq 3	Fundamental Refrigerant Management	2
d	Credit 1	Optimize Energy Performance	3
		Improve by 12% for New Buildings or 8% for Existing Building Renovations	4
		Improve by 14% for New Buildings or 10% for Existing Building Renovations	5
		Improve by 16% for New Buildings or 12% for Existing Building Renovations	6
		Improve by 18% for New Buildings or 14% for Existing Building Renovations	7
		Improve by 20% for New Buildings or 16% for Existing Building Renovations	8
		Improve by 22% for New Buildings or 18% for Existing Building Renovations	9
		Improve by 24% for New Buildings or 20% for Existing Building Renovations	10
		Improve by 26% for New Buildings or 22% for Existing Building Renovations	11
		Improve by 28% for New Buildings or 24% for Existing Building Renovations	12
		Improve by 30% for New Buildings or 26% for Existing Building Renovations	13
		Improve by 32% for New Buildings or 28% for Existing Building Renovations	14
		Improve by 34% for New Buildings or 30% for Existing Building Renovations	15
		Improve by 36% for New Buildings or 32% for Existing Building Renovations	16
		Improve by 38% for New Buildings or 34% for Existing Building Renovations	17
		Improve by 40% for New Buildings or 36% for Existing Building Renovations	18
		Improve by 42% for New Buildings or 38% for Existing Building Renovations	19
		Improve by 44% for New Buildings or 40% for Existing Building Renovations	1 to 7
		Improve by 46% for New Buildings or 42% for Existing Building Renovations	1
		Improve by 48%+ for New Buildings or 44%+ for Existing Building Renovations	2
d	Credit 2	On-Site Renewable Energy	3
		1% Renewable Energy	4
		3% Renewable Energy	5
		5% Renewable Energy	6
		7% Renewable Energy	7
		9% Renewable Energy	2
		11% Renewable Energy	2
		13% Renewable Energy	3
		Enhanced Commissioning	2
		Enhanced Refrigerant Management	2
		Measurement and Verification	3
		Green Power	2

Notes:

41	11	9
Total		
Possible Points: 110		

APPENDIX N

LEED REQUIREMENTS FOR MULTIPLE CONTRACTOR COMBINED PROJECTS

APPENDIX O
LEED STRATEGY TABLES
NOT USED

APPENDIX P

USGBC REGISTRATION

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 $\geq 6'-11"$ (as measured to the underside of the structural system) and having perimeter walls which are $\geq 4'-11"$. 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

APPENDIX R

SUBMITTAL REGISTER SAMPLE PAGE

RMS SUBMITTAL REGISTER INPUT FORM			CONTRACT NUMBER		DELIVERY ORDER																				
TITLE AND LOCATION																									
Button	<-----Right click for Instructions		TYPE OF SUBMITTAL							CLASSIFICATION				REVIEWING OFFICE											
SECTION	PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	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	FO - 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 Informatior		X													X		X	X				X	
01 10 00	5.8.3	BAS Performance Verification Tes					X						X						X	X				X	
01 10 00	5.8.4	Testing Adjusting and Balancing						X					X						X	X				X	
01 10 00	5.8.5	Commissioning						X					X						X	X				X	
01 10 00	6.15	Environmental As Required for Site Specific					X									X			X	X				X	
01 10 00	6.16	Permits as required for Site specific					X									X			X	X				X	
01 10 00	5.10.2	Fire Protection Tests						X	X				X						X	X				X	
01 32 01.00 1C	3.4.1	Preliminary Project Schedule	X											X					X	X					
01 32 01.00 1C	3.4.2	Initial Project Schedule	X											X					X	X					
01 32 01.00 1C	3.4.3	Design Package Schedule	X											X					X	X					
01 32 01.00 1C	3.6.1	Periodic schedule updates from the Contractor	X											X					X	X					
01 32 01.00 1C	3.7	Time Extension Request (Schedule)	X											X					X	X					
01 33 00	1.8	Submittal Register - DOR Input Required	X											X					X	X				X	
01 33 00	1.8	Submittal Register Updates (Design Packages, etc.)	X											X					X	X				X	
01 33 00	1.3.1	Substitution of Manuf or Model Named in Proposa		X	X												X		X	X				X	
01 33 16	1.2	Identify Designer(s) of Record	X											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	X					
01 33 16	3.2.1	Site and Utility Des Package, incl. Substantiator					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. Substantiator					X									X			X	X					
01 33 16	3.7.5	DD Form 1354 (Transfer of Real Property)										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	X					
01 33 16	B-2.0	FFE (as Applicable)					X									X			X	X					
01 45 04.00 1C	3.2	Design and Construction QC Plan	X													X			X	X					
01 57 20.00.10	1.2	Environmental Protection Plan	X													X			X	X					
01 78 02.00 1C	1.2.1	Final as-Built Drawings											X		X				X	X					
01 78 02.00 1C	1.2.7	Provide final as-built CADD and BIM Model files											X		X				X	X					
01 78 02.00 1C	1.2.9	Provide scans of all other docs in Adobe.pdf format											X		X				X	X					
01 78 02.00 1C	1.3.1	Equip-in-Place list of all installed equip and cost											X		X				X	X					
01 78 02.00 1C	1.3.2	Data on equip not addressed in O&M manuals											X		X				X	X					
01 78 02.00 1C	1.3.3	Final as-built specs - electronic files											X		X				X	X					
01 78 02.00 1C	1.4.2.1	Warranty management plan - FAR 52.246-21											X		X				X	X					
01 78 02.00 1C	1.4.2.1	Certificates of Warranty for extended warranty items											X		X				X	X					
01 78 02.00 1C	1.4.2.1	Contractor's POCs for implementing warranty process											X		X				X	X					
01 78 02.00 1C	1.4.2.1	List of each warranted equip, item, feature or system											X		X				X	X					
01 78 02.00 1C	1.5	See also Section 01 10 00 par. 5.8.4 and 5.8.:											X		X				X	X					
01 78 02.00 10	1.6.1.2	Equipment O&M Manuals - 1 electronic / 2 hard copies											X		X				X	X					
01 78 02.00 10	1.7	Field Training DVD Videos									X		X		X				X	X					
01 78 02.00 10	1.8	Pricing of CF/CI and GF/CI Property											X		X				X	X					
01 78 02.00 1C	1.11	List of Completed Cleanup Items											X		X				X	X					

Appendix S

REV 1.1 JUL 2011.

Manufacturing Performance Requirements for Plumbing Fixtures From The Energy Policy Act of 1992 (PL 102-486) (Including Exceptions for Projects Registered for LEED 3.0 or higher)

Note: This information is for use in establishing the Baseline to calculate flow rate reductions from said Baseline, where required by the contract.

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 **(BUT SEE BELOW**)**

`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.

**** EXCEPTIONS for Projects Registered under LEED 3.0 or higher.**

1. Any exceptions identified in the applicable LEED criteria.
2. Public lavatory faucets shall deliver a maximum flow rate of 0.5 gallons per minute, when tested in accordance with ASME A 112.18/CSA B125. Use that flow rate as the Baseline figure for calculating any required reductions from the Baseline.

APPENDIX T

FUNCTIONAL AREA LIGHTING CONTROL STRATEGY (FALCS)

A. GENERAL LIGHTING CONTROL SYSTEM ENERGY MANAGEMENT STRATEGIES

SUMMARY: This appendix describes various lighting energy management strategies to utilize across functional areas. These strategies are intended to supplement and NOT supersede the requirements of ASHRAE 90.1.

1. Consider **LIGHT LEVEL TUNING** to maintain the appropriate light level for a given space. Initial light levels are set high to compensate for light depreciation over time. Where dimming ballasts or dimmable LED drivers are used, they shall be digital and addressable in nature (where available) that can provide individual fixture light level tuning and reconfigurability that dims the light level to the target level, saving the energy that otherwise would be used to compensate for future light depreciation. Provide a life-cycle cost-benefit analysis (LCCBA) of light level tuning for all spaces where the general lighting luminaires are equipped with digital addressable dimming ballasts or LED drivers. The LCCBA shall follow the methodology contained in the IESNA Lighting Handbook. Provide light level tuning where the LCCBA shows it to be economical.
2. Use **OCCUPANCY/VACANCY SENSORS** to automatically turn off lighting a specified time after all occupants leave the space. The off time shall be adjustable settable to 1, 5, 15, or 30 minutes. Select the type (single or dual technology, wired or wireless) based on the use and configuration of the space. Lighting control system shall have the capability to manage both hard-wired and wireless sensors where applicable. Single technology solutions shall incorporate signal processing technology that distinguishes between background noise and actual motion without automatically changing their sensitivity threshold. To maximize energy savings potential, all occupancy sensors shall be either **MANUAL ON – AUTOMATIC OFF** (vacancy sensor) or **AUTOMATIC ON** (to a specified light level of 50% or less) – **AUTOMATIC OFF** to maximize energy savings. Occupancy/Vacancy sensors properly located in the space and set appropriately can offer typical lighting energy savings of 15% or more.
3. Use **DAYLIGHT HARVESTING** to control lighting in areas within at least two window head heights (head height is the distance from the floor to the top of the glazing) adjacent to exterior view windows. Typical daylight penetrates three times the window head height into the space. To maximize energy savings, daylight dimming strategies need to penetrate beyond the first row of luminaires (first daylight zone). When daylighting installed fluorescent or LED luminaires, accomplish daylight harvesting by digitally addressable dimming ballasts or drivers. As the natural light in the space increases, the artificial light level should dim gradually to maintain a uniform light level and prevent disruption to the occupants. One daylight sensor must be able to control multiple daylighting zones (cross-zoning) without the need of adding more sensors. All controls (daylight sensors, occupancy sensors, wall stations) shall have the capability to connect to the system via hard wire or wireless. Apply the same daylighting strategies to areas where skylights are available (refer to ASHRAE 189.1 daylight zone definitions). Daylighting systems properly tuned and calibrated can offer typical lighting energy savings of 15% or more.
4. Consider **AUTOMATED SHADING** in spaces utilizing daylight harvesting to maximize the energy savings of the day lighting system. The shades shall be controlled to reduce glare and unwanted heat gain while still allowing natural light to enter the space. When utilizing automated shading consider the following :
 - A. For ease of use and space aesthetics, operate the automated shades by common controls, wired or wireless (i.e. same appearance and design) with the lighting control system.
 - B. For maximum energy savings the automated shading system shall predictably position the shades based on a combination of time of day, façade direction, and sky conditions.
 - C. For maximum design flexibility and ease of installation, shade system should have the capability to address and control each shade individually.
 - D. The shading system shall have a manual override that allows the occupant to temporarily adjust the shades to any desired position. The system will revert back to automatic control after a specified period of time.

Provide a life-cycle cost-benefit analysis (LCCBA) of automated shading for all spaces where daylight harvesting is provided. The LCCBA shall follow the methodology contained in the IESNA Lighting Handbook. Provide automated shading where the LCCBA shows it to be economical.

5. Use SCENE BASED DIMMING in multiple-use areas including auditoriums, conference rooms and classrooms. Also provide scene based dimming in dining rooms and gymnasiums with multiple functions. One button preset touch recall shall allow multiple zones of light within a space to go to the appropriate light levels, known as a scene, for a specific task or use. Scene based control shall allow the integration of AV controls, shading/projection screens and lighting to work seamlessly with one button preset touch (i.e. lights dim, projection screen lowers, and shades go down). If dimming ballasts or LED drivers are used, they shall also be digital and addressable in nature (where available) to take advantage of installation and life-cycle reconfiguration benefits.
6. Provide PERSONAL CONTROL of lighting in spaces to allow the user of the space to vary the general light level based on the task at hand. Personal control can be achieved by wall mounted controls (hard wired or wireless), Infrared or Radio Frequency (RF) wireless devices, or via computer. Digital addressable ballasts and LED drivers allow the control flexibility of personal dimming of installed lighting on the occupant's work area (i.e. dim the luminaire over their cubicle to the appropriate light level).
7. Consider WIRELESS lighting control options for all installations, including retrofit projects (easy installation, lower installed cost, no power packs necessary). Wireless products shall include but not be limited to occupancy / vacancy sensors, daylight sensors, local wall controls, plug in switching and dimming appliance and parasitic load modules. To avoid interference, wireless products should communicate in an FCC frequency band that does not allow continuous transmissions and is free of Wi-Fi devices.

B. FUNCTIONAL TESTING AND MANUFACTURER SUPPORT

SUMMARY: This section describes functional testing to be performed on the lighting control system and the support required from the lighting control manufacturer.

1. Hire an independent agent with no less than three years experience in testing of complex lighting control systems to conduct and certify functional testing of lighting control devices and control systems. The testing agent shall not be directly involved in either the design or construction of the project and shall certify the installed lighting controls meet or exceed all requirements of ASHRAE 90.1 and all documented performance criteria. The lighting control manufacturer's authorized technical representative may serve as the testing agent. Submit qualifications of the testing agent for approval. Submit copies of test results to the Government.
2. LIGHTING CONTROL MANUFACTURER SUPPORT shall include technical phone support located in the United States. The technical phone support shall be available 24 hours a day, 365 days a year.

APPENDIX AA
FORT BLISS IDG EXCERPTS

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4.1.3 Environmental Setting

The arid southwest ecoregion is comprised of essentially two provinces, the Chihuahuan Desert Province and the American Semi-desert and Desert Province (Fig. 4.4). Both provinces share similar climatic conditions of extreme aridity as well as extremely high air and soil temperatures, which are characteristics of tropical/subtropical deserts. Direct sun radiation is strong, as is outgoing radiation at night, causing extreme variations between night and day temperatures (35-45° F), and rare nocturnal frosts. Annual precipitation is typically less than 9 inches and vegetation is xeriphytic, widely dispersed and providing negligible groundcover. Many annual species are present but only appear with heavy rains that saturate the soil. The dominant soil formation process is salinization, which produces areas of salt crust. Calcification also occurs in well-drained uplands and forms caliche (calcium carbonate) layers at soil depths of at least 12 inches below the surface. Humus in the soil is lacking (except along riparian areas) and soils are mostly Aridisols (soils formed in very dry conditions) and dry Entisols (recently developed soils).

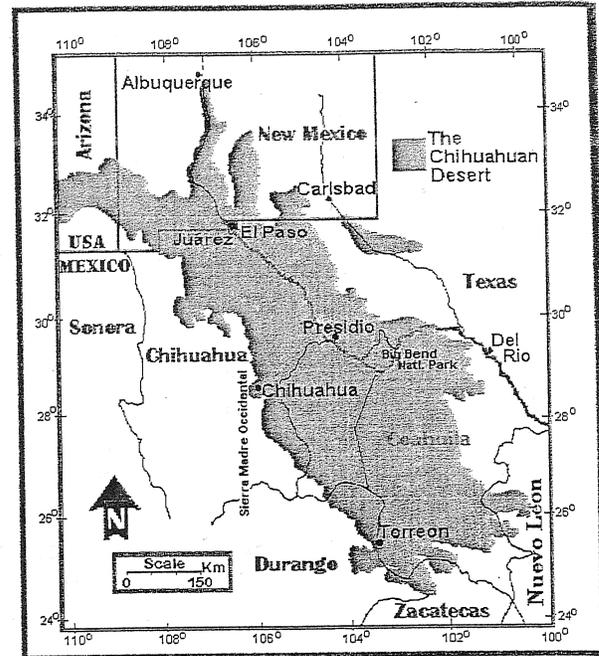


Fig. 4.4 - Chihuahuan Desert (map from UTEP website)

4.1.3.1 Topography

Fort Bliss is located partially within the Chihuahuan Desert Province and the American Semi-desert and Desert Province of the southwest region of the United States. The Chihuahuan Desert consists of southeastern Arizona, southern New Mexico and western Texas, encompassing approximately 85,200 square miles. The high desert consists of undulating plains, elevations near 4,000 feet and isolated mountains rising 2,000 to 5,000 feet. The American Semi-desert and Desert Province consists of southwestern California, southwestern Arizona, and southern Nevada and includes the Mojave, Colorado, and Sonoran deserts. (87,700 sq. mi.) The topography is characterized by gently undulating plains, isolated mountains, and buttes. Elevations range from 280 feet below sea level to 4,000 feet in valleys and basins. Some mountain ranges reach as high as 11,000 feet. Most of the province drains to the sea via dry washes or through underground seepage. The Colorado River is the largest and principal river through the province.

4.1.3.2 Geology

The Rio Grande Drainage Basin's geologic history generally ranges from Precambrian to late Cretaceous. During this time, the area experienced folding, broad regional uplifting, and inundations by continental seas. The current topography in the area reflects Cenozoic structural deformation.

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Fault patterns in the area indicate that extension in the southwestern United States was the result of both broad regional uplift and differential drift within the North American Plate. These forces combined to form a physiographic province characterized by dropped basins (called grabens) bounded by tilted fault block ridges (called horsts). More simply stated, grabens and horsts are formed when rock layers move upward along a fault line creating a ridge (horsts) and/or rock layers subside along a fault line creating a basin (graben). A structural trough was created by mid-Tertiary high-angle extension faults running north-south in front of the Franklin Mountains (Fig. 4.5). This represents both the approximate combined throw along two identified fault planes and the subsequent thickest Hueco bolson unconsolidated fill deposits.

Minor faulting continues in the area affecting Pleistocene and early Holocene bolson deposits. Evidence of the faulting is seen in the fault-scarp of the alluvial fan (created by sediments carried down from the mountains in a fan shape) that parallels the bedrock front of the Franklin Mountains. Movement along this fault was normal, with the basinward blocks subsiding approximately 200-300 feet relative to the mountain front. Smaller displacement faults (trending north-south) extend eastward across the Hueco bolson. These faults cut bolson deposits, Holocene alluviums, Pleistocene gravels, and the subsurface caliche layer. These Quaternary faults may uplift/basin-subsidence episodes. The proximity of the area to the eastern edge of the Rio Grande Rift Zone accounts for the extensive presence of various volcanic dikes and sills that crosscut existing structures.



Fig. 4.5 - Franklin Mountains

4.1.3.3 Soils

Soils are mostly aridisols in the western and northern portions of the province. Entisols and aridisols are found in the southern areas of the province. Alkaline conditions are present and salt crusting at the surface and caliche below the surface are typical. Soils are shallow and well drained, and gravelly or sandy in texture. Primary soil type is aridisols but entisols occur on older alluvial fans and terraces. Gravel or bare rock covers much of the ground near the bases of some mountains due to strong desert rainstorms that allow little soil development to occur.

4.1.3.4 Climate

Climate within the Chihuahuan Desert is distinctly arid with long hot summers, brief cold winters and occasional hard freezes (mean temp. 10-20°F) There are approximately 230-245 frost-free days but freezes are common and can last up to 72 hours. Spring and early summer are extremely dry; three quarters of the rainfall comes in summer monsoons, the rest as gentle rains in winter. **Eight inches of rain falls in the desert and up to 20 inches in the mountains.** Severe droughts occur about every 20 years have been recorded since 1890's.

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7.5.3.1 Hot Arid Regions. Design and site development to minimize solar heat gain and maximize shade and encourage humidity in outdoor spaces (Fig. 7.5).

7.5.4 Views and Vistas. The installation will be designed to preserve and enhance scenic and other attractive views and vistas, and to screen unattractive views and vistas. Visual extensions through open spaces provide a sense of orientation, relief, and enjoyment.

7.5.5 Vegetation. The installation will be designed to protect and preserve existing native vegetation. This preservation reduces maintenance and enhances sustainability. A preferred plant matrix (Appendix O, Plant Palette) is included in this Installation Design Guide. (Also, see Section 10 – Landscape Design Component).

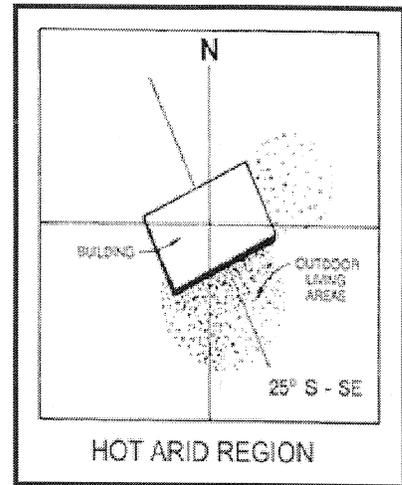


Fig. 7.5 – Building Orientation Minimizes Solar Heat Gain

7.6 MANMADE SITE CONDITIONS

7.6.1 The site plan provides the locations of the manmade development that will occur on site. It establishes the spatial relationships as well as the relationships between manmade and existing natural features. Manmade site conditions include all development on the installation to include buildings, roadways, parking lots, walkways, walls, fences, utilities, and other facilities. Buildings, roadways, parking lots and above ground utilities are the primary manmade visual determinants.

7.6.2 The following site planning guidelines will be used in the visual and spatial review of the installation:

7.6.2.1 Cluster buildings to reduce impact on the natural environment, and reduce roadways and utility corridors needed to serve the development; at the same time, give full consideration to antiterrorism and force protection requirements.

7.6.2.2 Locate large buildings in relatively flat areas to reduce cut and fill, preserve natural vegetation and drainage, and orient to topography (Fig. 7.6).

7.6.2.3 Minimize solar heat gain for cooling.

7.6.2.4 Site buildings with consideration for the microclimate conditions of the site that result in variances in wind or light because of adjacent land forms, structures, or trees.

7.6.2.5 Orient outdoor pedestrian areas for most comfortable exposure.

7.6.2.6 Utilize lighter colored building surfaces exposed to the sun and darker colors on recessed surfaces to absorb radiation.

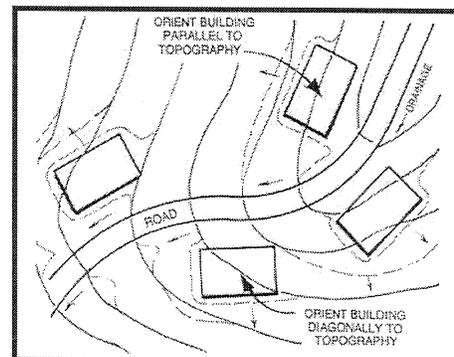


Fig. 7.6 - Orient Buildings and Roads to Topography

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- 7.6.2.7 Orient windows according to impact of climatic conditions.
- 7.6.2.8 Locate development on leeward side of hills.
- 7.6.2.9 Design and locate roads to provide a hierarchy of traffic carrying capacities.
- 7.6.2.10 Locate roads to blend with topography and vegetation.
- 7.6.2.11 Design and locate parking lots to minimize visual impact of broad expanses of pavement and vehicles.
- 7.6.2.12 Design and locate pedestrian walkways and bicycle paths to fit the physical environment; and, provide a comfortable pedestrian experience, limiting conflicts with vehicular traffic.
- 7.6.2.13 Locate trees and shrubs to buffer harsh natural conditions (Fig. 7.7).

7.6.2.14 Deciduous material allows for sun in the winter and provides shade in the summer. Evergreen material provides windbreaks for cold north winds.

7.6.2.15 Design and locate site elements to blend with and enhance the physical environmental.

7.6.2.16 Force Protection requirements should be designed and located to blend with the physical environment.

7.7 SPECIFIC SITE PLANNING CONSIDERATIONS

7.7.1 Site planning considerations must adhere to the physical historic context, or setting, of a historic district. The setting of a historic district is the area or environment in which a historic property is found. The elements of setting, such as the relationship of buildings to each other, setbacks, views, driveways and walkways, and street trees collectively create the character of a district. In instances, such as at Fort Bliss, buildings themselves form a neighborhood or setting that create the character of the district.

New site planning and new construction in Fort Bliss historic districts or in a historic district's view shed shall be physically compatible with the visual and spatial character of the historic district. Site planning considerations shall take into account the historical planning of the installation. This includes: location and orientation of buildings, spaces between

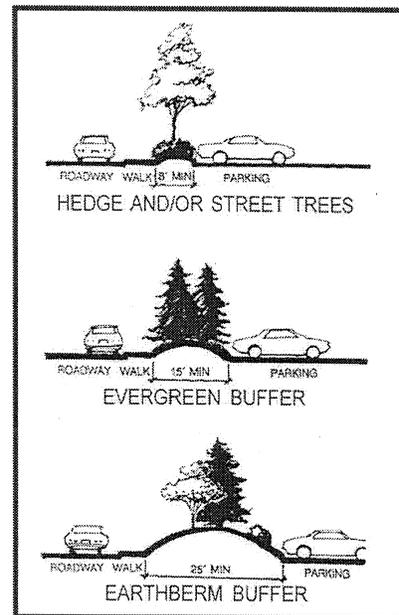


Fig. 7.7 - Screen Parking Areas

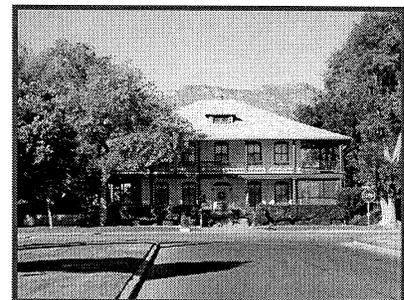


Fig. 7.8 - Pershing House –
Historic District

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SECTION 8 BUILDINGS DESIGN STANDARDS

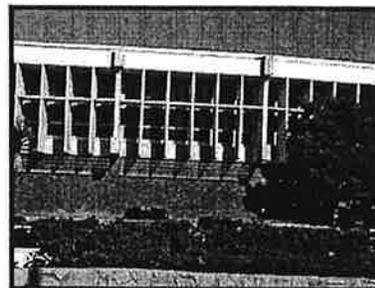
8.1 INTRODUCTION

8.1.1 The design character of an installation's buildings affects the installation's overall image. The visual analysis of buildings and related structures helps define visual zones and themes and is an important part of an installation's assets and liabilities assessment.

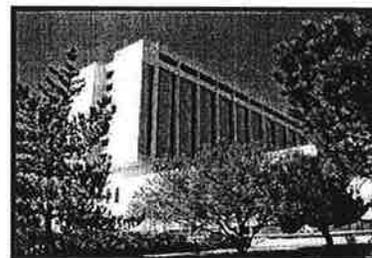
8.1.2 The building design component encompasses the character of the buildings as well as the arrangement of buildings relative to one another and to their environment. In general, use architectural style, materials, and colors indigenous to the region. The preservation of historically and culturally significant structures adds to an installation's character and provides the sense of a heritage.

8.1.3 The visual analysis of structures also includes concerns for accessibility, use of materials, placement of entrances, incorporation of additions and renovations, the incorporation of plazas and courtyards, interior design and the appropriateness and quality of building maintenance.

8.1.4 This section provides the objectives and visual determinants that should be utilized to identify and assess the building design quality of the installation. The section also provides standards and guidance pertaining to the development and maintenance of the various interiors and exteriors of buildings on the installation.



**Fig. 8.1 – Architectural Detail
of USASMA Building**



**Fig. 8.2 – The Medical Center
Main Building**

8.2 BUILDING OBJECTIVES

8.2.1 Sustainability. The architectural style of existing and future buildings should reflect and reinforce the sustainability of the installation. Sustainable design reduces construction and maintenance cost and conserves energy through proper construction and materials selection. See [Appendix D](#) for a

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more complete discussion on Sustainable Design.

8.2.2 Building Design Objectives:

8.2.2.1 Adapt building designs to natural site conditions (Fig. 8.3).

8.2.2.2 Design buildings in clusters to preserve land and reduce construction and maintenance costs.

8.2.2.3 Develop a coherent architectural style that results in the blending of new and old structures. However, when considering historical buildings, one should be able to differentiate between the historic fabric and the new material.

8.2.2.4 Design buildings to include more floors in a vertical structure that results in a smaller footprint and more efficiently utilizes limited installation land areas.

8.2.2.5 Combine multiple activities in one building to reduce the number of buildings required and more efficiently utilize limited installation land areas.

8.2.2.6 Design multiple use facilities with the capability to quickly change interior layouts to accommodate changing requirements.

8.2.2.7 Use indigenous construction materials and practices that require less energy to produce and transport and may be recycled at the end of their usefulness.

8.2.2.8 Locate windows to maximize natural light, ventilation and outward views.

- a) All windows and other glazed areas exposed to the sun, including all glass within 20 degrees east or west of true south, shall be completely shaded on the exterior no less than 50 percent of the time between 0900 and 1730 (solar time) daily during the period from 30 April through 1 October. Partial shading all the time is an acceptable alternative provided the total solar gain does not exceed the amount permitted above, based on actual solar studies. Shading may be achieved by building projections (either horizontal or vertical), by a deep reveal, or any combination of these measures or other architectural design.
- b) True South: Magnetic declination for Fort Bliss is 12 degrees east; that is, a compass reads 12 degrees east of True North or 12 degrees west of True South.
- c) Optimum Direct Gain Aperture Range (percent range of glazed opening to floor area): 11.6 percent.
- d) Minimum profile angle for fixed shade design (may declination): 65.5 degrees.
- e) Recommended shade devices (East and West): Trees and shrubs.

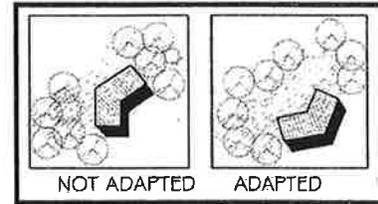


Fig. 8.3 - Adapt Building Design To Site Conditions

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- f) Optimum orientation of facility for passive solar and topo conditions: Within 20 degrees east or west of True South.

8.2.2.9 Consider adaptive reuse of buildings once their initial use is no longer required.

8.3 STRUCTURAL CHARACTER

8.3.1 The character of installation architecture varies according to the use of the structure and when it was built. This use and age variation can result in character incompatibilities.

8.3.2 The difference in character may also result when the designer ignores the character and scale of adjacent buildings or uses an imitative technique unsuccessfully.

8.3.3 The coordination of structural character on an installation provides a consistent and coherent “sense of order” and “sense of place”. This relationship of design comes from using compatible scales, massing, form, color, texture, materials, and fenestration. These design techniques can be utilized in the visual review and analysis of the installation. They are further explained below:

8.3.3.1 Scale. Scale refers to the size of a building facade in relation to humans. Buildings that include predominant vertical facades, which dwarf the individual, are defined as monumental in scale. Buildings with more horizontal facades designed to relate more to the size of the human figure are defined as human scale (Fig. 8.4). The scale of most buildings on installations should be more human than monumental. All new construction should be compatible in scale with adjacent buildings. Monumental architectural design is typically utilized for more ceremonial buildings, such as worship centers, headquarters complexes, and hotel facilities. These buildings make use of large, glazed areas at entrances and oversized fenestration elements to create a scale appropriate to the building’s use. Scale and relief should be provided through roof form, fenestration, building articulation and landscape plantings.

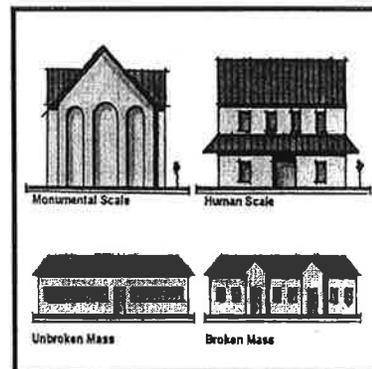


Fig. 8.4 - Structure Scale and Massing

8.3.3.2 Massing. Massing refers to the overall bulk or volume of a building or buildings (Fig. 8.4). The size and proportion of the individual buildings in a grouping of buildings should be designed to be proportionally compatible with the adjacent structures.

8.3.3.3 Form. The form of a building is determined by its size, mass, shape and proportions. The use of similar building forms provides continuity to the installation architectural image.

8.3.3.4 Color. The use of a color scheme that is consistent throughout the installation, where possible, results in a continuity of buildings and contributes to a sense of place



Fig. 8.5 - Color and Form Contribute to a Sense of Place.

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(Fig. 8.5). However, color schemes throughout the installation often vary according to the visual zone and visual theme in which the structure is located.

8.3.3.5 Texture. The use of building materials of similar texture provides visual continuity for the installation.

8.3.3.6 Materials. The use of similar building exterior finish and trim materials provides visual continuity.

8.3.3.7 Fenestration. Building fenestration includes features such as doors, windows, and decorative details. These features should be similar in arrangement, design, size, and proportion for architectural compatibility and visual consistency (Fig. 8.6).

8.3.3.7.1 Discourage Bird Habitat. When designing new construction, consider the use of design components that discourage birds from nesting on buildings. Birds and bird droppings are a nuisance, damaging to buildings and unhealthy to the human work environment. The following architectural features are attractive to birds and should not be used unless proper measures are taken to discourage their attractiveness to birds:

- Deep, uninhabited porches
- Flat architectural relief that projects from buildings or structures at least 4 inches
- Deep window sills
- Exposed gutters
- Flat and accessible areas under open stairs
- HVAC equipment that provide a water source for birds

8.4 BUILDING ENTRANCES

8.4.1 The building entrance is a primary feature of any building design. It should be defined and recognizable as the point of entry regardless of the size or importance of the building (Fig. 8.7).

8.4.2 The entrance to a building should be in a prominent location and should be oriented toward the primary adjacent public spaces such as a courtyard, lawn, parking lot, or street.

8.4.3 The details of an entrance should be designed to

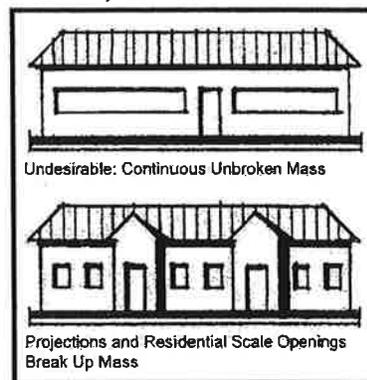


Fig. 8.6 - Fenestration Breaks Up Mass.

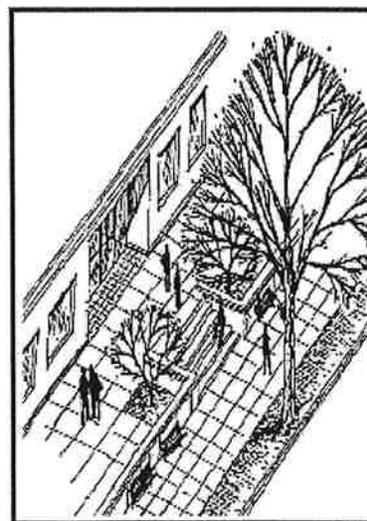


Fig. 8.7 - Entrance is Positive Visual Experience

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provide continuity with other entrances to the building and the entrances of adjacent buildings.

8.5 SERVICE AREAS

8.5.1 Service areas, such as loading docks and trash dumpsters, should be screened from the views of primary use areas such as entrances, courtyards, gathering areas, streets, and parking lots.



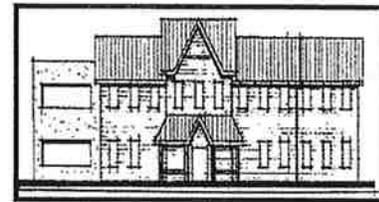
Fig. 8.8 – Screened Loading Dock

8.5.2 Service areas should be enclosed by masonry or rock walls. Screen walls should be between six and eight feet high and should be in harmony with the adjacent building.

(Fig. 8.8)

8.5.3 Trash and garbage collection areas must be located a minimum of 25 meters (82 feet) from troop billeting, family housing areas (containing more than 12 units), and stand-alone retail facilities (UFC 4-010-01, Table B-1).

8.6 NOT USED



Not This This
Fig. 8.10 – Renovation/ Additions
should be Compatible.

8.7 NOT USED

8.8 INDIGENOUS STRUCTURES

Sustainability in the design and construction of buildings includes incorporating time-proven building designs that are indigenous to the region. Indigenous design elements should be utilized in the design of new buildings (Fig. 8.11).



Fig. 8.11 – Building with Stucco Finish

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8.14.1.2 Use the following guidelines when selecting exterior building materials.

8.14.1.2.1 Choose materials for their longevity and maintenance characteristics.

8.14.1.2.2 Use materials with integral colors - avoid painting exterior colors.

8.14.1.2.3 Use installation standard colors for exterior walls. Add accent colors sparingly. Accent colors can be used in recesses and to accent certain portions of a buildings façade.



Fig. 8.21 – The Medical Center at WBAMC

8.14.1.2.4 Exposed exterior materials shall not require periodic repainting. Preferred materials are factory prefinished, integrally colored, or have similarly intrinsic weathering finishes. Ferrous metals shall not be exposed to the weather unless prefinished with a protective coating that has a minimum 20-year warranty.

8.14.1.2.5 Use dark bronze anodized aluminum for exterior windows. Use dark bronze anodized aluminum storefront doors for Main Entrance doors.

8.14.1.2.6 ~~Use blended colors, T lock type, on shingle pitched roofs;~~ fully adhered white 45 mil chlorosulfonated polyethylene (CSPE) or 60 mil Thermo Plastic Olefin (TPO), ¼” to 12” slope for “flat” roofs.

8.14.1.2.7 If a stucco look is desired, more durable materials such as EIFS or stucco-like finish on prefabricated metal panels or concrete panels shall be used. If EIFS is used a heavy duty reinforcing mesh shall be used around all doors and window openings, and extend a minimum 8’0” above finished floor elevation on all exterior walls. The heavy duty reinforcing mesh used on the EIFS shall have a minimum combined weight of 20 ounces per square yard and this standard can be met by using two layers. Use high impact mesh on all other surfaces.

8.14.1.2.8 NOT USED

8.14.1.2.9 Metal, wood, or vinyl siding should not be used. Vinyl or wood trim should not be used.

8.14.1.2.10 Satellite dishes, whether roof mounted or ground mounted, are not allowed. This requirement does not apply to Family Housing, nor to McGregor Range.

8.14.1.2.11 Not Used.

8.14.2 Appendix K, Exterior Materials Charts list the building materials applicable to the visual zones listed. – Under Development

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8.14.3 Exterior Building Color

8.14.3.1 Color charts have been developed for specific geographical areas giving consideration to climate, geography, culture, facility function, historical context, architectural character, etc. Color changes will be implemented during normally scheduled paint cycles (see [Appendix L, Exterior Color Charts – Under Development](#)).

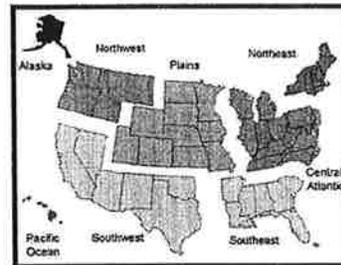


Fig. 8.22 - The Geographical Areas for Exterior Colors.

8.14.3.2 Color is closely linked to the appropriate selection of exterior building materials and is a critical design element in relating adjacent buildings and creating a compatible visual environment within an installation.

8.14.3.3 Overhead doors color shall be light beige or white.

8.14.3.4 Historic Buildings. Repaint the building or structure to match the existing colors or colors that can be documented to have been used on that building.

8.15 KEY FACILITY TYPES STANDARDIZATION

8.15.1 The Assistant Chief of Staff for Installation Management (ACSIM) establishes Army facility standards and approves deviations from the standards.

8.15.2 Residential Communities Initiative

8.15.2.1 The intent of the Residential Communities Initiative (RCI) is to improve the housing for military families by providing quality housing in attractive neighborhoods.

8.15.2.2 The Military Housing Privatization Initiative (MHPI) legislation allows developers to build and renovate housing to local standards. In those areas where local standards do not meet the quality of life requirements of soldiers, the Community Development and Management Plan (CDMP) process allows a negotiated determination of those standards. To ensure a uniform level of quality throughout RCI, Headquarters, Department of the Army has developed new construction and renovation standards for RCI family housing to be used as reference points during CDMP preparation. These standards are routinely updated. Revisions apply to CDMP collaboration contracts awarded within specific time frames and are not retroactive to previous projects.

8.15.2.3 All RCI projects planned or under design will meet the "Gold" SPiRiT rating (as of 18 March 2003). See [Assistant Secretary of the Army Memorandum Subject: Sustainable Design and Development Requirements, dated 18 March 2003](#).

8.15.3 Not Used

8.15.5 Army Lodging.

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SECTION 10

LANDSCAPE DESIGN STANDARDS

10.1 INTRODUCTION

10.1.1 The Landscape Design Standards includes selection, placement, and maintenance of plant material on the installation. Landscape plantings provide a simple and cost effective enhancement to the general appearance of the installation.

10.1.2 The visual image conveyed by a military installation is defined not just by architectural character and site organization, but also by an attractive, organized landscape design. The presence of plant material on the installation greatly enhances the visual character and environmental quality of the installation.

10.1.3 Plantings add an element of human scale to open spaces and can be used functionally to screen undesirable views, buffer winds, reinforce the hierarchy of the circulation system, or provide a visual transition between dissimilar land uses.

10.2 LANDSCAPE OBJECTIVES

10.2.1 The overall objective of the use of plant material within the installation is to improve the physical and psychological well being of the people who live and work on the installation. This is achieved through the following objectives:

10.2.1.1 Preserve and enhance natural desert terrain where applicable.

10.2.1.2 Because trees are the largest and most visible vertical elements in the landscape, the most benefit to the appearance and physical environment of the Fort Bliss is achieved through the addition of trees. Trees must be the primary element and type of plant material in the Fort Bliss landscape to conserve water and minimize maintenance. Use shrubs and ground cover primarily as accent elements to delineate building entrances and special outdoor spaces such as plazas and patios, and at vehicular entryways.



Fig. 10.1 -Use Locally Adapted Plants to Improve Visual Quality

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Improve the overall visual quality of the installation through the use of native or locally adapted plant material to (Fig. 10.1):

- 10.2.1.2.1 Blend built environment with the natural environment.
- 10.2.1.2.2 Provide scale and comfort to pedestrian environments (Fig. 10.2).
- 10.2.1.2.3 Reinforce the hierarchy of the circulation system (Fig. 10.3).
- 10.2.1.2.4 Screen unsightly views or elements.
- 10.2.1.2.5 Buffer incompatible land uses.
- 10.2.1.2.6 Minimize maintenance through the use of native plant materials that require less maintenance to survive.
- 10.2.1.2.7 Enhance antiterrorism capabilities.

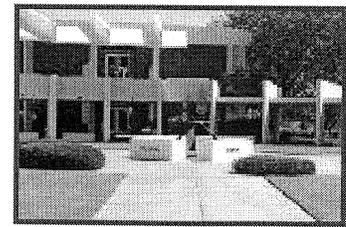


Fig. 10.2 – Provide Comfort to Pedestrians

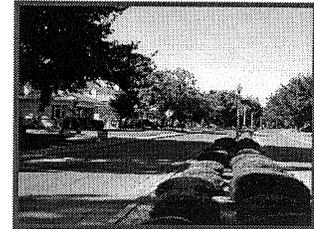


Fig. 10.3 - Landscaping Reinforces Circulation Hierarchy.

10.3 PRINCIPLES OF LANDSCAPE DEVELOPMENT

10.3.1 Landscape design is based on the following principles.

10.3.1.1 **Unity.** The selection and placement of plant material can blend, screen, and soften incompatible architectural or other unattractive visual impacts. Plant material as a unifying element can be placed in front of a building or view to frame and enhance the visual impact.

10.3.1.2 **Balance.** Except in some historic areas, informal planting designs which utilize masses of plant materials rather than rows and hedges are most desirable. Not only do such designs offer more visual interest, but, generally, they require less maintenance. Also in an informal design, when one or a few plants die, the design intent is less likely to be lost than in a formal design.

10.3.1.3 **Contrast.** Plant material can be selected and placed to provide differences in size and shape that add interest to the environment. Plants can be located to provide a backdrop for other plants such as by placing a hedge behind a bed of annuals or perennials.

10.3.1.4 **Rhythm.** Repetition of a single plant or a mass of plants provides visual interest and formality to the landscape. Rhythm

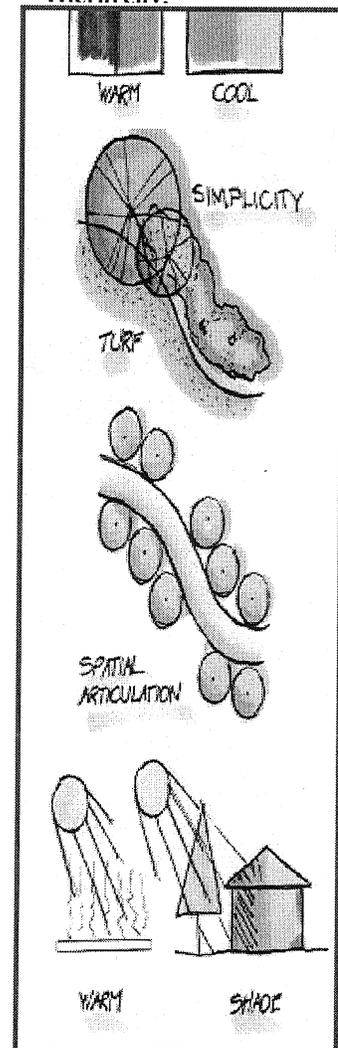


Fig. 10.4 - Principles of Design

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produces emphasis and unity and is especially effective in articulating main circulation routes.

10.3.1.5 Color and Texture. Plants can be selected and placed to provide visual interest according to their color and texture. Colors are classified as either warm (red, orange, yellow) or cool (violet, blue, green). Texture is classified as either coarse or fine.

10.3.1.6 Simplicity. Landscape plans should be broad and simple in form to limit excessive maintenance. Plants usually look better and achieve more impact when massed than when used alone. When groups of seven or less plants are used, odd numbers of plants make the most pleasing masses. Groups or clusters of plant materials should also be visually connected to successfully delineate space. Overspacing causes the composition to appear disjointed and is likely to increase maintenance.

10.3.1.7 Ultimate Effect. The landscape plan should be prepared with consideration for the mature size of all plants. The spacing of all material should utilize nursery industrial standards for mature material to account for spread as well as height. The ultimate height of the material should also be considered in relation to windows and other visual concerns.

10.3.1.8 Spatial Articulation. Plants can be selected and placed to create enclosed spaces or to separate spaces from one another. They can also be used to direct people by visually defining and reinforcing patterns of movement. The degree of enclosure, separation, or movement is dependent upon the density, form, and type of plants used.

10.4 SUSTAINABLE LANDSCAPE DEVELOPMENT

10.4.1 The use of plant material on the installation promotes the sustainability. Trees, shrubs, groundcover, and vines provide aesthetic appeal, energy conservation, climate modification, erosion control, air purification, wind/dust mitigation, reduction of glare and noise abatement (Fig. 10.5).

10.5 LANDSCAPE DESIGN GUIDELINES

10.5.1 Proposed plantings must be reviewed to ensure that site conditions (soil, topography, adjacent uses, and architecture) and climatic criteria (sun, shade, and moisture requirements) are considered in the desired plant design and selection (i.e., form, texture, color, size). The uses and users of the site must also be considered. Landscape planting plans should be approved by qualified personnel to provide quality assurance and promote design consistency within each visual zone.

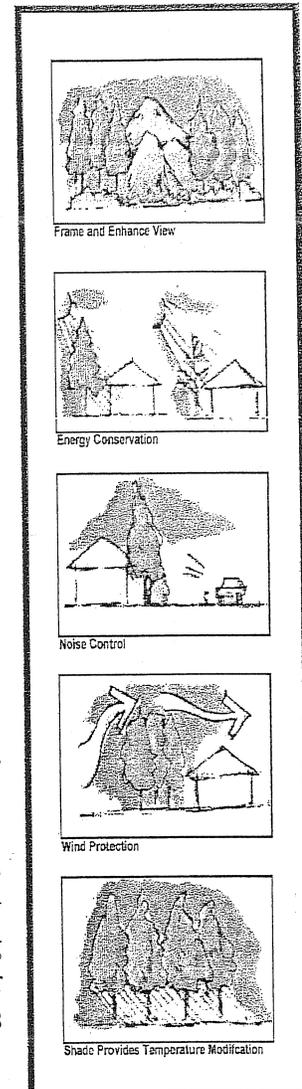


Fig. 10.5 - Plant Material Promotes Sustainability

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10.5.2 The following paragraphs present landscaping guidelines for the various locations of plant material use.

10.5.2.1 **Foundation Planting.** To conserve water and minimize maintenance, trees must be the primary element and type of plant material in the Fort Bliss landscape. Because trees are the largest and most visible vertical elements in the landscape, the most benefit to the appearance and physical environment of the post is achieved through the addition of trees (Fig. 10.6).

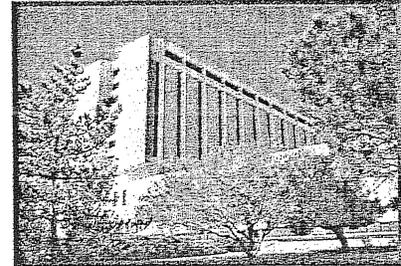


Fig. 10.6 – The Medical Center at WBAMC

10.5.2.1.1 Focal and seasonal plantings should be located at building entries for pedestrian interest.

10.5.2.1.2 Use the architecture of the building to evaluate the planting design and selection of plants.

10.5.2.1.3 Plant materials should not block windows and views from interior spaces.

10.5.2.1.4 Trees shall be set back from the building walls to provide space for mature growth and to prevent root systems from damaging the foundation.

10.5.2.1.5 Except in some historic areas, informal planting designs which utilize masses of plant materials rather than rows are most desirable.

10.5.2.1.6 Due to the possibility of insect problems (bee stings, etc.), do not plant flowering plants near entrances.

10.5.2.2 **Screening.**

10.5.2.2.1 **Windscreens.** Measures to mitigate high winds and blowing dust must be considered for very large open areas such as parking lots, perimeter open space areas and recreational areas. Plant materials can be used for wind control by breaking, directing or filtering the wind. Use a combination of evergreen and deciduous trees to provide windbreak protection from prevailing winds. Windbreak plantings should be irregular in form, rather than straight and evenly spaced, in order to provide more effective wind control and to visually blend with the natural character of the installation.

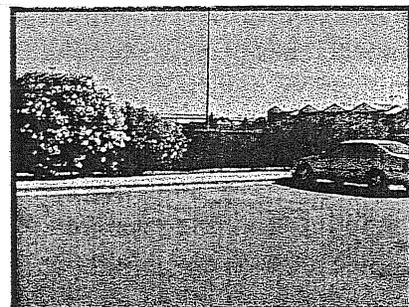


Fig. 10.7 – Buffer Planting

10.5.2.2.2 Not Used.

10.5.2.3 **Buffer Planting.** Use a mixture of evergreen and deciduous trees and shrubs to visually separate land uses and to help separate visual zones or to screen unpleasant views or noises (Fig. 10.7).

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10.5.2.4 Open Space Planting / Natural Recovery Areas. The preservation and enhancement of existing landscape is encouraged (Fig. 10.8).

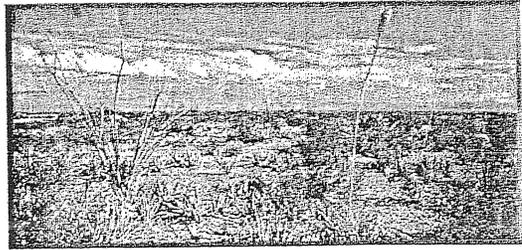


Fig. 10.8 – Desert Vegetation

A program directed to allow natural recovery in almost 100 large open areas on Fort Bliss is ongoing (Fig. 10.9). The main objective is to suppress dust emissions from these areas during wind events that are common in the region. Dust is a nuisance for people in many ways: it increases the need for cleaning inside homes and working spaces, creates accumulation of soil around buildings and against walls, and commonly produces a safety risk factor as visibility is greatly reduced for motorists (Fig. 10.10).



Fig. 10.9 - Natural Recovery Area

There are more than 40 locally adapted plants that are able to get established naturally in open soil, including native and exotic species, which can live with natural rainfall. This eliminates the need for maintenance.

The following is a list of recommended actions to promote both natural vegetation recovery and aesthetics in these open areas. This approach is applicable to any open areas where the soil has been disturbed.

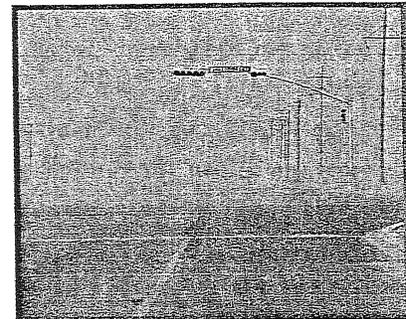


Fig. 10.10 – Dust Problem

Initial preparations. Level soil to desired grade, leaving a rough surface so it traps seeds and retains moisture. Do not disturb ground except to conduct the maintenance described below. Soils left alone, even without vegetation, produce less dust than disturbed surfaces.

Year 1 and 2. Conduct bush-hogging at 8 inches in August and November to cut off the tops of taller vegetation and protect low-growing plants. This will allow them to grow and produce new seeds. Any undesirable tumbleweeds that proliferate during this period will be gradually outcompeted by other native vegetation and can be controlled by bush-hogging.

Year 3. If tumbleweeds are still present, mow at 8 inches in August and November. If these plants are nearly absent, mowing may be optional to improve area appearance. Do not mow less than 6 inches high.

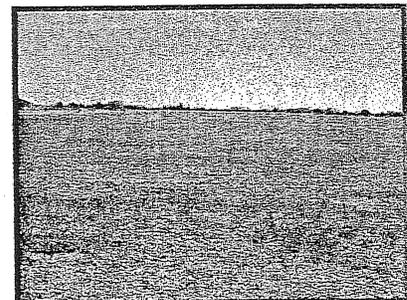


Fig. 10.11 - Ground Covered by Natural Vegetation in a Natural Recovery Area

Year 4 and on. Areas may be left undisturbed to protect vegetation cover and soil. Dust emissions should be greatly reduced or eliminated by this time. To improve appearance in highly visible areas mowing to 6 inches may be conducted in June or November.

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It is not recommended to clean the edges of areas with weed-eater machines that re-expose the soil. This promotes the establishment of tumbleweeds along the perimeters, creating more work to remove them, as they are a source for seeds that may invade recently-recovered areas.

10.5.2.5 Street Trees. Street tree plantings should be used to reinforce vehicular hierarchy, orient and direct traffic, upgrade views, and to visually de-emphasize on-street parking (Fig. 10.12). Also, in the design of a street tree planting, separate plant species may be used to identify distinctive details or areas of the installation, for example, a particular land use relationship, historical district, community area, or other similar entity.

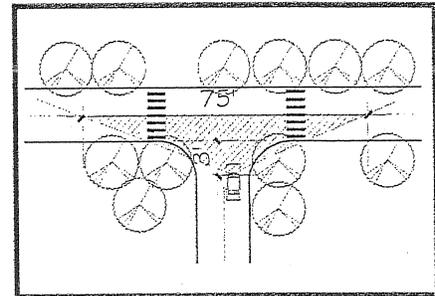


Fig. 10.12 – Use Street Trees to Visually Reinforce Road Hierarchy

10.5.2.5.1 Except in some historical areas, where specific landscape guidelines apply, use Mondel Pine, Afgan Pine, Honey Mesquite, Washingtonia Palm Tree, and Desert Willow street trees in clusters to visually reinforce primary and secondary roads (Fig. 10.13).

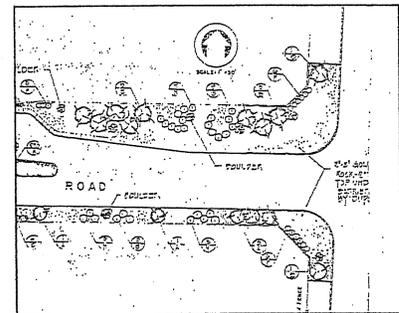


Fig. 10.13 - Trees and Plants in Clusters.

10.5.2.5.2 Except in some historic areas (where specific landscape guidelines apply), use informal groupings of street trees along tertiary routes. Utilize medium size trees to screen on-street parking along roadways. Set trees 1 to 2 meters (3 to 6 feet) from the back of curbs.

10.5.2.5.3 As a general rule, street trees should be resistant to salt and root pressure, and should have a 10' to 12' high clearance between the street pavement and branch height to allow adequate clearance for pedestrian and vehicle traffic to pass unimpeded by lower branches.

10.5.2.5.4 The street tree layout should be coordinated with the layout of proposed street lighting.

10.5.2.5.5 Appropriate plant heights should be used within sight triangles to ensure safe views from intersections.

10.5.2.5.6 Weeping trees should not be used where they may hang over roadways or block views.

10.5.2.6 Parking Lot Planting. Parking lots are often the least attractive elements on a military installation. The use of landscape plant material and earth berms can greatly improve the appearance of these areas, while helping to define circulation and reduce heat gain during summer months (Fig. 10.14).

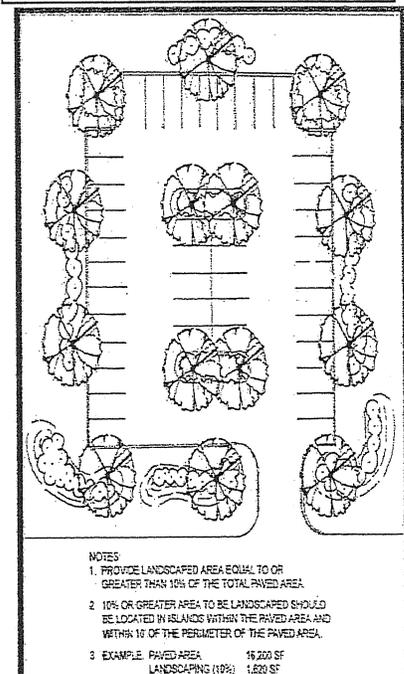


Fig. 10.14 - Provide Parking lot Planting to Reduce Heat Gain

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10.5.2.6.1 Use shade tree plantings at parking lots to reduce glare and moderate ambient air temperatures on the lot. Optimum spacing of parking lot shade trees is 10 to 12 meters (35 to 40 feet) on center.

10.5.2.6.2 Choose trees and shrubs that require minimum maintenance and will not litter the parking area with leaves, fruit, or nuts.

10.5.2.6.3 Consider sight distances near entrances and exits when selecting and placing plant material.

10.5.2.6.4 Select trees, shrubs, and ground covers that can withstand harsher conditions, such as sun, glare, heat, and reduced water supply.

10.5.5.6.5 Use a mix of evergreen and deciduous plant material to screen parking areas from adjacent uses.

10.5.2.7 Environmental Control Planting. When properly placed, plants can provide environmental benefits, as well as address visual concerns.

10.5.2.7.1 Use deciduous trees and shrubs at courtyards, buildings and along streets to provide shade, moderate temperatures and reduce glare during the summer months while allowing solar exposure in the winter.

10.5.2.7.2 Locate deciduous plantings on the southeast and southwest corner of buildings or courtyards to mitigate solar radiation and glare due to heat build-up and lower sun angles in the mid-morning and late afternoon hours.

10.5.2.7.3 Use mixed massings of deciduous shrubs and evergreen trees and shrubs to provide sound control along primary and secondary roads.

10.5.2.8 Image Planting. The image of the installation is formed by the visual impressions that exist within the installation. The primary locations of highly visible images are the main gate, along primary circulation systems, and at areas of high concentrations of people. Features such as signs, statues, static displays, and other primary visual images can be improved by the use of trees, shrubs, and ground cover.

10.5.2.9 Entrances to the Installation. The entrances and streetscapes into the installation are areas to place landscaping that will develop a strong visual image and provide visual interest during all four seasons. The entrance to the installation creates the first visual impression for the visitor.

10.5.2.9.1 The landscape materials and planting areas should be proportional in scale to the hierarchy of the street on which they are located.

10.5.2.9.2 Landscaping must be integrated with the Force Protection requirements of Section 12. Low shrubs, groundcover, annual/perennial plants and canopy trees provide

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seasonal interest as well as maintain views required to ensure force protection measures. Adequate lines of sight must be maintained for guard personnel to observe vehicular and pedestrian traffic approaching the gate.

10.5.2.10 **Zeroscaping.** Zeroscaping is the use of only inert materials such as rock, gravel, bricks and pavement. When absolutely necessary, zerospacing may be the only option. For a zeroscape installation, landscape rock or gravel will be underlaid with 6-mil plastic. Finished surface is to be 1" below top of curbs and paving. Landscape rock will be 1" – 1.5" and approximately 2" deep. 1" fines will be placed on the plastic to keep the rock from tearing it. Pea gravel is not desirable in areas where pedestrians walk. (Note: Zeroscaping is not the same as "Open Space Planting and Treatment Management" described in 10.5.2.4.)

10.5.2.11 **Xeriscape.** Xeriscape is the use of water-saving landscape designs incorporating desert-adapted plants. It may also include sections of rock landscapes that are typical of zeroscaping (para 10.5.2.10). Instead of 6-mil plastic use woven polypropylene weed barrier. Creative xeriscapes not only look attractive, but also save money, water and maintenance. All tree/plants in a xeriscape installation will be provided with automatic drip irrigation.

10.6 PLANT MATERIAL SELECTION

10.6.1 Trees, shrubs, ground cover and turf are the major elements of a planting composition. Basic plant selection criteria should consider creating a unified composition utilizing native materials for low maintenance and sustainability, avoiding incompatible colors, textures and forms, and matching the appropriate plant to the land use, situation, and environmental condition. Also, plantings in designated historic areas only should follow the Fort Bliss Landscape Handbook for Historic Residences.

10.6.2 The ability of plant material to provide lasting benefit is dependent upon the plant's hardiness and its appropriateness to the site use. Major factors affecting plant hardiness are soil type and organic content, temperature, moisture and light. These climatic conditions can be modified to an extent by specific site conditions, such as wind protection, solar orientation, and planting design, to create microclimates.

10.6.3 Selecting appropriate plants for a given condition is only one aspect of planting design. Compositional arrangement to provide texture variety and to accent site and building features is another. The selection and composition of a planting design requires an understanding of each plant's characteristics, form, and environmental needs as well as how each plant can relate to and complement other plants in the design. Plants are used in four basic design categories (Fig. 10.15):

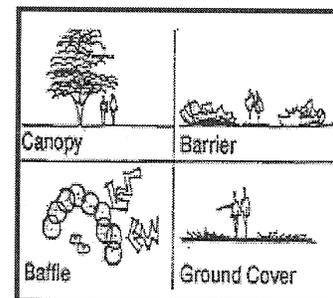


Fig. 10.15 - Four Basic Design Categories

- Canopy
- Barrier
- Screen (or Baffle)

APPENDIX BB

Utility Meter Specifications and Details

Transformer and Electric Meter Specification

Abbreviations:

LDE Land Development Engineer

D/B Design Build Contractor

The following items shall be furnished and installed by the D/B contractor:

1. Structural concrete pad for transformer as detailed on drawing U-837 with the following:
 - Extend secondary conduit duct bank to facility service equipment and metering conduit to communications room, furnish and install secondary service conductors and terminate secondary conductors at transformer.
 - Add secondary conduits, if required, to match facility service entrance requirements.
 - Eight bolts to fasten transformer pad to the vaults

Clarifications—The transformer pad shall be set on concrete vaults furnished and installed by the LDE. The transformer pad is identified as "LID L2" on the attached drawing U-837. The two "LID L1" and the compacted gravel under the transformer pad shall be furnished and installed by the LDE. Secondary and metering conduit ductbank stub-out from vault shall be furnished and installed by the LDE.

2. Outdoor pad-mounted oil-filled transformer with the following ratings and accessories:
 - 13.8kV-3Ø-3W Delta primary and 3Ø-4W secondary
 - Insulating liquid—Mineral oil: ASTM D 3487, Type II, tested in accordance with ASTM D 117. Provide identification of transformer as "non-PCB" and "Type II mineral oil" on the nameplate.
 - High voltage compartment minimum 24" deep from tank to inside of hinged door to accommodate elbow surge arrester connected to 600A dead-break elbow.
 - Radial feed with oil immersed primary load-break switch
 - Three 600A dead-break bushings with parking stands
 - Surge arresters IEEE C62.11, rated 18 kV, 15.3 MCOV, fully shielded, dead-front, metal-oxide-varistor, elbow type with resistance-graded gap, suitable for plugging into inserts. Provide three arresters for radial feed circuits. Surge arresters shall be delivered to Contracting Officer for installation by LDE.
 - Ground pads
 - Factory installed secondary electronic metering (See item 3 below)
 - Tap changer, no-load, externally operable with four 2.5% taps—two above and two below rated primary voltage.

Clarifications—the transformer shall be set on the transformer pad by the D/B contractor. LDE shall furnish and install the 13.8kV conductors, 600A dead-break elbow connectors and connect ground ring ground wires to the ground pads. The LDE shall

install the surge arresters furnished by the D/B contractor. The 13.8kV electrical distribution system is a low-resistance neutral grounded system.

3. Socket mounted electronic programmable outdoor watt-hour meter, surface mounted flush against the side of the low voltage compartment with the following ratings and accessories:
 - Meter shall be designed for use on a 3Ø-4W system with current transformers. Current transformer shorting terminal strips shall be furnished.
 - Include necessary KYZ pulse initiation hardware for Energy Monitoring and Control System (EMCS).
 - The meter shall be Class 20, Form 9S with an accuracy of +/- 1.0 percent
 - Meter fusing—provide a fuse block mounted in the secondary compartment containing one fuse per phase to protect the voltage input to the watt-hour meter. Size fuses as recommended by the meter manufacturer.
 - The meter cover shall be polycarbonate and lockable.
 - The kilowatt-hour register shall be 5 digit electronic type with a solid state demand register and meter reading multiplier. Demand intervals shall be 15 minutes with rolling demand up to 6 subintervals per interval.
 - The meter socket shall be NEMA 3R, box mounted and have automatic circuit closing bypass and having jaws compatible with requirements of the meter. Paint to match transformer.

WATER METER SPECIFICATIONS

1.1. Displacement Type Meters

Meters 2" in size and smaller shall be displacement type meters. Displacement type meters shall conform to AWWA C700. Registers shall be straight-reading and shall read in U.S. gallons. Meters in sizes 1/2 through 1 shall be frost-protection design. Connections shall be suitable to the type of pipe and conditions encountered. Register type shall be an encoder type remote register designed in accordance with AWWA C707. Meters shall comply with the accuracy and capacity requirements of AWWA C700.

1.2. Turbine Type Meters

All meters 2.5" and larger shall be turbine type meters. Turbine type meters shall conform to AWWA C701 Class I. The main casing shall be bronze with stainless steel external fasteners. Registers shall be straight-reading type, shall be permanently sealed and shall read in U.S. gallons. Connections shall be suitable to the type of pipe and conditions encountered. Register type shall be an encoder type remote register designed in accordance with AWWA C707. Meters shall comply with the accuracy and capacity requirements of AWWA C701.

1.3. Compound Type Meters

Compound type meters shall conform to AWWA C702 and shall be furnished with strainers. The main casing shall be bronze with stainless steel external fasteners. The main casing shall be tapped for field testing purposes. Registers shall be straight-reading type, shall be permanently sealed and shall read in U.S. gallons. The meter shall be equipped with a coordinating register. Connections shall be suitable to the type of pipe and conditions encountered. Register type shall be an encoder type remote register designed in accordance with AWWA C707. Meters shall comply with the accuracy and capacity requirements of AWWA C702.

1.4. Meter Vaults

Meters 2.5" and larger in size shall be installed in reinforced concrete vaults in accordance with the El Paso Water Utilities Public Service Board Detail No. 290-3 and Detail No. 294. Meter vaults and covers within roadways and POV paved areas shall be rated for H-20 loading. Meter vaults and covers within GOV areas and access drives shall be rated for the heaviest proposed loading in the parking area.

1.5. Meter Boxes

Meters 2" in size and smaller shall be set in reinforced concrete meter boxes in accordance with the El Paso Water Utilities Public Service Board Detail No. 290-2 and Detail No. 293. The boxes shall be of sufficient size to completely enclose the meter and shutoff valve or service stop. Meter boxes set in paved areas subject to vehicular traffic shall be concrete with cast iron lid and cast iron meter reader lid. Boxes set in sidewalks, not subject to vehicular traffic, shall use concrete covers with cast iron meter reader lids. Plastic boxes and lids shall not be used in any area. Box height shall

extend from invert of the meter to final grade at the meter location. The lid shall have the word "WATER" cast in it.

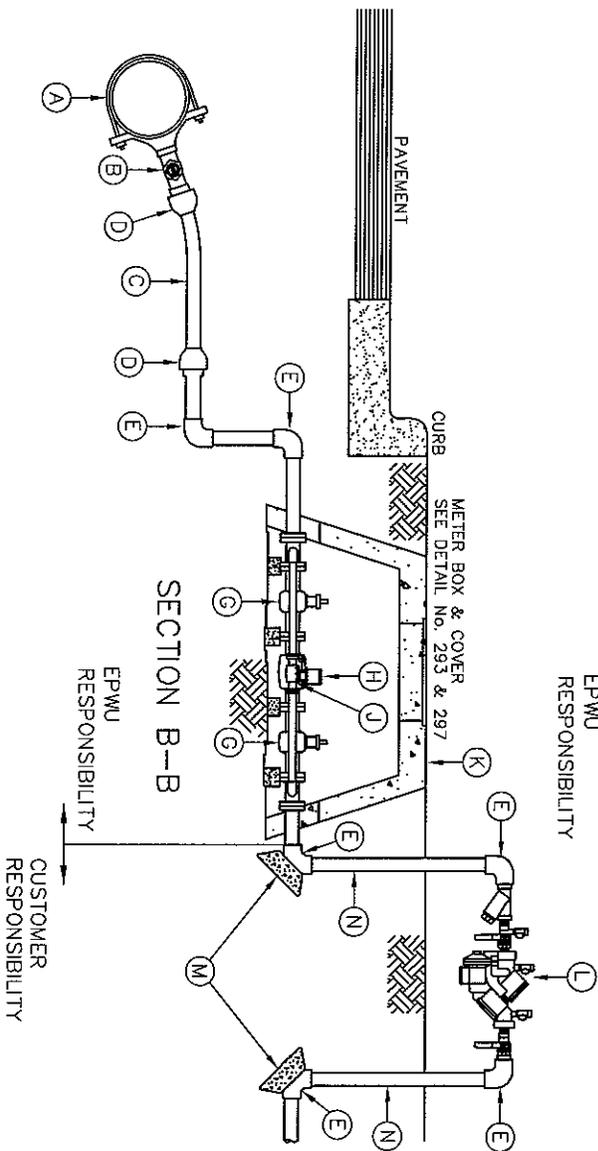
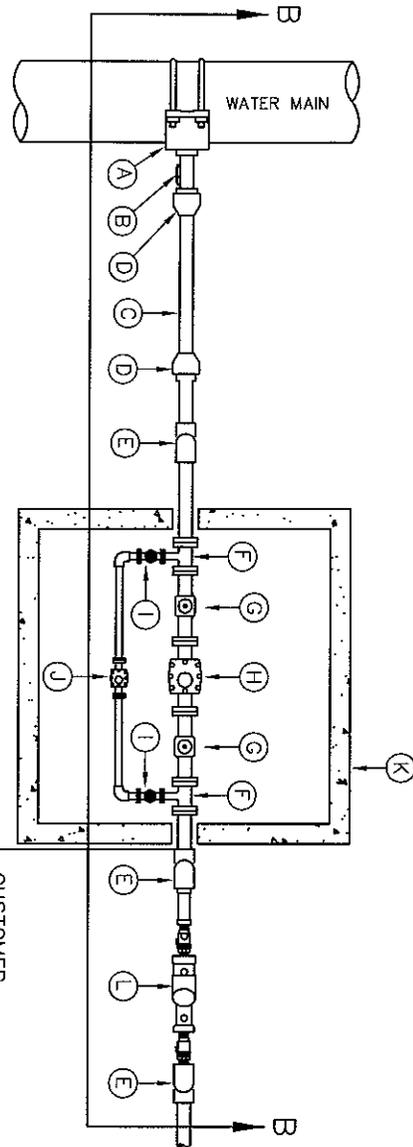
1.6 Accessories

Provide a 1" conduit from each meter vault or meter box to the building mechanical room. Provide an accumulator and data pulse logger for each building complying with the following:

The Pulse Logger must be web-enabled and be capable of recording pulses from gas or water meters. It must be able to accept at least 4 pulse inputs. The logger must have Ethernet communication capabilities. Consumption data must be transmitted either via email and/or ftp in XML formats. The Pulse Logger's features and capabilities must include:

- ⇒ View Load Profile data using the built in Web Server.
- ⇒ Transmits reports via email or ftp or both.
- ⇒ CC a secondary email recipient.
- ⇒ Open Protocols XML, HTTP, SMTP, SNTP, FTP, DHCP, DNS.
- ⇒ Compact size 3.0" X 3.25" X 1.25".
- ⇒ Comes with a 110~220 VAC to 12VDC power supply.
- ⇒ RJ45 Ethernet Network jack.
- ⇒ ROHS Compliant for Europe.
- ⇒ Safe log-in to the Web Server via password authentication.
- ⇒ Secure data storage in non volatile memory with Lithium Ion Battery backup.
- ⇒ Lithium Ion Battery backup for storing data during power outages.
- ⇒ Recharging of Lithium Ion battery occurs automatically.
- ⇒ High measurement rate of up to 100 pulses per second.
- ⇒ Compatible with any network using DHCP or static IP Addressing.
- ⇒ Uses SNTP for highly accurate time stamping.
- ⇒ Day Time client integrated if SNTP server is not accessible.
- ⇒ International Time Zone support.
- ⇒ User Configurable
 - Logging interval from 5 minutes to 60 minutes.
 - Reporting interval from 5 minutes to hourly, daily, or weekly.
 - 16 character alpha numeric ID.
 - 20 character alpha numeric Serial Number.
 - 80 character Location / Address.
 - User configurable SNTP server.
 - Time Stamps can be in USA or European format.

Connection to the base wide EMCS system will be by others and is not included in this scope of work.



GENERAL NOTES:

1. DETAIL SHOWN FOR 1 1/2" SERVICE. INSTALLATION SIMILAR FOR 2" SERVICE EXCEPT FOR SIZES OF PIPE, FITTINGS AND METER. WHEN SPECIFIED A 1" BY-PASS METER SHALL BE INSTALLED WITH A 1 1/2" SERVICE, A 2" SERVICE SHALL INCLUDE A 1" BY-PASS METER
2. WHERE NO CURB EXISTS, METER IS TO BE SET NEAR PROPERTY LINE OR AT DESIGNATED LOCATION.
3. THE EPWU WILL FURNISH AND INSTALL ALL NECESSARY PIPE, FITTINGS, METER BOXES, AND METERS REQUIRED. IT SHALL BE THE RESPONSIBILITY OF THE PRIVATE OWNER TO HAVE A CERTIFIED PLUMBER INSTALL A BACKFLOW PREVENTER AND EXTEND SERVICE LINE ON DISCHARGE SIDE OF METER.

CONSTRUCTION KEY NOTES:

- A. SERVICE SADDLE
- B. 1 1/2" TAP WITH CORPORATION STOP
- C. 1 1/2" COPPER PIPE FOR 1 1/2" & 2" SERVICE INSTALLATIONS, ALL PIPING SHALL BE COPPER AND ALL FITTINGS SHALL BE BRONZE UNLESS OTHERWISE SPECIFIED.
- D. UNION
- E. BEND 90°
- F. TEE
- G. 1 1/2" GATE VALVE
- H. 1 1/2" TURBINE METER
- I. CURB VALVE
- J. 1" BY-PASS METER
- K. STANDARD METER BOX TYPE "C"
- L. BACKFLOW PREVENTER WHEN REQUIRED BY EPWU
- M. THRUST BLOCKING AS REQUIRED
- N. 1 1/2" BRASS PIPE-LENGTH AS REQUIRED



STANDARD
DETAIL

DATE: 12/12/1996
REV: 7/24/2001

TYPICAL 1 1/2" SERVICE LINE
INSTALLATION BY PSB
N.T.S.



DETAIL No.
290-2



STANDARD
DETAIL

DATE: 1/29/1997
REV: 7/25/2001

TYPICAL 3" AND LARGER
SERVICE LINE INSTALLATION BY PSB
N.T.S.

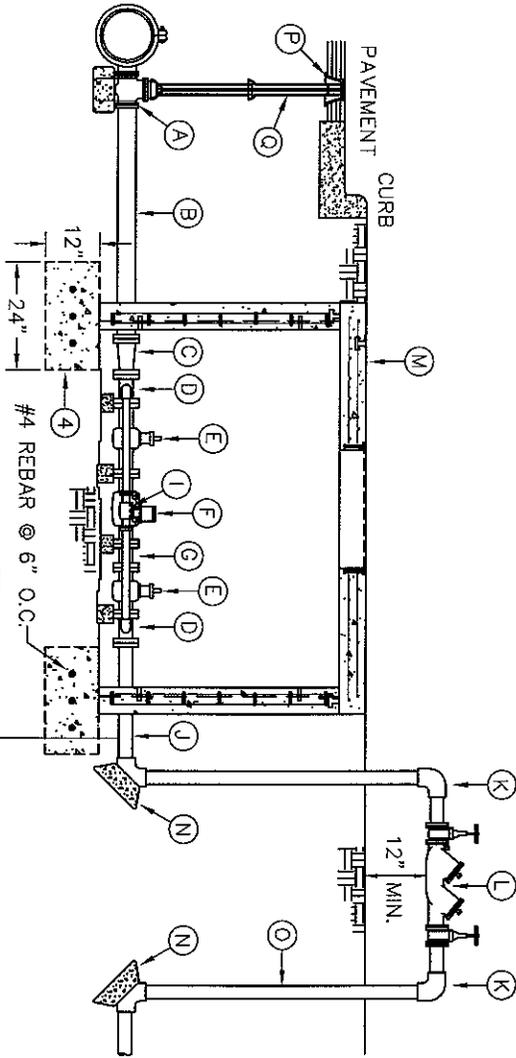


DETAIL No.
290-3

SECTION A-A

CUSTOMER
RESPONSIBILITY

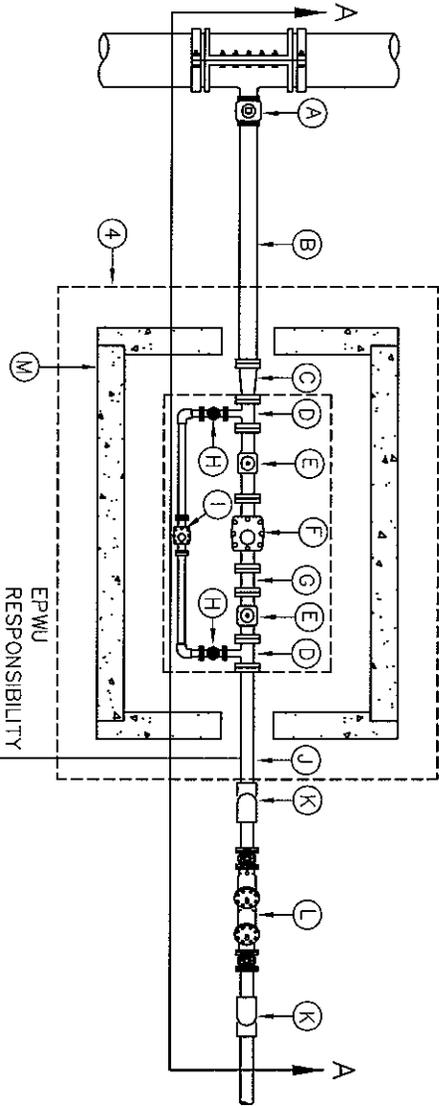
EPWU
RESPONSIBILITY



PLAN VIEW

CUSTOMER
RESPONSIBILITY

EPWU
RESPONSIBILITY



GENERAL NOTES:

1. DETAIL SHOWN FOR 3" SERVICE. INSTALLATION SIMILAR FOR LARGER SERVICES EXCEPT FOR SIZE OF PIPE, FITTINGS AND METER.
2. WHERE NO CURB EXISTS, METER IS TO BE SET NEAR PROPERTY LINE OR AT DESIGNATED LOCATION.
3. THE EPWU WILL FURNISH AND INSTALL ALL NECESSARY PIPE, FITTINGS, METER BOXES, AND METERS REQUIRED. IT SHALL BE THE RESPONSIBILITY OF THE PRIVATE OWNER TO HAVE A CERTIFIED PLUMBER INSTALL A BACKFLOW PREVENTER AND EXTEND SERVICE LINE ON DISCHARGE SIDE OF METER.
4. FOOTING REQUIRED WHEN PLACED UNDER EXISTING OR PROPOSED STREET PAVING.

CONSTRUCTION KEY NOTES:

- A. 4" TAPPING SLEEVE AND VALVE
- B. 4" P.V.C.
- C. 4"x3" REDUCER
- D. 3"x2" TEE
- E. 3" GATE VALVE
- F. 3" METER
- G. 3" TEST PLUG D.I.P.
- H. 2" GATE VALVE
- I. 2" BY-PASS METER
- J. 3" SPOOL D.I.P.
- K. 3" BEND 90°
- L. 3" BACKFLOW PREVENTER
- M. STANDARD METER BOX TYPE "D"
- N. THRUST BLOCKING AS REQUIRED
- O. 3" FLANGED D.I.P. - LENGTH AS REQUIRED
- P. BONNET BOX AND COVER IN ACCORDANCE WITH DET 269.
- Q. PIPE AS PER EPWU STANDARD DET. 260.



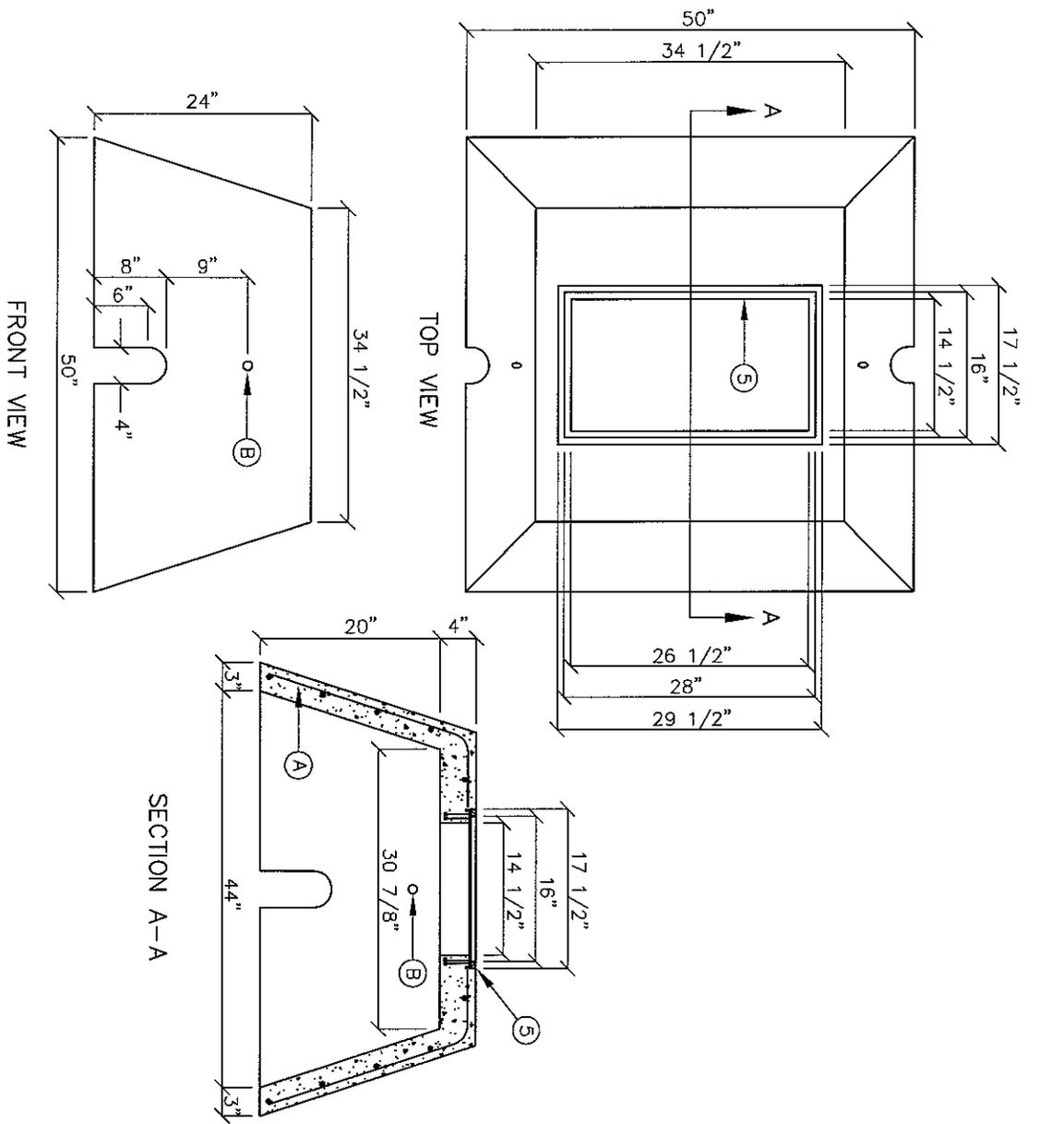
STANDARD
DETAIL

APR. 1994
REV. OCT. 1994

METER BOX TYPE "C"
1 1/2" TO 2" SERVICE INSTALLATION
N.T.S.



DETAIL No.
293



GENERAL NOTES:

1. INSTALL TO GRADE MATCHING TOP OF CURB.
2. ANGLE VALVE SHALL BE IN LINE WITH THE INLET/OUTLET PORTS OF THE METER BOX.
3. METER BOXES SHALL NOT BE INSTALLED UNDER SIDEWALKS, DRIVEWAYS, OR PROPOSED ABOVE GROUND STRUCTURES.
4. WHERE NO CURBING EXIST, INSTALL BOXES IN ACCESSIBLE LOCATIONS BEYOND LIMITS OF STREET SURFACING, WALKS AND DRIVEWAYS.
5. STANDARD METER BOX FRAME AND COVER PER EPWU STANDARD DETAIL 297.

CONSTRUCTION KEY NOTES:

- A. No. 4 REBAR AT 6" ON CENTER, EACH WAY
- B. 1" DIAMETER HOLE
- C. SINGLE UNIT



STANDARD
DETAIL

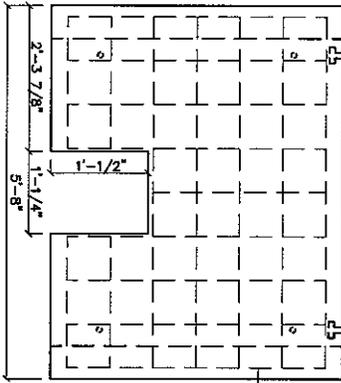
SEPT. 1994
REV. OCT. 1994

3" AND LARGER SERVICE INSTALLATION
METER BOX TYPE "D"
N.T.S.

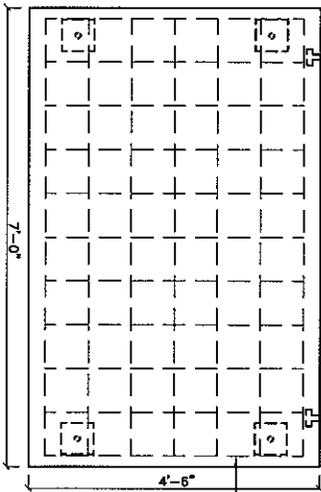
EL PASO WATER UTILITIES
PUBLIC SERVICE BOARD

DETAIL No.
294

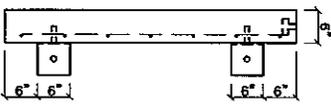
FRONT VIEW OF PANEL C SIDE VIEW



FRONT VIEW OF PANEL D



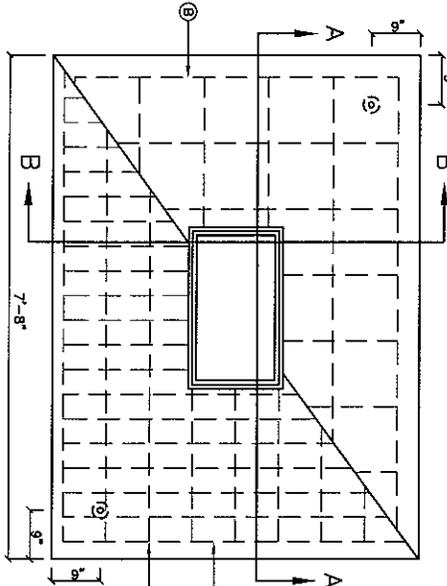
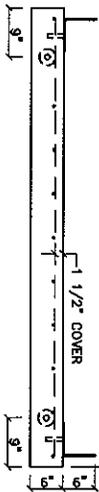
SIDE VIEW



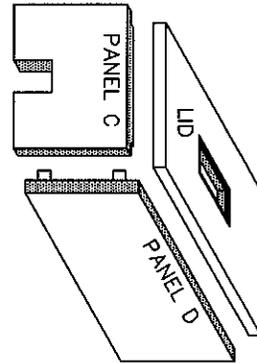
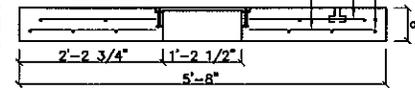
TOP VIEW OF PANEL C



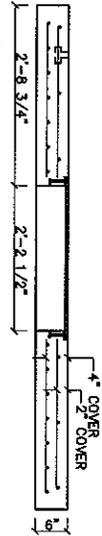
TOP VIEW OF PANEL D



SECTION B-B



(SECTION A-A) TOP VIEW OF LID



GENERAL NOTES:

1. WATER CEMENT RATIO 0.5 OR LESS BY WEIGHT OR NOT MORE THAN 5.5 GALLONS PER SACK.
2. REINFORCING SHALL COMPLY WITH ASTM A615 GRADE 60 STEEL F_y=60000 PSI.
3. BAR BENDING AND PLACEMENT TO COMPLY WITH LATEST ACI STANDARDS.
4. LIFTERS FOR HANDLING SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS AND RATED TO HANDLE THE WEIGHT.
5. CONCRETE TO HAVE A MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 4000 PSI.
6. STANDARD METER BOX FRAME AND COVER PER EPWU STANDARD DETAIL 297.

CONSTRUCTION KEY NOTES:

- A. No. 4 REBAR AT 8" ON CENTER, BOTH WAYS.
- B. No. 4 REBAR AT 12" ON CENTER, BOTH WAYS (TOP LAYER).
- C. No. 4 REBAR AT 8" ON CENTER, LONG SPAN (BOTTOM LAYER).
- D. No. 5 REBAR AT 4 1/2" ON CENTER, SHORT SPAN (BOTTOM LAYER).
- E. MODULAR



STANDARD
DETAIL

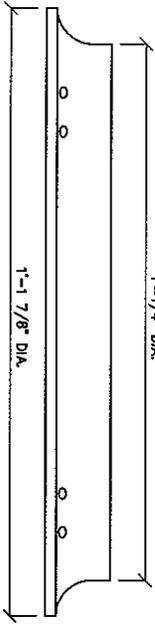
JAN. 1995
REV.

METER BOX RING
N.T.S.

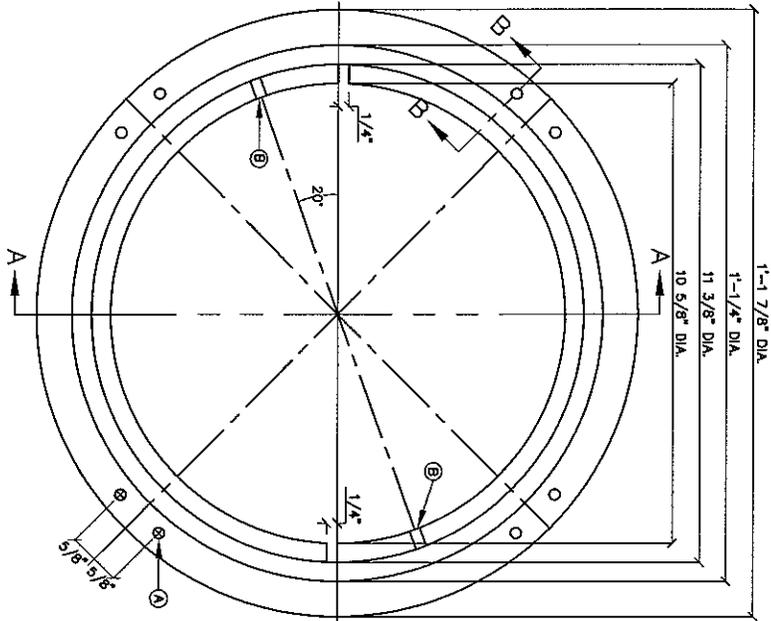


DETAIL No.
295

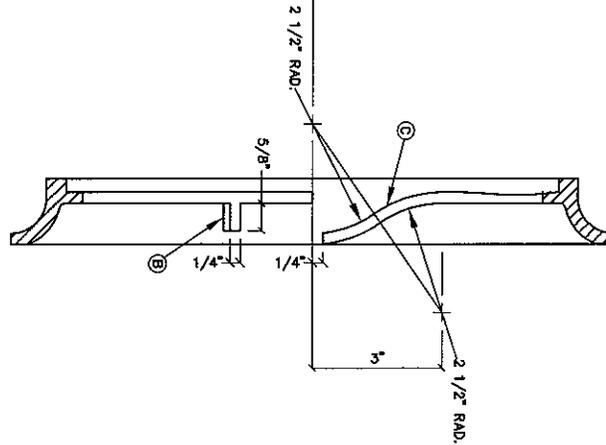
SIDE VIEW



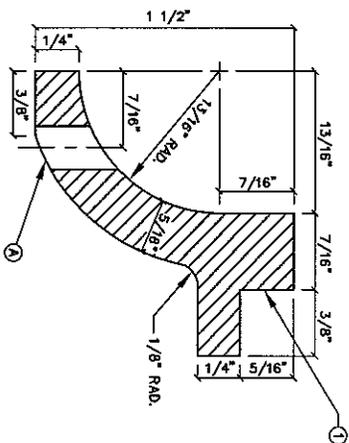
TOP VIEW



SECTION A-A



SECTION B-B



GENERAL NOTES:

1. MATCHING SURFACES TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
3. METER BOX RING WEIGHT = 7 LBS.
4. METER BOX RING MADE OF CAST IRON.

CONSTRUCTION KEY NOTES:

- A. 1/4" DIAMETER HOLES FOR ANCHORING RING TO CONCRETE METER BOX.
- B. LUG STOP
- C. LOCKING LUG SLIDE



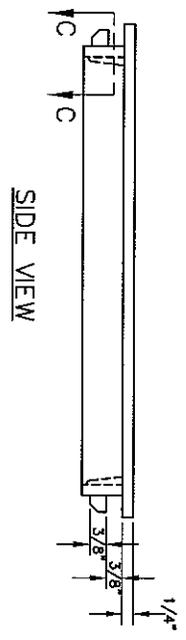
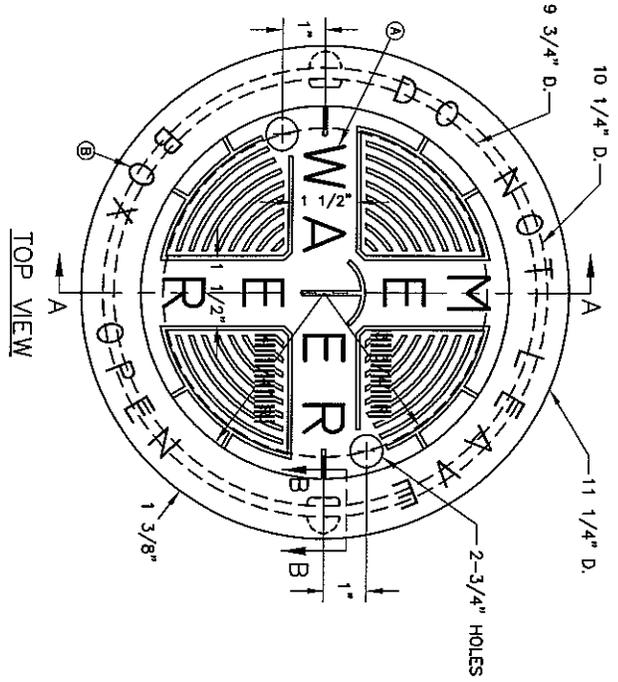
STANDARD
DETAIL

APR. 1994
REV. 08-06-97

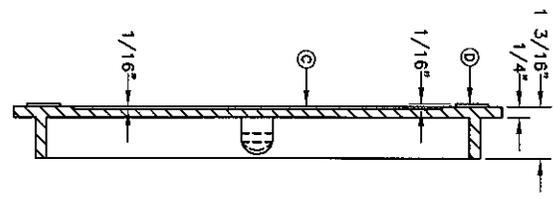
METER BOX COVER
N.T.S.



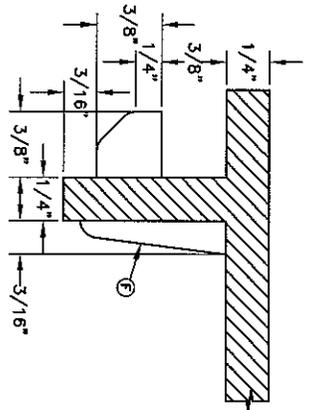
DETAIL No.
296



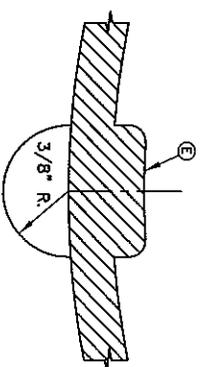
SECTION A-A



SECTION B-B



SECTION C-C



- GENERAL NOTES:
1. MATCHING SURFACES TO BE ROUGH GROUND OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
 2. CASTING TO BE SMOOTH AND VOID OF AIR
 3. METER BOX COVER WEIGHT= 1 1/4 lbs.

CONSTRUCTION KEY NOTES

- A. LETTERS TO BE 1" HIGH, 3/4" WIDE, 1/8" THICK
- B. LETTERS TO BE 3/4" HIGH, 5/8" WIDE, 1/8" THICK
- C. INSIDE LETTERS & RIBS 1/16" TALL
- D. OUTSIDE LETTERS 1/16" TALL
- E. REINFORCE BACK OF LUG
- F. REINFORCEMENT

APPENDIX CC

Waste Management Documents

El Paso and Regional Recyclers

<http://www.yellow.com/>

http://www.cleantexas.org/index.cfm?fuseaction=public.memberprofiles_bymembername_rtolquery1

<http://www.tceq.state.tx.us/assistance/P2Recycle/renew/renew.html>

Company	Address	Phone	Notes
Acoustic Tile			
WeRecycle, Inc.	500 South Broad St., Meriden, CT 06450	203-630-0344	carpet, ceiling tiles, pallets
Cardboard/Paper/Fiber			
Durango McKinley Paper Co	1520 Myrtle Ave., El Paso	915-351-7970	drop off services available
Master Fibers Inc.	1710 East Paisano Dr., El Paso	915-544-2299	drop off services available, top prices paid for cardboard, customized recycling program
Twin Cities Recyclers Co., Inc.	3230 Durazno Ave., El Paso	915-543-3000	top prices paid for paper, industrial plastics, metal, wood pallets, Customized recycling programs available
The UPS Stores	955 North Resler Dr., El Paso	915-842-8075	packing peanuts, cardboard, other packing material
Bryan Drive-In Recycling Center	2202 Briarcrest Dr., Bryan, TX 77802	979-209-5675	
Carpet/Carpet Tile			
Sunshine Padding and Foam	8172 Elder Creek Rd, Sacramento, CA 95824	916-383-5213	accepts carpet, padding, foam, mail in program
WeRecycle, Inc.	500 South Broad St., Meriden, CT 06450	203-630-0344	carpet, ceiling tiles, pallets
Landfill/Hauling/Collection			
Duncan Disposal/Alpine	3001 Old Marathon Hwy., Alpine, TX 79830	432-837-1244	Hauling, Collection, Landfill (approx 200 miles from El Paso)
Charter Landfill	12035 West Murphy St., Odessa, TX 79763	432-381-4722	landfill (approx 240 miles from El Paso)
Duncan Disposal/Midland	8220 West Hwy. 80, Midland, TX 79706	432-563-5060	Hauling, Collection (approx 260 miles from El Paso)
Saguaro Environmental Svcs	5055 South Swan Rd, Tucson, AZ 85706	520-745-8820	Hauling/Collection (approx 260 miles from El Paso)
Duncan Disposal/Lubbock	1408 N. Martin Luther King Blvd., Lubbock, TX 79403	806-762-6464	Hauling, Collection (approx 300 miles from El Paso)

Company	Address	Phone	Notes
San Angelo Landfill	1422 Hughes Ave., San Angelo, TX 76903	325-655-6869	landfill (approx 360 miles from El Paso)
TrashAway Svcs Duncan San Angelo	1422 Hughes Ave., San Angelo, TX 76903	325-653-6957	Hauling, Collection (approx 36 miles from El Paso)
Metal			
American Metal Recycling	11201 Alameda Ave., Socorro, TX	915-859-4916	
Asa Recycling	1042 Eastside Road, El Paso	915-779-3326	drop off services available
Discover Recycling	3845 Durazno Ave., El Paso	915-544-8414	drop off services available
El Paso Iron and Metal	1535 East San Antonio Ave., El Paso	915-532-6981	
Lopez Scap Metal, Inc.	351 North Nevarez Rd., El Paso	915-859-0770	drop off services available
Lucero Scrap	10717 Alameda Ave., Socorro, TX	915-872-9880	pick-up services available, provide containers
M&M Metal Inc.	12751 Pellicano Dr., El Paso	915-852-2080	
Shapiro Sales Co	206 Dodge Rd., El Paso	915-881-1991	drop off services available
Twin Cities Recyclers Co., Inc.	3230 Durazno Ave., El Paso	915-543-3000	top prices paid for paper, industrial plastics, metal, wood pallets, Customized recycling programs available
W Silver Recycling, Inc.	1720 Magoffin Ave., El Paso	915-532-5643	Container and trailer service available
Environmental Center	800 South Piedras, El Paso	915-593-2784	
Bryan Drive-In Recycling Center	2202 Briarcrest Dr., Bryan, TX 77802	979-209-5675	
Plastics			
Discover Recycling	3845 Durazno Ave., El Paso	915-544-8414	drop off services available
National Recycling, Inc.	10400 Griffin Rd., Suite 101, Cooper City, FL, 33328	954-680-8802	buy, sell, offers waste stream solutions,
Twin Cities Recyclers Co., Inc.	3230 Durazno Ave., El Paso	915-543-3000	top prices paid for paper, industrial plastics, metal, wood pallets, Customized recycling programs available
United Plastics Services	12572 Darrington Rd., Suite 10, Horizon City, TX	915-851-9460	
Environmental Center	800 South Piedras, El Paso	915-593-2784	#1, #2
FDA Packaging	2355 Nevada St., Las Cruces, NM 88001	505-524-1997	#6
The UPS Stores	955 North Resler Dr., El Paso	915-842-8075	packing peanuts, cardboard, other packing material
The Alliance of Foam Packaging Recyclers	2128 Esprey Court, Crofton, MD 21114	800-944-8448	packing peanuts, other forms of packing material, foam
Bryan Drive-In Recycling Center	2202 Briarcrest Dr., Bryan, TX 77802	979-209-5675	#1, #2
Diversified Plastics Recycling	7340 State Road 245 East, North Lewisburg, OH 43060	937-747-3040	#1, #2, #4, #5, #6, #7

Company	Address	Phone	Notes
Propoly	Marlboro, NJ 07746	732-431-2200	#1, #2, #3, #4, #5, #6, #7
Wood			
Custom Crates and Pallets	1501 Westway Blvd., Canutillo, TX	915-892-2660	
Forproducts Corp	3624 East Gateway, El Paso	915-532-6710	pulpwood
Kastro's Wood Pallets, Inc.	13781 Davidson Blvd., El Paso	915-855-8011	
Twin Cities Recyclers Co., Inc.	3230 Durazno Ave., El Paso	915-543-3000	top prices paid for paper, industrial plastics, metal, wood pallets, Customized recycling programs available
WeRecycle, Inc.	500 South Broad St., Meriden, CT 06450	203-630-0344	carpet, ceiling tiles, pallets
Unknown Material			
Alpha Recycling	1820 East Mills Ave., El Paso	915-313-0333	drop off services available
Border Trading, Inc.	6940 Commerce Ave., El Paso	915-775-2546	drop off services available
Gandara's Recycling	10721 North Loop Dr., Socorro, TX	915-860-9596	drop off services available
Haro's Company, Inc.	11369 Alameda Ave., Socorro, TX	915-851-2028	drop off services available
Newell Recycling of El Paso	6800 Market Ave., El Paso	915-772-2728	
RG&M	11309 Alameda Ave., Socorro, TX	915-851-0995	drop off services available



US Army Corps
of Engineers.

New Construction Waste Management

Plans and Methods

Tuesday, February 21, 2012



Army Policy on Waste Management

- 50% diversion (by weight) from landfill of construction and demolition waste for all Army projects.
- Waste type and quantities must be tracked, documented, and upward reported (SWAR)



Contract Requirements for Waste Management

- 50% diversion (by weight) from landfill of construction and demolition waste
(01010, Section 6)
- A Waste Management Plan is required
(01355 Environmental Protection Plan)



Added Bonus

- **The two easiest LEED credit points:**
 - Automatically pick up LEED Credit MR 2.1
(Achieve 50% diversion of C&D waste from landfill)
 - With little effort, pick up LEED Credit MR 2.2
(Achieve 75% diversion of C&D waste from landfill)



Management Plan

- Section 1 – Company Philosophy
- Section 2 – Project Waste Management Goals
- Section 3 – Communication Plan
- Section 4 – Expected Waste Streams, Disposal, and Handling



How to Meet Army and USACE Waste Management Goals (WMP Section 2)

- Prevent – don't create/promote the waste in the first place
- Reduce – reduce the amount of waste generated for a given material/element
- Reuse – reuse scrap
- Recycle – send back to the company for remanufacturing or to a recycling facility



Prevention

- Pre-fabrication/Pre-cut – manufacture to exact dimensions
- Accurately order the amount of material needed
- Measure carefully to avoid end cuts
- Store materials so they are not damaged



Reduce

- Order and ship in bulk where possible, avoiding excess packaging
- To encourage efficient use of materials, avoid paying installers on the basis of smaller units of measure (i.e. sq. ft. instead of sheet)
- GCs include similar recycling/diversion requirements in subcontracts (incl. Mgmt Plans, monitoring, and documentation).



Reuse

- Save sizeable pieces for use elsewhere
 - carpet tiles piece from one edge may fit at the edge of another location
 - wallboard pieces can be used around doors and windows
 - lumber pieces can be used as spacers or blocking
 - Reuse PVC cut-offs for use as stubs for wall drains
- Optimum Value Engineering for wood construction



Recycle

- Concrete/Asphalt/Masonry
- Drywall/Gypsum
- Metal
- Plastics
- Cardboard/paper/fibers
- Site/Landclearing Debris
(vegetation, soils)
- Wood
- Glass
- Carpet/Carpet
Tile
- Paints
- Floor Tile
- Acoustical Tile



Ft. Bliss Resources

- Now
 - Cardboard/paper – Ft. Bliss can accept small quantities of paper and cardboard for recycling
- Future
 - Clean wood – Ft. Bliss owns a shredder, but no end use of shredded material is currently identified.
 - Soil – provide native fill material, accept native soil
 - Concrete/Aggregate/Asphalt/Masonry



Site Handling

- Interior collection containers in centralized convenient locations for the trades.
- Exterior recycling containers clearly labeled and located in convenient locations for the trades.
- For pieces of materials to be reused – make sure the trades know where they can find these materials.



Site Handling

- Keep garbage out of interior and recycling containers.
- Provide frequent and well labeled garbage containers, both interior and exterior.
- Training and Communication
- Whole Building Design Guide Construction Waste Management Resource Page (www.wbdg.org/design/cwm.php)



Keeping Track

- Collect and organize documentation from receiving facilities (weight tickets, reports)
- Obtain/Estimate weights for those items not taken to a facility (elements returned to manufacture, wood taken to Ft. Bliss for mulching, etc.)
- Organize incoming information daily (DCQCRs, Excel spreadsheet)
- Keep quarterly (Dec, March, June, and Oct) and final (end of project) reports in mind
 - keeping track daily/regularly will make the final report easy.



Government Oversight

- Plan-Do-Check-Act
- Review and approval of Waste Mgmt Plan prior to start of construction.
- QAR will check regularly interior and exterior collection bins to confirm appropriate use.
- QAR will ask regularly to see your tracking document/notebook/file.
- QAR will conduct periodic quick calculations to confirm that waste diversion is on track.
- Final waste report – diversion calculation must be verifiable (values easily matched to waste documentation)



US Army Corps
of Engineers.

Questions?

Tuesday, February 21, 2012



US Army Corps
of Engineers.

Need Help?

Elizabeth Chien

206-764-6718

206-499-6119 cell

Elizabeth.A.Chien@usace.army.mil

Tom Napier

217-373-3497

Tuesday, February 21, 2012

Thomas.R.Napier@usace.army.mil

Tips to improve Reduce, Reuse, and Recycle

Material	Planning	On-Site
General	<ul style="list-style-type: none"> > Order products with recycled content. > To reduce waste and cost, accurately order in the amount of material needed. > Request suppliers to limit packaging. > Ask your vendors to take non-recyclable packaging back for reuse. > Use larger pieces elsewhere on the project (fillers and shorter pieces can be used to fill in). 	<ul style="list-style-type: none"> > Make sure both interior collection containers and exterior recycling dumpsters are convenient and clearly labeled. > Store materials so they are not damaged. > Measure carefully to avoid end cuts.
Concrete	<ul style="list-style-type: none"> > Use concrete mix containing fly ash as part of the cementitious content of the concrete. > Request CMUs that contain recycled content from your supplier. 	<ul style="list-style-type: none"> > Separate and recycle asphalt and concrete. > Use reusable forms and supports to the maximum extent possible. > Reuse removed crushed concrete and asphalt as aggregate, sub-base material or fill. > Designate a location for excess concrete for use in paving, post footing anchorage, reinforcement, etc. > Store materials so that they are not damaged or discolored.
Drywall	<ul style="list-style-type: none"> > Order drywall with recycled content gypsum. > To reduce waste and cost, accurately order in the amount of material needed. > To encourage efficient use of materials, avoid paying installers on the basis of sheets of material installed (try using sq. ft. installed instead). 	<ul style="list-style-type: none"> > Store materials so they are not damaged. > Measure carefully to avoid end cuts. > Separate and recycle waste drywall. > Make sure both interior collection containers and exterior recycling dumpsters are convenient and clearly labeled. > Save sizeable pieces of drywall for use around doors, windows, or built-ins, or for reuse on another job.
Electrical	<ul style="list-style-type: none"> > Order plumbing and other mechanical supplies with recycled content. > To reduce waste and cost, accurately order the amount of material needed. > Ask your vendors to reduce the amount of packaging (pallets, cardboard, plastic shrink wrap, metal bands) that is delivered to the job-site. > Ask your vendors to take non-recyclable packaging back for reuse. 	<ul style="list-style-type: none"> > Separate and recycle cardboard. > Separate and recycle metals and wire. > Separate and recycle plastics, such as PVC pipe. > Make sure both interior collection containers and exterior recycling dumpsters are convenient and clearly labeled. > Store materials so they are not damaged. > Measure carefully to avoid end cuts.

Material	Planning	On-Site
Mechanical	<ul style="list-style-type: none"> > Order electrical, plumbing, and other mechanical supplies with recycled content. > To reduce waste and cost, accurately order the amount of material needed. > Ask your vendors to reduce the amount of packaging (pallets, cardboard, plastic shrink wrap, metal bands) that is delivered to the job-site. > Try precut and prefabricated components such as commercial heating and cooling ductwork or commercial sprinkler systems. > Ask your vendors to take non-recyclable packaging back for reuse. 	<ul style="list-style-type: none"> > Separate and recycle cardboard. > Separate and recycle plastics, such as PVC pipe. > Make sure both interior collection containers and exterior recycling dumpsters are convenient and clearly labeled. > Store materials so they are not damaged. > Measure carefully to avoid end cuts.
Plumbing	<ul style="list-style-type: none"> > Order plumbing and other mechanical supplies with recycled content. > To reduce waste and cost, accurately order the amount of material needed. > Ask your vendors to reduce the amount of packaging (pallets, cardboard, plastic shrink wrap, metal bands) that is delivered to the job-site. > Ask your vendors to take non-recyclable packaging back for reuse. 	<ul style="list-style-type: none"> > Retain PVC cut-offs for use as stubs for wall drains. > Properly clean joints to prevent leaking. > Separate and recycle plastic, including PVC, if possible. > Separate and recycle cardboard. > Make sure both interior collection containers and exterior recycling dumpsters are convenient and clearly labeled. > Store materials so they are not damaged. > Measure carefully to avoid end cuts.
Site/Landclearing	<ul style="list-style-type: none"> > shred vegetation for reuse in project landscaping. > design landscaping that reuses stone. 	<ul style="list-style-type: none"> > Separate and recycle asphalt and concrete/masonry. > Sell all marketable trees designated for removal. > Grind, chip, or shred other vegetation for mulching and composting. > Separate stumps, brush, and other wood waste for recycling. > Separate and recycle rebar and other metals. > Reuse removed crushed concrete and asphalt as aggregate, sub-base material or fill. > Provide on-site locations for as much excavated rock, soil, and vegetation as possible.

Material	Planning	On-Site
Wood	<ul style="list-style-type: none"> > To reduce waste and cost, accurately order the amount of material needed. > Use larger pieces elsewhere on the project (fillers and shorter pieces can be used to fill in). > Use building systems such as modular systems or foam-core panels that minimize the use of wood (systems that contain recycled wood chips or wood from small diameter secondary trees). 	<ul style="list-style-type: none"> > Segregate bits and ends for recycling from useable pieces to be used elsewhere. > Make sure both interior collection containers and exterior recycling dumpsters are convenient and clearly labeled. > Store materials so they are not damaged. > Measure carefully to avoid end cuts. > Save sizeable pieces of wood in a central area for use as spacers, blocking, kindling, or for use on another job. > Designate a central area for end-cuts and damaged wood, making it convenient for carpenters to find and use scrap wood.

CONSTRUCTION / DEMOLITION SWARWeb PICKLIST		
MAJOR CATEGORY	SUB-CATEGORY	DEFINITION
Wood		
	Structural	TBD
	Finished	TBD
	Treated	TBD
	Other (C/D Wood)	TBD
Metal		
	Steel	TBD
	Copper	TBD
	Aluminum	TBD
	Mixed Metal	TBD
	Other (C/D Metal)	TBD
Masonry/Asphalt/Concrete/ Stone		
	Asphalt	TBD
	Brick	TBD
	Concrete	TBD
	Concrete Block Unit	TBD
	Stone	TBD
	Other (C/D Masonry/Asphalt)	TBD
Land Clearing Debris		
	Top Soil	TBD
	Sub Soil	TBD
	Petroleum-Contaminated Soil	TBD
	Non-Hazardous Lead-Contaminated Soil	TBD
	Vegetation/Timber (tree trunks & limbs)	TBD
	Crushed Stone/Base	TBD
	Other (C/D Land Clearing)	TBD
Other		
	Siding	TBD
	Composition Roof	TBD
	Insulation	TBD
	Doors/Windows/Stairs/Cabinets	TBD
	Ceiling Tile	TBD
	Gypsum/Plaster	TBD
	Plastic	TBD
	Glass	TBD
	Paper	TBD
	Other (C/D Other)	TBD
Additional Information		
Project Number		
Building Number(s)		
Reuse (Installation)		
Reuse (Off-Site)		
Recycle (Installation)		
Recycle (Off-Site)		
Bury (Installation)		
Bury (Off-Site)		
Dispose (Installation)		
Dispose (Off-Site)		
Other		
Source: Army Environmental Center, Charles Harris, (410) 436-1224, charles.harris2@us.army.mil		

Non- Hazardous Waste Management Plan

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- b. Specific actions that will be taken to reduce solid waste generation.
- c. Description of the specific approaches to be used in salvage/reuse/recycling/other diversion of the various materials generated, including the areas and equipment to be used for processing, sorting, and temporary storage of wastes.
- d. Identification of waste streams, including estimated types and quantities, of the waste to be generated.
- e. Identification of local and regional salvage/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.
- f. List of specific waste materials that will be salvaged for resale, salvaged for reuse, or recycled. Recycling facilities that will be used shall be identified. If a recycling facility (public or private) exists within a 50 mile radius of the project site, its use is required for all materials that facility accepts and that cannot be otherwise reused.
- g. Identification of materials that cannot be recycled/reused with an explanation or justification.
- h. Name of landfill and/or incinerator to be used for waste that are not diverted and the estimated costs for disposal.
- i. 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.

Hazardous Waste Management Plan (in addition to the requirements above)

- a. Types of wastes anticipated to be managed. This should include a discussion of processes which are generating the waste, the volumes anticipated, and the EPA/state waste codes associated with the waste (40 CFR 261, Subpart C and D).
- b. The regulatory status of the waste. In other words, whether the waste is subject to large quantity generator, small quantity generator, or conditionally exempt small quantity generator standards (40 CFR 262.34).
- c. The locations in which wastes will be accumulated will be discussed. This should discuss whether these are 90/180 day accumulation areas, satellite accumulation points,

or permitted storage areas. Preferably a map indicating the precise location should be included (40 CFR 262.34).

d. Inspection requirements. This should discuss what will be inspected, how often it will be inspected, who will conduct the inspection, what the inspection log will contain, and where the inspection records will be retained (40 CFR 262.34, 40 CFR 265.174, and 40 CFR 265.195).

e. Contingency Planning. Large quantity generators are required to have a contingency plan. Small quantity generators are required to post certain information (40 CFR 262.34 and 40 CFR 265 Subparts C and D).

f. Marking requirements. This should discuss what type of hazardous waste markings are to be utilized during accumulation (40 CFR 262.32).

g. Container types. Types of containers used to accumulate hazardous wastes should be identified. Compatibility with the waste being stored should be considered as well as whether the containers will meet packaging requirements for off-site transport (49 CFR 171.178).

h. Treatment requirements. How will wastes be treated to meet land disposal restrictions (40 CFR 268.40). If elementary neutralization is being performed to render waste non-hazardous, a statement should be included which indicates the activity is being performed under a permit exclusion (40 CFR 270.1(c)(2)(v)).

i. Disposal requirements. This should discuss whether wastes and/or treatment residues will be disposed in a Subtitle C, hazardous waste disposal facility or in a Subtitle D, nonhazardous waste facility.

j. Proposed treatment, storage, or disposal facilities (TSDFs). This should provide the name, address, telephone number, and EPA ID number of the TSDFs proposed to be utilized for the waste.

k. LDR forms. This should provide copies of the LDR forms from the proposed receiving facilities.

l. Recycling Facilities. This should discuss how the waste is to be salvaged, reused, and/or recycled. The name, address, and phone number of the facilities proposed for waste diversion should be provided.

Waste Management Plan Template

Section 1. Company Mission Statement/Company Philosophy and Organization

- a. Philosophy – basic company approach to waste management (i.e.: prevent, reduce, reuse, recycle, dispose)

Section 2. Project Waste Management Goal

- a. Contract required goal.
- b. Specific actions that will be taken to prevent or reduce solid waste generation. This includes identifying those companies providing material and equipment that are willing to accept the return of the resulting waste product after installation (floor tiles, ceiling/acoustical tiles, carpet tiles, etc.). Also identify material/companies willing to send large quantities of items in bulk, rather than individually wrapped (box of 200 door knobs instead of individually wrapped door knobs, pallets of stacked floor tiles instead of box of 12 floor tiles).
- c. Description of the specific approaches to be used in salvage/reuse/recycling/other diversion of the various materials generated, including the areas and equipment to be used for processing, sorting, and temporary storage of wastes.
- d. List of specific waste materials that will be salvaged for resale, salvaged for reuse, or recycled.
- e. Identification of materials that cannot be recycled/reused with an explanation or justification.

Generally, it's better (more resourceful) to reduce, than to reuse, and better to reuse than to recycle. However, it's not realistic to eliminate all waste, or salvage all materials not used on a particular job. Following is our Waste Management Plan.

Reduce means to prevent waste before it happens. You can reduce waste significantly on a construction project by “tweaking” your practices a bit; this means designing in less waste to begin with and minimizing damage and inefficient material use.

Reuse means to reuse materials as much as possible in your construction project. This includes:

- Materials removed during demolition
- Scrap generated on site
- Used materials or scraps from other jobs

Recycle means to separate recyclable materials from non-recyclable materials and supply them to a hauler or business so they can be processed and used to make new products. Another aspect of recycling is to Buy Recycled. Buying building materials with recycled content helps develop a market for the waste materials you recycle from your job site and “closes the loop.”

Section 3. Communication Plan

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- b. Specific actions that will be taken to communicate waste management issues throughout the project.
- c. Specific actions that will be taken to communicate the waste management plan and procedures to new employees/subs.
- d. Specify where containers will be placed, how they will be labeled, how waste management practices will be enforced (acceptable and unacceptable items and practices), and how this information will be communicated to the site staff.
- e. Specific procedures and details on how the waste information (what where, how much, who, how) will be documented, organized, and tracked. This includes all waste streams that are returned, salvaged, reused, recycled, and landfilled.
- f. Specific details on how the waste information will be reported to the government (routinely – weekly? monthly? quarterly? and at project closeout – final total details).

Section 4. Expected Waste Streams, Disposal, and Handling (non-hazardous only)

- a. Identification of waste stream (both diverted and landfilled).
- b. Quantity of each type of waste stream identified.
- c. Receiving facility or entity.
 - o Identification of local and regional salvage/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.
 - o Name of landfill and/or incinerator to be used for waste that are not diverted and the estimated costs for disposal.
- d. Specific site handling procedures.
- e. Identification of transportation method or company.

Example Table Identifying Possible Waste Streams, Quantity, Disposal/Diversion Method, and Handling Procedures

Material	Qty.	Disposal Method (where applicable)	Handling and Transportation Procedure
<i>New Construction</i>			
Concrete	15 cy		Break up concrete onsite with an excavator, load in trucks and haul to Echo Park Recycle
Forming Boards	6 tons	Reused as many times as possible then recycled to Renu Recycling	Stack next to supply of new form boards for reuse. Recycle clean unusable form in "clean wood" recycling dumpster
Clean Wood Scrap	3 tons	Scraps reused for form work, fire-breaks, etc., then recycled by Renu Recycling	Stack reusable pieces next to dumpster for Reuse. Separate unusable clean wood into "clean wood" recycling dumpster (including wood pallets)
CMUs	75 yds	Henson Masonry to recycle and submit report to recycling coordinator	Will request CMUs that contain recycled Content from supplier
Scrap Metal	5 tons	Renu Recycling Service	Deposit all metals in "metal" dumpster
Acoustical Tile			
Floor Tile			
Carpet Tile			
Gypsum/Wall board			
Cardboard			
Plastic			
Etc.			

Section 5. Hazardous Waste Management Plan (in addition to the requirements above)

Be sure to coordinate Hazmat procedures with Tom Curcio (FL DPW) 253-966-6458.

- a. Types of wastes anticipated to be managed. This should include a discussion of processes which are generating the waste, the volumes anticipated, and the EPA/state waste codes associated with the waste (40 CFR 261, Subpart C and D).
- b. The regulatory status of the waste. In other words, whether the waste is subject to large quantity generator, small quantity generator, or conditionally exempt small quantity generator standards (40 CFR 262.34).
- c. The locations in which wastes will be accumulated will be discussed. This should discuss whether these are 90/180 day accumulation areas, satellite accumulation points, or permitted storage areas. Preferably a map indicating the precise location should be included (40 CFR 262.34).
- d. Inspection requirements. This should discuss what will be inspected, how often it will be inspected, who will conduct the inspection, what the inspection log will contain, and where the inspection records will be retained (40 CFR 262.34, 40 CFR 265.174, and 40 CFR 265.195).
- e. Contingency Planning. Large quantity generators are required to have a contingency plan. Small quantity generators are required to post certain information (40 CFR 262.34 and 40 CFR 265 Subparts C and D).
- f. Marking requirements. This should discuss what type of hazardous waste markings are to be utilized during accumulation (40 CFR 262.32).
- g. Container types. Types of containers used to accumulate hazardous wastes should be identified. Compatibility with the waste being stored should be considered as well as whether the containers will meet packaging requirements for off-site transport (49 CFR 171.178).
- h. Treatment requirements. How will wastes be treated to meet land disposal restrictions (40 CFR 268.40). If elementary neutralization is being performed to render waste non-hazardous, a statement should be included which indicates the activity is being performed under a permit exclusion (40 CFR 270.1(c)(2)(v)).
- i. Disposal requirements. This should discuss whether wastes and/or treatment residues will be disposed in a Subtitle C, hazardous waste disposal facility or in a Subtitle D, nonhazardous waste facility.
- j. Proposed treatment, storage, or disposal facilities (TSDFs). This should provide the name, address, telephone number, and EPA ID number of the TSDFs proposed to be utilized for the waste.
- k. LDR forms, if required. This should provide copies of the LDR forms from the proposed receiving facilities.

<i>Hazardous Material</i>			
ACM	1500 cyds	XYZ Landfill	Abatement by XXX Abatement Co., transported to landfill by XXX Transport
PCB Ballasts			Stored in drums provided by Ft. Lewis hazmat office at location building XYZ
Flourescent Lamps			
Mercury Switches			
Ozone-Depleting Substances			
Lo-level Rad elements			
Etc.			
Etc.			

APPENDIX DD

Water Quality

The tables that follows list all of the federally regulated or monitored constituents which have been found in your drinking water. The U.S. EPA requires water systems to test up to 97 constituents.

Action Level (AL) - the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Highest Detected - maximum laboratory analytical result for a contaminant; this value is evaluated against an MCL or AL to determine compliance.

Maximum Contaminant Level (MCL) - the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG) - the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfection Level (MRDL) - the highest level of disinfection allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfection Level Goal (MRDLG) - the level of drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of use of disinfectants to control microbial contamination.

ABBREVIATIONS

NTU - nephelometric turbidity unit; a measure of turbidity in water.

pci/l - picocuries per liter; a measure of radioactivity in water.

ppb - parts per billion; a unit of measure equivalent to a single penny in \$10,000,000 or another example is one packet of artificial sweetener sprinkled into an Olympic-size swimming pool full of water.

ppm - parts per million; a unit of measure equivalent to a single penny in \$10,000.

Range - the range of the highest and lowest analytical values of a reported contaminant.

Treatment Technique - a required process intended to reduce the level of a contaminant in drinking water. disinfection.

Other Substances

Unregulated Initial Distribution System Evaluation for Disinfection Byproducts: Waived or Not Yet Sampled.

Turbidity: Not Required

Total Coliform: Reported Monthly Testing Found No Coliform Bacteria

Fecal Coliform: Reported Monthly Tests Found No Fecal Coliform Bacteria.

Organic chemical contaminants: Testing Waived, Not Reported or None Detected

Required Additional Health Information for Lead

“If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. This water supply is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at <http://www.epa.gov/safewater/lead>.”

Inorganic Contaminants								
Year	Contaminant	Average Level	Minimum Level	Maximum Level	MCL	MCLG	Unit of Measure	Source of Contaminant
2008	Arsenic	4	3	5	10	0	ppb	Erosion of natural deposits
2008	Barium	.077	0.054	0.1	2	2	ppm	Erosion of natural deposits
2008	Chromium	3.6	1.6	5.7	100	100	ppb	Erosion of natural deposits
2008	Fluoride	0.91	0.8	1.02	4	4	ppm	Erosion of natural deposits; water additive which promotes strong teeth
2009	Nitrate	3.31	2.06	4.56	10	10	ppm	Fertilizer use runoff; septic tank leaching, sewage, erosion from natural deposits.
2005	Gross alpha	3.15	2.9	3.4	15	0	pCi/L	Erosion of natural deposits
2005	Gross beta emitters	8.5	7.4-9.6		50	0	pCi/L	Decay of natural and man-made deposits

Secondary and Other Constituents Not Regulated (No associated adverse health effects)								
Year	Constituent	Average Level	Minimum Levels	Maximum Level	Secondary Limit	Unit of Measure	Likely Source of Constituent	
2008	Aluminum	0.013	0.011	0.014	0.05	ppm	Abundant naturally occurring element.	
2008	Bicarbonate	143	126	160	NA	ppm	Corrosion of carbonate rocks such as limestone.	
2008	Calcium	42.2	22.7	61.7	NA	ppm	Abundant naturally occurring element.	
2008	Chloride	89	70	109	300	ppm	Abundant naturally occurring element	
2008	Hardness as Ca/Mg	169	87	251	NA	ppm	Naturally occurring calcium and magnesium.	
2008	Magnesium	15.5	7.4	23.6	NA	ppm	Abundant naturally occurring element.	
2008	Nickel	0.001	0	0.002	NA	ppm	Erosion of natural deposits	
2008	pH	8.1	8	8.1	>7.0	units	Measure of corrosivity of water	
2008	Sodium	80	72	88	NA	ppm	Erosion of natural deposits.	
2008	Sulfate	76	60	93	300	ppm	Naturally occurring, industrial by-product	
2008	Total Alkalinity as CaCO3	143	126	160	NA	ppm	Natural occurring soluble mineral salts	
2008	Total Dissolved Solids	454	377	531	1000	ppm	Total dissolved mineral constituents in water	
2008	Zinc	0.006	0.005	0.006	5	ppm	Moderately abundant naturally occurring element; used in metal industry.	

Maximum Residual Disinfectant Level								
Year	Disinfectant	Average Level	Minimum Level	Maximum Level	MRDL	MRDLG	Unit of Measure	Source of Disinfectant
2009	Chlorine Residual, Free	0.78	0.2	3	4	4	ppm	Disinfectant used to control microbes

Disinfection Byproducts								
Year	Contaminant	Average Level	Minimum Level	Maximum Level	MCL	Unit of Measure	Source of Contaminant	
2009	Total Haloacetic Acids	21.6	< 6.0	33.9	60	ppb	Byproduct of drinking water disinfection	
2009	Total Trihalomethanes	55.2	< 4.0	92 ⁽¹⁾	80	ppb	Byproduct of drinking water disinfection	

(1) The system average meets the current drinking water requirements

Unregulated Contaminants								
Year	Contaminant	Average Level	Minimum Level	Maximum Level	Unit of Measure	Source of Contaminant		
2009	Bromoform	1.9	1.9	1.9	ppb	Byproduct of drinking water disinfection		
2009	Dibromochloromethane	1.2	1.2	1.2	ppb	Byproduct of drinking water disinfection		

Lead and Copper								
Year	Contaminant	90th Percentile	Number of Sites Exceeding Action Level	Action Level	Unit of Measure	Source of Contaminant		
2009	Lead	7.1	0	15	ppb	Corrosion of household plumbing systems; erosion of natural deposits		
2009	Copper	0.773	0	1.3	ppm	Corrosion of household plumbing systems; erosion of natural deposits		

Texas Department of Health

BUREAU OF LABORATORIES
 CLIA #45D0660644
CONFIDENTIAL LABORATORY REPORT
WATER ANALYSIS REPORT
METALS -

Submitter Identification Number: 0710078

FORT BLISS BIGGS ARMY AIRFIELD
 -SDWA PROGRAM MANAGER
 ATZC-DOE BLDG 622
 FORT BLISS, TX 79916

Laboratory Number: EP216501
 Sample Type:
 Sample Source:
 Entry Points: 001
 Collector Remarks:

Date Collected: 10/17/2002
 Date Received: 10/18/2002
 Date Reported: 11/12/2002

Constituent Name	Result	Units	+/-
Aluminum	<	0.0200	mg/l
Arsenic	<	0.0068	mg/l
Barium	<	0.0492	mg/l
Cadmium	<	0.0010	mg/l
Calcium	<	18.80	mg/l
Chromium	<	0.0100	mg/l
Copper	<	0.0809	mg/l
Iron	<	0.011	mg/l
Lead	<	0.0054	mg/l
Magnesium	<	6.20	mg/l
Manganese	<	0.0020	mg/l
Mercury	<	0.0004	mg/l
Nickel	<	0.0010	mg/l
Selenium	<	0.0032	mg/l
Silver	<	0.0100	mg/l
Sodium	<	110.00	mg/l
Antimony	<	0.0030	mg/l
Beryllium	<	0.0010	mg/l
Thallium	<	0.0010	mg/l
Zinc	<	0.0321	mg/l
Total Hardness as CaCO3	<	72.4	mg/l



Texas Department of Health

1622 WEST 49TH STREET
AUSTIN, TEXAS 78756-3194
(512) 458-7318

BUREAU OF LABORATORIES
CLIA #45D0660644

CONFIDENTIAL LABORATORY REPORT WATER ANALYSIS REPORT MINERALS

Submitter Identification Number: 0710078

FORT BLISS BIGGS ARMY AIRFIELD

ATZC-DOE BLDG 622
EL PASO, TX 79916

Laboratory Number: EP216498

Sample Type:

Sample Source:

Entry Points: 001

Collector Remarks:

Date Collected: 10/17/2002
Date Received: 10/18/2002
Date Reported: 12/19/2002

Constituent Name	Result	Units	+/-
Chloride	70	mg/l	
Fluoride	0.9	mg/l	
Nitrate	1.40	mg/l	
Sulfate	66	mg/l	
pH	7.1		
Dil. Conduct (umhos/cm)	720		
Tot. Alka. as CaCO3	134	mg/l	
Bicarbonate	163	mg/l	
Carbonate	0	mg/l	
Dissolved solids	353	mg/l	
P. Alkalinity as CaCO3	0	mg/l	

BUREAU OF LABORATORIES
CLIA #45D0660644

CONFIDENTIAL LABORATORY REPORT
WATER ANALYSIS REPORT
MINERALS

Submitter Identification Number: 0710078

FORT BLISS BIGGS ARMY AIRFIELD

ATZC-DOE BLDG 622
FORT BLISS, TX 79916-0000

Laboratory Number: EP411262
Sample Type:
Sample Source: CMO 1C
Entry Points: 001
Collector Remarks: NITRATE

Date Collected: 05/13/2004
Date Received: 05/14/2004
Date Reported: 05/19/2004

Constituent Name

Nitrate
Nitrite

Result Units

1.56 mg/l

NOT TESTED - OTHER

Tuesday, February 21, 2012

1100 W. 49th Street

Austin, TX 78758

Texas Department of Health

Trihalomethanes by GC-ELCD

Contact: Gary Fest

(512)458-7552

Submitter ID: 0710078
 TDH Lab ID: EP04-11271
 Method: EPA 502.2 Rev. 2.1 (THM)
 Data File: 05170019.D
 QC File: D:\HPCHEM\1\DATA\IO01G0517
 Sample Type: Water

Date Collected: 05/13/2004
 Date Prepared: 05/17/2004
 Date Analyzed: 05/17/2004 8:50
 Analyst: M. Gerlach
 Dilution Factor: 1
 Concentration Units: µg/l

Compound:

Result:

Chloroform	< 2.0
Bromodichloromethane	< 2.0
Dibromochloromethane	< 2.0
Bromoform	< 2.0
Total THM's	< 8.0

COMMENTS:

Approval:



Tuesday, February 21, 2012

MAY 19 2004

Texas Department of Health Haloacetic Acids GC Results

Contact: Gary Fest
(512) 458-7552

Submitter Sample Number 0710078
TDH Sample Name EP4-11294
Method 552.2
Data File Name 0519023.D
QC File C:\MSDCHEM\2\DATA\O18P0519\
Sample Type Water

Date Collected 5/13/2004
Date Extracted 5/18/2004
Date Analyzed 5/20/2004 4:17
Analyst M. Kabay
Dilution Factor 1
Concentration Units µg/L

Regulated Compounds:	Result:
Monochloroacetic acid	<2.0
Dichloroacetic acid	<1.0
Trichloroacetic acid	<1.0
Monobromoacetic acid	<1.0
Dibromoacetic acid	<1.0
<u>Total:</u>	<u><6.0</u>

Monitor Compounds:	Result:
Bromochloroacetic acid	<1.0
Dalapon	<1.0

Comments:

Rev #3 1/03 HP6890N SNus10338045

Approval: 

Tuesday, February 21, 2012

MAY 21 2004



Texas Department of Health

1101 WEST 49TH STREET
AUSTIN, TEXAS 78756-3194
(512) 458-7318

BUREAU OF LABORATORIES
CLIA #45D0660644

CONFIDENTIAL LABORATORY REPORT WATER ANALYSIS REPORT RADIOCHEMICALS

Submitter Identification Number: 0710078

FORT BLISS BIGGS ARMY AIRFIELD

ATZC-DOE BLDG 622
EL PASO, TX 79916

Laboratory Number: EP216503

Sample Type:

Sample Source:

Entry Points: 001

Collector Remarks:

Date Collected: 10/17/2002
Date Received: 10/18/2002
Date Reported: 04/01/2003

Constituent Name	Result	Units	+/-
Radium 226	< 0.2	pCi/l	
Radium 228	1.5	pCi/l	
Gross Beta	9.3	pCi/l	0.5
Gross Alpha Particle Activity	4.6	pCi/l	1.4

Tuesday, February 24, 2012

APPENDIX EE

CorrShield NT 402



GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 01-SEP-2004

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

CORRSHIELD NT402

PRODUCT APPLICATION AREA:

CORROSION INHIBITOR.

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
7632-00-0	SODIUM NITRITE Oxidizer; toxic (by ingestion); potential blood toxin
12179-04-3	BORIC ACID,DISODIUM SALT,PENTAHYDRATE Irritant (abraded skin); slight irritant (respiratory)

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING

May cause moderate irritation to the skin. Severe irritant to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Toxic Liquid, RQ
Emergency Response Guide #151
Odor: Slight; Appearance: Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: Flood with water. Use of CO2 or foam may not be effective.

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; May cause moderate irritation to the skin.

ACUTE EYE EFFECTS:

Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:

Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:

Toxic;
May cause gastrointestinal irritation with possible nausea, vomiting, headache, dizziness, unconsciousness and injury to the kidneys and liver.

TARGET ORGANS:

Prolonged or repeated exposures may cause CNS depression and/or toxicity to the liver, kidney, and blood system.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin.

4 FIRST AID MEASURES

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Dilute contents of stomach. Induce vomiting by one of the standard methods. Immediately contact a physician.

NOTES TO PHYSICIANS:

No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

Flood with water. Use of CO2 or foam may not be effective.

HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

MISCELLANEOUS:

Toxic Liquid, RQ
UN3287;Emergency Response Guide #151

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:

Contains an oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids. Do not allow to dry.

STORAGE:

Keep containers closed when not in use. Protect from freezing.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS**CHEMICAL NAME****SODIUM NITRITE**

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

BORIC ACID, DISODIUM SALT, PENTAHYDRATE

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): 1 MG/M3

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:

rubber gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	1.250	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< < 0	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -18		
Viscosity(cps 70F,21C)	12	% Solubility (water)	100.0

Odor	Slight
Appearance	Yellow
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	11.6
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY**STABILITY:**

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	~275 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>5,000 mg/kg
NOTE - Estimated value	

12 ECOLOGICAL INFORMATION**AQUATIC TOXICOLOGY**

Ceriodaphnia 48 Hour Static Renewal Bioassay
 LC50= 61; No Effect Level= 15.6 mg/L
 Daphnia magna 48 Hour Static Renewal Bioassay pH of test solutions was adjusted to a level of 6-9.
 LC50= 100; No Effect Level= 38 mg/L
 Fathead Minnow 96 Hour Static Renewal Bioassay
 LC50= 1072; No Effect Level= 500 mg/L
 Rainbow Trout 96 Hour Static Acute Bioassay
 LC50= 180; No Effect Level= 100 mg/L

BIODEGRADATION

BOD-28 (mg/g): 1
BOD-5 (mg/g): 0
COD (mg/g): 79
TOC (mg/g): 4

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD: Toxic Liquid, RQ
UN / NA NUMBER: UN3287
DOT EMERGENCY RESPONSE GUIDE #: 151

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

32 gallons due to SODIUM NITRITE;

SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
7632-00-0	SODIUM NITRITE	21.0-30.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:

No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE -----	REVISIONS TO SECTION: -----	SUPERCEDES -----
MSDS status:	13-FEB-1997		** NEW **
	23-JUN-1997		13-FEB-1997
	16-NOV-2001	15	23-JUN-1997
	09-OCT-2002	12	16-NOV-2001
	10-OCT-2002	4,16	09-OCT-2002
	26-NOV-2002	12	10-OCT-2002
	01-SEP-2004	3,5,14	26-NOV-2002

APPENDIX FF

Fort Bliss Permits

1) ACCESS CONTROL POLICY

2) FIRE PREVENTION CONTRACTOR'S
GUIDE

3) STANDARD EXCAVATION REQUEST



December 27, 2006

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Dear Fort Bliss Business Partner:

Fort Bliss continues to take steps to ensure the safety of our personnel, facilities, vendors, suppliers, contractors, service providers and visitors on our post. Effective February 1, 2007, Fort Bliss is instituting a new standardized entry protocol called the *RAPIDGate*TM Program for all new and existing vendors, suppliers, contractors and service providers (companies) who require routine access to Fort Bliss. The *RAPIDGate* Program is one of several steps Fort Bliss is undertaking to comply with Homeland Security Presidential Directive 12 (HSPD-12). The *RAPIDGate* Program, provided by Eid Passport, Inc., will provide a standardized background check, an identification badge and entry procedure that improves security while at the same time significantly speeding up entry for participating companies.

Companies participating in the *RAPIDGate* Program will be able to enter Fort Bliss through any of the 8 currently open gates (Cassidy, Sheridan, Marshal, Chaffee, Remagan, Robert E. Lee, Jeb Stuart South, and Pershing) without having to stop and obtain a day pass. Of course, due to the size constriction of some vehicles, larger vehicles in the size of semi-truck or larger will be only allowed to enter through the Cassidy, Sheridan, Chaffee, and Robert E. Lee access points. Companies can enroll in the *RAPIDGate* Program by calling 1-877 *RAPIDGATE* (1-877-727-4342). Once enrolled, employees can register at the self-service Registration Stations located at the Chaffee Gate, Bldg. 505 (Vehicle Registration) or the BAAF Main Gate. Based on the information collected at the self-service Registration Station, the *RAPIDGate* Program runs a 10-year felony background screen, other criminal screens, and validates the social security number. The *RAPIDGate* Program also verifies that the individual is either a U.S. Citizen or is legally eligible to work in the United States. Upon passing the screening process, participants will be issued a personalized *RAPIDGate* identification badge that when verified by a security officer will allow the participant to enter Fort Bliss without having to sign in for a day pass. The *RAPIDGate* identification badge will be valid for a period of twelve (12) months. Your company will be given an opportunity at the end of the 12 month period to renew enrollment in the program. Fort Bliss will no longer accept background checks from other sources beginning February 1, 2007.

Companies that chose not to participate in the *RAPIDGate* Program will be allowed access only through the Fort Bliss Chaffee (Commercial) Gate where, before entering the installation, these personnel will be required to obtain a day pass at the Chaffee Pass Office. To receive the one day pass, you will need to park your vehicle and have all occupants enter the gate pass office to sign in, individually, for the day pass. All vehicle occupants must be prepared to provide a government issued photo ID, and the driver of the vehicle will be required to provide proof of

Tuesday, February 21, 2012

vehicle registration, proof of insurance, and a state issued drivers license. Extended Passes will no longer be available beginning February 1, 2007 while currently issued extended passes will be honored until their expiration date.

The *RAPIDGate* Program not only saves you time, but also increases the safety and security for Fort Bliss and all personnel who work on the base. We encourage your participation in the *RAPIDGate* Program. Please note, *RAPIDGate* participants are still subject to random inspections.

To enroll, please follow the guidelines on the attached document (*RAPIDGate* Program Enrollment Information). Questions about the Fort Bliss *RAPIDGate* program should be addressed to info@rapidgate.com with the subject line RE: *RAPIDGate* Program.

Sincerely,



Robert T. Burns
Colonel, US Army
Commanding

Forms of Acceptable Identification

List A – One Needed

- U.S. Passport (unexpired or expired)
- Certificate of U.S. Citizenship (Form N-560 or N-561)
- Certificate of Naturalization (Form N-550 or N-570)
- Unexpired foreign passport, with I-551 stamp or attached Form I-94 indicating unexpired employment authorization
- Permanent Resident Card or Alien Registration Receipt Card with photograph (Form I-151 or I-551)
- Unexpired Temporary Resident Card (form I-688)
- Unexpired Employment Authorization Card (Form I-688A)
- Unexpired Reentry Permit (Form I-327)
- Unexpired Refugee Travel Document (Form I-571)
- Unexpired Employment Authorization Document issued by DHS that contains a photograph (Form I-688B)

List B – Two Needed

- Driver's license or ID card issued by a state
- ID Card issued by federal, state or local government agencies or entities
- School ID card with a photograph
- Voter's registration card
- U.S. Military card or draft record
- Military Dependent's ID card
- U.S. Coast Guard Merchant Mariner Card
- Native American tribal document
- Driver's license issued by a Canadian government authority
- U.S. Social Security card issued by the Social Security Administration
- Certification of Birth Abroad issued by the Department of State (Form FS-545 or Form DS-1350)
- Original or certified copy of a birth certificate issued by a state, county, municipal authority or outlying possession of the United States bearing an official seal
- Native American tribal document
- U.S. Citizen ID Card (Form I-197)
- ID Card for use of Resident Citizen in the United States (Form I-179)
- Unexpired employment authorization document issued by DHS (other than those listed under List A)

RAPIDGate Program Enrollment Information

Enroll your company by calling Eid Passport at 1-877-*RAPIDGATE* (1-877-727-4342) and provide a Fort Bliss sponsor point of contact that includes a name, phone number, and e-mail address. Once your request is received, final authorization to participate in the *RAPIDGate* Program will be granted by the Fort Bliss Office of the Provost Marshal.

Once your company has been approved for enrollment and paid the enrollment fee, instruct your employees who need access to Fort Bliss to register for the *RAPIDGate* Program using the self-service Registration Station located within the Chaffee Gate Pass Office, Bldg. 505 (Vehicle Registration Office) or the BAAF Main Gate Pass Office. Each employee should be ready to provide your company's *RAPIDGate* company code, his or her address, phone number, date of birth, and Social Security number for proof of identification and background screening. The Registration Station will capture the employees photograph and fingerprints for identity verification and badging during the application process.

Once your company has approved each employee for participation, and paid the registration fee, the employee will undergo a background screen. Upon passing the screen, your company will be notified to send the employee to pickup their personalized *RAPIDGate* Badge at the Fort Bliss Vehicle Registration Office located within bldg. 505. The employee will be required to show identification at the time of badge pickup. The employees can show one form of identification from List A, or two forms of identification from List B. Please see last page for listing.

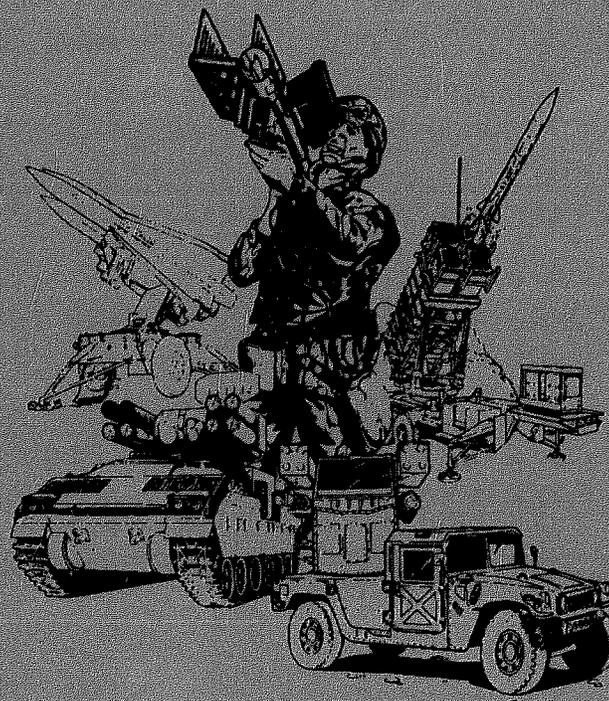
Once a *RAPIDGate* Badge is issued, employees will be required to present their Badge to gain entry to Fort Bliss, and must wear and display the Badge at all times while on the premises. Questions about the Fort Bliss *RAPIDGate* program should be addressed to info@rapidgate.com with the subject line RE: *RAPIDGate* Program.

Continuation -

Due to ongoing construction on Fort Bliss, Biggs AAF, and WBAMC several temporary access gates have been constructed to facilitate entry onto the cantonments. The additional access gates are not included within the Letter To Vendors due to their temp status and their construction after the letter was issued. The additional access gates, located on Biggs AAF, are Global Reach ACP, General Harmon ACP and IBCT ACP. These listed temp access gates will follow the same access control procedures as outlined for all members of the Rapid Gate system. Please be advised that, due to their temporary construction status, care should be taken when attempting access with larger than standard sized vehicles. These temp access gates are constructed with 10' to 12' in width paved traffic lanes and an overhead clearance of no less than 14.5'. Traffic speed limits upon approaching, entering, and leaving the temp access gates are listed as 15mph.

FEB 1, 2009

Fort Bliss Fire Department



Fire Prevention Contractors Guide

FIRE PREVENTION CONSTRUCTION GUIDE

Fires during construction, alteration, or demolition operations are an ever-present threat. The fire potential is inherently greater during these operations than in the completed structure due to previous occupancy hazards and the presence of large quantities of combustible materials and debris, together with ignition sources such as temporary heating devices, cutting/ welding/ soldering operations, open fires and smoking. The threat of arson is also greater during construction and demolition operations due to the availability of combustible materials on site and open access.

Fires during construction, alteration, or demolition operations can be eliminated or controlled through the early planning, scheduling and implementation of fire prevention measures, fire protection systems, rapid communications and on-site security. An overall construction or demolition fire safety program shall be developed; essential items to be emphasized include:

- a. Good housekeeping
- b. On-site security
- c. Installation of new fire protection systems as construction progresses.
- d. Preservation of existing systems during demolition
- e. Organization and training of on-site fire brigade
- f. A pre-fire plan developed with the fire department.
- g. Rapid communication availability
- h. Consideration of special hazards in and around site.
- i. Protection of existing structures and equipment from exposure fires resulting from construction, alterations and demolition operations.
- j. Prohibiting employees from smoking at the job site or establishing designated smoking areas.

A fire safety program shall be included in all construction, alteration or demolition contracts. It is the responsibility of the Fire Department to administer and enforce this program. Contractors need to refer to NFPA 1, Uniform Fire Code, and Chapter 41 for Hot Work Permits. The standards for safeguarding construction, alteration and demolition operations are found in NFPA 241. It is the contractors' responsibility to provide extinguishers at the job site. The suitability, distribution and maintenance of extinguishers shall be in accordance with NFPA-10. These standards provide measures for preventing or minimizing fire damage during these types of operations. Contact the Fire Department for guidance (568-8194/568-8195). The unique and dangerous situations confronting fire fighters during such operations demand that a complete exchange of pertinent information be established and continue during the life of the project.

The installation Fire Chief or (designated representative) will monitor contractor operations on maintenance and repair, construction and self-help projects. The contracting officer representative (COR) will notify the contractor and request prompt corrective action when they find fire hazards, unsafe practices or non compliance with specifications. The Fire Chief, if delegated this authority by the commander may stop any operation or activity when there is imminent danger to life and property.

This Contractor Fire Prevention Brochure is designed to assist you in establishing fire procedures on Fort Bliss property. The unsafe practices listed herein are just a fraction of many hazardous situations that could occur in or around construction areas.

The most hazardous situations have been listed for ready references. The Fire Department solicits your help in preventing fires. We stand ready to assist you in any matter pertinent to fire prevention or safety. Feel free to call on us any time you have a problem or any situation that might lead to a problem. We are located in building 11211, on Biggs Army Airfield and our phone numbers are 744-8194 or 744-8195.

CONTRACTOR'S FIRE PREVENTION GUIDE

1. Prior to performing "Hot Work" (welding, soldering, cutting, tar pots, etc.) or operating other flame producing devices, contractor shall request the issuance of a Hot Work Permit. Permits will not be issued in advance. Insure all equipment is in place prior to calling. The telephone number to request the permit is 568-5283.
2. All painting materials to include paint brushes, empty paint cans, drop cloths etc., and flammable liquids shall be stored outside in authorized storage containers. The containers will be located at a safe distance from the building and insure they are not obstructing any Fire Department connections to that building.
3. Accumulation of trash, papers, shavings, sawdust, excelsior, boxes and other packing materials will be removed from the building at close of work day and disposed in proper containers located away from the building. Areas outside of the building undergoing work will be kept clean of trash, paper or other discarded combustibles.
4. Storage of lumber, roofing paper or other combustible supplies needed during construction shall be kept at a safe distance from the building if no storage yard is assigned.
5. All portable electric devices (saws, sanders, compressors, extension cords or lights) will be disconnected at the close of each workday.
6. All contractors will require their employees to familiarize themselves with locations of the nearest administrative telephones and the procedures when using their own cell phones. Employees will dial the emergency numbers provided in this guide book.
7. Contractors will report all fires no matter how small they may be. Use emergency numbers provided in the guide book.
8. Fire extinguishers in buildings shall not be removed from their locations or used for any purpose other than fire.
9. Fire hydrants will not be utilized without getting the consent of Ft. Bliss Water (569-5360) and the Asst Chief of Fire Prevention at 744-9896.
10. Fort Bliss Water will provide personnel for the operation of water valves pertaining to our water distribution system.
11. Smoking in buildings undergoing work is prohibited. Assign a designated smoking area with a proper receptacle for discarded smoking material
12. Contractors will notify the Fire Department if roads, Fire Lanes, etc., are to be blocked or closed. Call 568-5283, 744-8195.
13. Contractors will not work on sprinkler systems or any part of the alarm system without the approval of the Fort Bliss Fire Department. Call 568-5283 or 744-8195 prior to commencing work.

14. Prior to close of business the contractor will inspect the exterior and interior of the building to insure all guide lines have been followed.

Listed below are other areas of concern which may pose problems in and around the construction site:

- a. Improper storage of flammable materials
- b. Cleaning with flammables
- c. Improper use of extension cords
- d. The use of electrical equipment with faulty wiring
- e. The use of tools that are not UL approved
- f. Not following Hot Work Permit guide lines
- g. Smoking in unauthorized areas and or improper discard receptacles
- h. Blocking Fire Department Connections

Charles J. Butler, YN-02
Fire Chief
Fire and Emergency Service Division
Directorate of emergency Services

Receipt of Contractor's Fire Prevention Guide Acknowledgement

Date _____

Name: _____ Company _____

E-Mail Address _____

Work Site _____ Telephone _____

Fire Inspector: _____

E-Mail Address: _____

Signature _____

Telephone _____

Contractor Copy

Receipt of Contractor's Fire Prevention Guide Acknowledgement

Date _____

Name: _____ Company _____

E-Mail Address _____

Work Site _____ Telephone _____

Fire Inspector: _____

E-Mail Address: _____

Signature _____

Telephone _____

Inspectors
Copy

Section I: To Be Completed By Requesting Individual

Government Representative
Name/Phone number

PN#, NEPA#, WO#, SO#
Gov. Contract Numbers

Company name, address
and phone number

Purpose and location of
request:
(Describe what and where)

(Equipment must meet safety standards established by the Dept of Army and OSHA)

Requesting individual: (please print name, grade, title, PH#) Signature:

Date:

Section II: To Be Completed By Utility Integrator (COE), Bldg P140A, Next to T0071 @ Longknife

Resident Engineer: (print name, title, phone number)

Signature:

Date:

Section III: To Be Completed By DPW Master Planning Maps, Room 1 - Bldg 777 (915) 569-8400

Location of excavation has been checked and the location of existing utilities or interfering facilities is located on the maps furnished.

No mechanical excavation will be accomplished within three feet of utilities and hand tools will be used without exception.

Area excavated will be satisfactorily backfilled Drawings/electronic files furnished (to include irrigation systems)

Return to Operations & Maintenance Division (Room 317) after completion with **as-builts**

Signature:

Date:

Section IV: To Be Completed By DPW Master Planning Division Chief, Room 113 - Bldg 777 (915) 569-8449

Recommend:

Signature:

Date:

Approval

Disapproval

Section V: To Be Completed By Directorate of Information Management (DOIM) - Bldg 56 (915) 744-4344

Location of the proposed excavation has been checked and no underground communication cables exist in the vicinity of the excavation.

Location of proposed excavation has been checked and under ground communication cables exist in the vicinity of the excavation.
Call (915) 744-4344 prior to the beginning of any excavation work.

Recommend:

Signature:

Date:

Approval

Disapproval

Section VI: To Be Completed By DPW-Environmental (DPW-E) - Bldg 624 (915) 568-6999 / 568-6746

Recommend:

Comments:

Approval

Disapproval

Signature:

Date:

Section VII: Obtain Following Approval Signatures:

Please note: A service order is required to mark all utilities.

Rio Grande Electric Service Representative
3633 Mattox Ave. (915) 778-0152

Date:

Signature:

Texas Gas Service Representative
4700 Pollard St. (915) 680-7329/680-7274

Date:

Signature:

Ft. Bliss Water Service Representative
Water and Sewer Bldg 1320 (915) 569-5359

Date:

Signature:

Pride Representative
(915) 568-1107

Date:

Signature:

Balfour Betty Representative Bldg 2022
(915) 564-0459

Date:

Signature:

Section VIII: Obtain Final Approval Signature:

Final Approval from O&M Division Chief
Bldg 777, Room 317/ (915) 568-5233

Date:

Signature:

MANDATORY NO EXCEPTIONS. MUST HAVE THE CONTRACT OR WORK ORDER NUMBER FROM THE GOVERNMENT NOT FROM YOUR GENERAL CONTRACTOR IF YOU ARE A SUBCONTRACTOR TO ONE OF THE UTILITY COMPANIES. PLEASE WRITE IN GDR, WHATEVER UTILITY (E.G.) AND THEIR WORK ORDER NUMBER. THIS IS THE ONLY EXCEPTION TO THE ABOVE

DESCRIBE THE TYPE OF EXCAVATION YOU ARE PERFORMING AND THE LOCATION. (I.E. BLDG #, STREET INTERSECTION ETC.)

COMPLETED BY DPW MASTER PLANNING MAPS, ROOM 1, BLDG 777.

COMPLETED BY DPW MASTER PLANNING DIVISION CHIEF ROOM 113, BLDG 777.

COMPLETED BY DDIM @ BLDG 56

COMPLETED BY UTILITY COMPANIES EXCEPT @ LONGKNIFE, BCT & IBCT AREAS. PRIDE SIGNS OFF FOR THESE AREAS. INITIATING THIS STARTS AT THE WORK ORDER DESK IN BLDG 777.

MANDATORY NO EXCEPTIONS. MUST HAVE THE NAME AND PHONE # OF YOUR GOVERNMENT REPRESENTATIVE, EITHER FROM DPW DR COE. THE PHONE NUMBER MUST ALSO BE A LOCAL 915 AREA CODE. IF YOU ARE A SUBCONTRACTOR TO ONE OF THE UTILITY COMPANIES, YOUR REP FOR FT. BLISS WATER AND TEXAS GAS. WILL BE JR MORALES 568-2779, YOUR REP FOR EL PASO ELECTRIC AND RIO GRANDE ELECTRIC WILL BE LALO RODRIGUEZ 568-5914. THESE ARE THE ONLY EXCEPTIONS TO THE ABOVE.

NAME ADDRESS AND PHONE NUMBER (COMPANY'S OFFICE) OF YOUR COMPANY

PRINT YOUR NAME AND CELL PHONE NUMBER, SIGN AND DATE

IF THIS IS A CORPUS OF ENGINEERS CONTRACT THE RESIDENT ENGINEER MUST SIGN OFF IN THIS AREA. PRINT THEIR NAME AND OFFICE PHONE NUMBER, SIGN AND DATE. THIS MUST BE ACCOMPLISHED BEFORE GOING TO SECTION III.

COMPLETED BY DPW-E ENVIRONMENTAL BLDG 624

THE ABSOLUTELY LAST SIGNATURE. ACCOMPLISHED AFTER ALL OTHER SIGNATURES ARE ACCOMPLISHED. THIS SIGNATURE CAN BE OBTAINED AT BLDG 777 ROOM 317.

STANDARD EXCAVATION REQUEST
(IAW AR 415-15)

No Ground Disturbance Is Authorized Before Concurring Signatures In ALL SIGNATURE BOXES Have Been Obtained

Section I: To Be Completed By Requesting Individual

Print Form

Government Representative Name (Phone number) _____ PMA/EPWA WORK ORDER/CONTRACT NUMBER _____

Company Name, address and phone number _____ Purpose and location of request: (Describe what and where) _____

(Equipment must meet safety standards set forth by the Dept. of Transportation, CSMVA.)

Requesting individual: (please print name, grade, title, PH#) Signature: _____ Date: _____

Section II: To Be Completed By Resident Engineer (COE), Bldg 10070, Bldg 10071, Bldg 6999 (if Applicable)

Resident Engineer: (print name, title, phone number) Signature: _____ Date: _____

Section III: To Be Completed By DPW Master Planning Maps, Room 1 - Bldg 777 (915) 569-8400

No mechanical excavation will be accomplished within three feet of utilities and hand tools will be used without exception.

Area excavated will be satisfactorily backfilled Drawings/electronic files furnished (to include irrigation systems)

Return to Operations & Maintenance Division (Room 317) after completion with as-builts

Signature: _____ Date: _____

Section IV: To Be Completed By DPW Master Planning Division Chief, Room 113 - Bldg 777 (915) 569-8449

Recommend: Approval Disapproval Signature: _____ Date: _____

Section V: To Be Completed By Directorate of Information Management (DOIM) - Bldg 56 (915) 744-4344

Location of the proposed excavation has been checked and no underground communication cables exist in the vicinity of the excavation.

Location of proposed excavation has been checked and underground communication cables exist in the vicinity of the excavation. Call (915) 744-4344 prior to the beginning of any excavation work.

Recommend: Approval Disapproval Signature: _____ Date: _____

Section VI: To Be Completed By DPW Environmental (DPW-E) - Bldg 624 (915) 568-6999 / 568-6746

Recommend: Approval Disapproval Signature: _____ Date: _____

Section VII: Obtain Following Approval Signatures: *Please note: A service order is required to mark utilities.*

Rio Grande Electric Service Representative Date: _____ Signature: _____

3633 Major Ave. (915) 778-0152

Texas Gas Service Representative Date: _____ Signature: _____

4700 Pollard St. (915) 680-7329/680-7274

FT. Bliss Water Service Representative Date: _____ Signature: _____

Water and Sewer Bldg 1320 (915) 569-5559

Bikarut Betty Representative Bldg 2022 Date: _____ Signature: _____

(915) 568-5544

Section VIII: Obtain Final Approval Signature:

Final Approval from O&M Division Chief Date: _____ Signature: _____

Bldg 777, Room 317 (915) 568-5233

FB FORM 1994-RR (DPW) 15-MAR-2010

Previous editions of this form are obsolete

APPENDIX GG

Site Structures and Amenities

Update
February 2009

- Walls and Fences
- Trash Receptacles
- Dumpsters
- Flagpoles
- Movable Planters
- Bicycle Racks
- Tree Grates
- Bollards
- Play Equipment
- Mailboxes
- Monuments, Memorials, Military Equipment Static Displays
- Drinking Fountains

11.3.3 Seating

Seating includes benches and walls, as well as tables and movable chairs.

11.3.3.1 Benches

11.3.3.1.1 Bench Location. Benches should be located in areas of high pedestrian use, and arranged to encourage socialization within a pleasant outdoor setting. This includes pedestrian nodes along primary walkways, at major building entryways, courtyards, and at bus stops.

11.3.3.1.2 Bench Siting. Benches should be sited on concrete pads adjacent to walkways. Provide proper clearance around benches, a minimum 2'0" setback from adjacent sidewalks and a minimum of 5'0" between front of bench and any stationary obstacle. Provide appropriate planting treatment for visual definition and seasonal shade.

11.3.3.1.3 Bench Design. Pre-Cast Concrete or Metal Benches. Pre-cast concrete or metal benches, with or without backs, are appropriate for the informal gathering, resting, eating and waiting uses characteristic of community facility areas. Standard bench size should be 6'-0" long. Metal support base should have a dark brown factory finish to match standard trim color. Wall mounted benches should be similar in style and color to free standing benches.

Update
February 2009

11.3.3.2 Seating Walls

11.3.3.2.1 Seating Walls Location. Wherever possible, seating should be incorporated into planter boxes (Fig. 11.4) or retaining walls, particularly at building entrance areas. Seating walls should be integrated into the overall area design and the pedestrian circulation system.

11.3.3.2.2 Seating Wall Design. Seating walls should generally be between 18" and 22" high, 12" to 18" wide, and constructed of rock wall, textured concrete, or brick in a manner to complement or match the materials of the adjacent buildings.

11.3.3.3 Tables.

11.3.3.3.1 Locate tables together with seating that is oriented to the user needs of socializing, relaxing, or eating in less formal spaces with a pleasant setting and attractive view.

11.3.3.3.2 Table Location. Small groupings of tables in high visibility areas should be placed within proximity of recreation or food service facilities. These groupings should be located on hard pavement areas adjacent to walkways. Pavement should be constructed of exposed aggregate, broom finish concrete, or pavers. Incorporate tree plantings and overhead trellis structures within these areas to provide shade and spatial definition.

11.3.4 Telephone Booths

Telephone booths should be incorporated into building architecture, utilizing building recesses and overhangs, or integrated into bus or other shelters. Provide a minimum 3'0" clearance between booths and the edge of walkways. All service line wiring should be underground or concealed. Booths should be equipped with lighting for nighttime use. In sheltered areas, use standard wall-mounted phone enclosures.

11.3.5 Shelters

11.3.5.1 There are many different types of shelters on military installations. Shelters are provided for those waiting for buses, and in areas where people congregate to socialize or eat such as in courtyards or picnic areas.

11.3.5.1.1 Bus Shelters

11.3.5.1.1.1 Bus Shelter Location. Bus shelters should be located at major facilities along the bus route such as Commissary/Post Exchange areas, barracks areas, hospital, and library. Bus stops should relate to major pedestrian walkways, and be placed on concrete pads. Provide a minimum 3'0" clearance between shelters and the edge of walks.

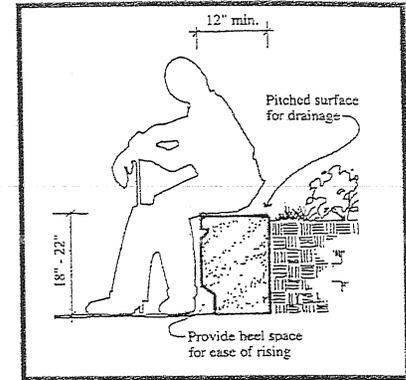


Figure 11.4 - Retaining Wall / Seating.

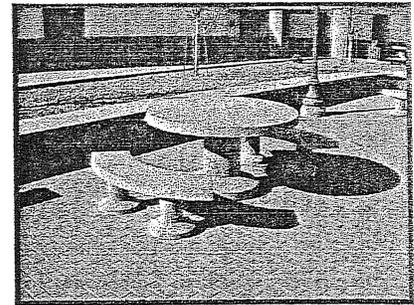


Fig. 11.5 - Seating Incorporated Into Planter Box at Dining Facility

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11.3.5.1.1.2 Bus Shelter Design. Bus shelter design typically should be simple and consistent throughout the post, matching the existing units in terms of materials, scale, and detail (Fig. 11.6). The shelters should include an integral bench, and trash receptacle.

11.3.5.1.2 Picnic Shelters

11.3.5.1.2.1 Picnic Shelter Location. Picnic shelters should be strategically located and sized for shared use to discourage the proliferation of small shelters scattered throughout the installation.

11.3.5.1.2.2 Picnic Shelter Design. Picnic shelters can be open on all sides. The minimum size should be 20 feet square with a minimum 8-foot vertical clearance.

11.3.6 Kiosks

11.3.6.1 Kiosk Location

Kiosks can be used as information centers at pedestrian nodes within the town center. Provide kiosks only where they are needed on a concrete base adjacent to walkways. Allow a minimum of 3' clearance on all sides.

11.3.6.2 Kiosk Design

Kiosk design should blend compatibly with other site furnishings and with the architectural character of the zone in terms of form, scale, and materials. A similar design treatment should be established for kiosks and shelters.

11.3.7 Walls and Fences

11.3.7.1 Location and Use

Walls and fencing should be used to provide visual screening, define pedestrian plaza areas, wind screening, pedestrian and vehicular control, security, and to retain soil. The design of walls and fences should fulfill their function in harmony with the character and appearance of their setting.

11.3.7.2 Walls

Low walls should be used to define pedestrian courtyard areas and provide informal seating. Screening walls can be used where appropriate to screen building service areas. Walls adjacent to walkways should be free of any projections, such as signs or drain pipes that

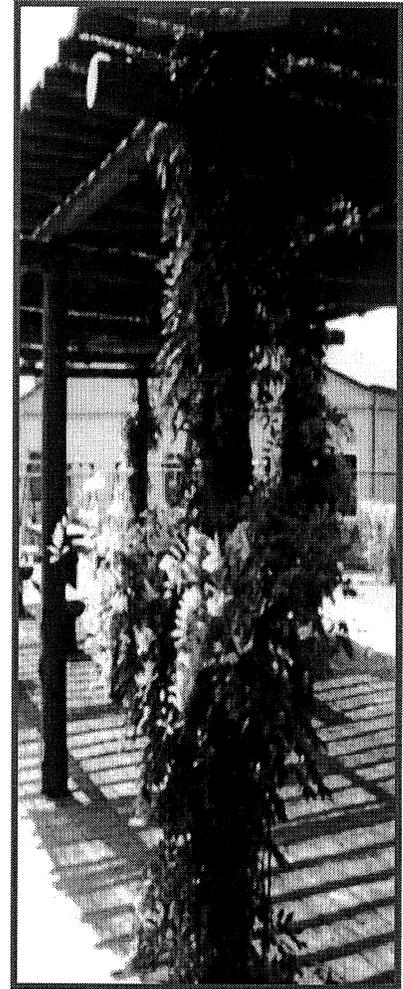


Fig. 11.6 - Trellis and Vines Provide Shelter.

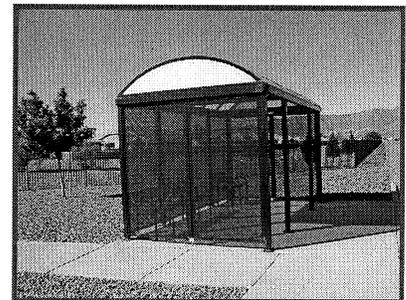


Fig. 11.7 – Typical Fort Bliss Bus Shelter.

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would pose a hazard to passing pedestrians. Construction of walls should incorporate either rock wall, brick to match adjacent buildings, with stone or concrete cap, or concrete with a textured finish and stone or concrete cap. Retaining walls (Fig. 11.8) may be constructed of native stone, brick, versa-lock modular stone with a light tan finish, or concrete block with a light tan stucco finish, concrete block planters, or other appropriate material.



Fig. 11.8 - Indigenous Stone Retaining Wall

11.3.7.3 Fences

Rock wall or other masonry fences should be utilized for screening of service areas and site utilities, particularly dumpsters. Chain link fences should be screened with trees and shrubs. The use of chain link fence should be held to a minimum in the cantonment area.

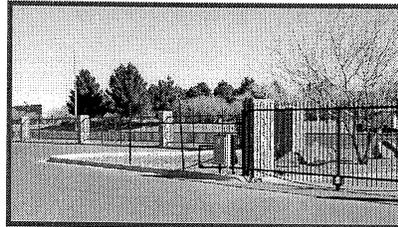


Fig. 11.9 - Wrought Iron Fence

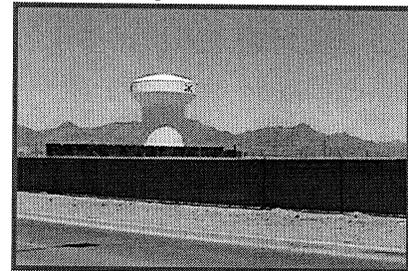


Fig. 11-10 - Chain Link Fence With Green Fabric Screening

11.3.7.3.1 Use of wrought iron fence where appropriate (Fig. 11.9).

11.3.7.3.2 Use chain link with green color fabric for storage yards and other appropriate areas (Fig. 11.10).

11.3.8 Trash Receptacles

11.3.8.1 Trash Receptacle Location

Trash containers should be highly visible and accessible for effective litter control. Containers should be located conveniently along walkways, near major pedestrian intersections, near building entrances and near seating and eating areas. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas (*Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings*, Table B-1).

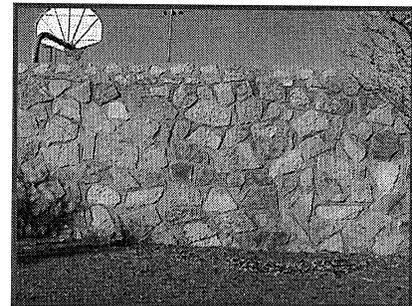


Fig. 11.11 - Six Foot Rock Wall

11.3.8.2 Trash Receptacle Design – Not Used

11.3.8.3 Trash Receptacle Type - Not Used

11.3.8.4 Dumpsters

11.3.8.4.1 Dumpster Location

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The location of dumpsters can have a significant visual impact, and should therefore be addressed as part of an overall building design and incorporated in site planning. To the greatest extent possible, incorporate dumpster placement into areas screened with walls. Avoid locating dumpsters along major circulation routes or use areas. Dumpsters should be directly accessible by way of a paved service drive or parking lot with adequate overhead clearance for collection vehicles. Antiterrorism/force protection requirements restrict the location of dumpsters to a minimum of 10 meters (33 feet) from inhabited buildings and 25 meters (82 feet) from billeting and primary gathering areas (Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, Table B-1).

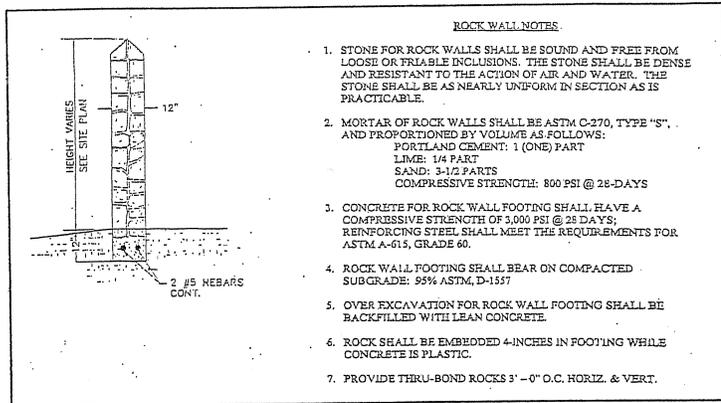


Fig. 11.12 – Construction Detail for Six Foot Rock Wall

11.3.8.4.2 Dumpster Site Design

Rock walls shall be 6' in height. All dumpsters should be placed on 12' x 12' concrete pads with aprons large enough to encompass the bearing points of the service vehicle (Fig. 11.12).

11.3.9 Flagpoles

The standard flagpole for Fort Bliss shall be tapered mill finish aluminum, fitted with a gold anodized finish "ball" finial (Fig. 11.13). The mounting detail should be simple with a concrete base flush at grade. A concrete pad should be used when poles are located in lawn areas. In plaza areas, flagpole locations and mounting detail should be integrated into the paving pattern. Flagpoles should include lighting and may be accented with planting beds around the base of the flagpole.

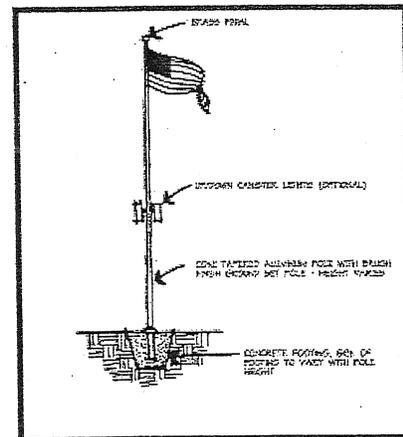


Fig. 11.13 – Standard Flagpole

11.3.10 Planters

11.3.10.1 Movable pre-cast concrete planters may be used outside building entrances to provide seasonal color and interest and function as security threat barriers (Fig. 11.14). Planters should be located so they impede vehicular access to a building, but not so they excessively impede pedestrian movement. Several planters of various sizes may be grouped together to produce an aesthetically pleasing display.

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11.3.11 Bicycle Racks

Bicycle racks should be provided at key destination locations. They should be located on a concrete surface where they will not impede pedestrian movement or block building entrances.

A ribbon type tubular aluminum bike rack with an anodized dark bronze finish is the post standard (Fig. 11.15). Bicycle storage areas near barracks should be covered.

11.3.12 Tree Grates

Tree grates should be used when installing trees in large paved areas such as pedestrian plazas, walks, and ceremonial entrance courts. Tree grates and planting pits should be a minimum of 5' x 5'.

11.3.13 Bollards

Bollards are utilized to separate vehicular and pedestrian traffic, to direct access, or as decorative elements in pedestrian areas.

11.3.14 Playgrounds/Tot Lots

11.3.14.1 Installation playgrounds and tot lots should use equipment that is consistent throughout the installation or that meets specific criteria of materials, color, and design (Fig 11.16).

11.3.14.2 Playground Planning and Design

Guidance for planning and designing unsupervised outdoor play areas that meet child safety and child development requirements is found in Unified Facilities Criteria (UFC) 3-210-04, Design: Children's Outdoor Play Areas. The guidance given in this publication meets the needs of children with and without disabilities.

11.3.14.3 Playground Inspection and Maintenance

A play area inspection and maintenance program for Child Development Centers can be found in Technical Manual (TM) 5-663, Child Development Center, Play Area Inspection and Maintenance Program.

11.3.14.4 Recalled and Banned Playground Equipment

For updates on banned or recalled playground equipment consult the Consumer Product Safety Commission Press Releases and Recalls web site.

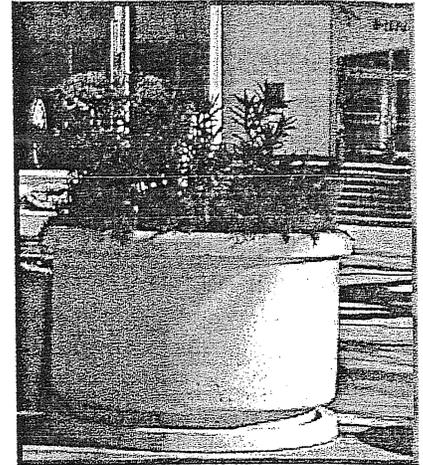


Fig. 11-14 – Movable Precast Concrete Planter

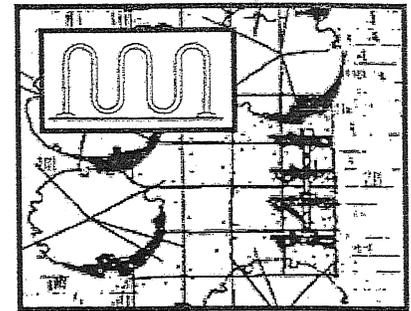


Fig. 11.15 – Bicycle Rack System

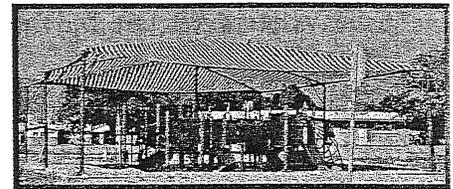


Fig. 11.16 - Playground and Tot Lot With Canopy For Shade

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Table 11.5.4 Lighting Design Matrix

		TYPICAL AREAS OF LIGHTING USE																		
		Entry Gates	Primary Roadways	Secondary Roadways	Tertiary Roadways	Primary Walkways/Bikeways	Secondary Walkways/Bikeways	Tertiary Walkways/Bikeways	Courtyards	Playgrounds	Ball fields	Basketball Courts	Tennis Courts	Buildings	Landscaping	Fence Perimeters	Signs & Monuments	Large Parking Lots	Small Parking Lots	Training areas
TYPE	Compact Fluorescent	•												•	•		•			
	Metal Halide	•						•	•	•	•	•		•	•	•				•
	High Pressure Sodium	•	•	•	•	•	•	•	•					•		•		•	•	•
LEVEL	Lux (lx)		20	15	10	10	2		50		200	200	50							
	Foot-candles (fc)		2	1.4	0.9	0.9	0.2		5		10	20	5.6			0.2		1	1	1
HEIGHT	30' Max	•	•	•	•									•	•			•		
	25' Max					•	•	•											•	
	15' Max																			
	Varies								•	•	•	•	•			•	•			•
FIXTURE	Cutoff	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Utility													•		•				•
	Bollard																			
	Spot																•			
	Wall Mount													•						
POLE	Metal	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Wood															•				•
SPACING	120' Max		•	•	•											•		•		
	90' Max																		•	
	Varies													•		•				•

• = Appropriate usage

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11.6.6.4 Fire hydrants should be highly visible and free of any screening. They shall be nutmeg brown in color with luminous paint. Cap color shall indicate tested water pressure (Fig. 11.37).

Each fire hydrant shall include an antiterrorism check valve (ATV) designed to protect against accidental backflow and intentional contamination of drinking water via the hydrant. The ATV shall be a stealth check valve located internal to the upper barrel of the hydrant and shall consist of four main parts:

- A sleeve-insert valve seat, made of E coated or fusion bonded epoxy steel. The top of the valve seat shall have a machined slot to accommodate an EPDM quad ring which will provide an impenetrable seal between the seat and the valve.
- A valve made of brass with machined slots to accommodate an o-ring between the valve and the upper stem.
- A stainless steel machined upper stem will replace the original upper stem. The brass valve shall be attached to the upper stem in such a manner as to provide free vertical movement along the shaft.
- A stainless steel spring that shall fit around the upper stem and be of adequate compression strength and length that sufficient pressure is placed on the valve to provide an impenetrable seal when the hydrant is not in use and yet allow water to flow freely when the hydrant is flowed.
- The ATV shall be installed by a manufacturer certified technician.



Fig. 11.37 - Fire Hydrants Shall Be Nutmeg Brown. Cap Color Shall Indicate Tested Water Pressure.

11.6.7 Storm Drainage

11.6.7.1 Installation storm drainage systems should be appropriate to the character of development they serve. Storm drainage systems in densely developed areas require curbs, gutters, and underground lines. Storm drainage systems in low-density areas can utilize drainage swales and ditches that are contoured to be compatible with the natural landform. Where retention ponds are required, they should be designed to appear as a natural amenity that is part of the natural contour of the land, rather than a square or rectangular hole in the ground. Retention ponds that are designed to be dry most of the time can be utilized for recreational purposes or as open space. In either case, the areas should be designed to conform to the natural contours of the land. A recreational field that is an integral part of a Primary Facility, however, cannot be used as a retention pond.

11.6.7.2 Large hard surfaced parking lots should have covered drainage at the entry to prevent water draining into adjacent streets.

APPENDIX HH

SUBMITTAL DISTRIBUTION MATRIX

ELECTRONIC MAINTENANCE FACILITY DESIGN SUBMITTAL DISTRIBUTION MATRIX								
Activity & Address	Full Size Drawings	Half-Size Drawings	Design Analysis	Specs	CD w/D.A, specs, .pdf & CADD dwgs	Furniture, Furnishings & Equipment Submittal	Structural Interior Design Submittal	BIM DVD (Per 01 33 16, Attach F)
US Army Corps of Engineers ATTN: Kevin S. Weber CESWT-PP-M 1645 S. 101st E Ave. Tulsa, OK 74128 918-669-7060	0	8	7	7	8	1	1	2
US Army Corps of Engineers ATTN: Phil Barrick CESWF-PM-J 801 Cherry Suite 860 Ft. Worth, TX 76102-0300 817-338-8663	0	0	0	0	3	0	0	1
US Army Corps of Engineers ATTN: Mark Wallace CESWF-PM-J 3C09 819 Taylor St Ft. Worth, TX 76102 817-338-8650	0	0	0	0	4	0	0	0
US Army Corps of Engineers ATTN: Brad Hartell Bldg T-0071 Velez & Sapper Streets Ft. Bliss, TX 79906 915-744-6016	0	0	0	0	1	0	0	0
US Army Corps of Engineers ATTN: Rogelio Torres Corner of Velez & Sapper Streets Ft. Bliss, TX 79906 915-744-6035	0	4	4	4	4	2	2	2
Directorate of Public Works IMWE-BLS-PWF ATTN: Angel Hernandez 777 Pleasanton Rd, Rm 220 Ft. Bliss, TX 79916 915-569-5790	0	1	1	1	3	2	2	1
Directorate of Public Works DPW-ESD, ATTN: Antonio DeAnda 777 Pleasanton Rd, Rm 228 Ft. Bliss, TX 79916 915-568-5936	0	1	1	1	3	0	0	0
IMSW-BLS-Z ATTN: John Barrera Bldg 624 Pleasanton Ave. Ft. Bliss, TX 79916-6816 (915) 568-3908	0	1	1	1	1	0	0	0
IMWE-BLS-PWM ATTN: Emilio Escandon 777 Pleasanton Rd, Rm 311 Fort Bliss, TX 79916-6812 (915) 568-6755	0	0	0	0	1	0	0	0
IMWE-BLS-PWM ATTN: Krystyna Makarewicz 777 Pleasanton Rd, Rm 319 Fort Bliss, TX 79916-6812 (915) 568-6885	0	1	1	1	1	0	0	0
IMWE-BLS-PWM ATTN: Juan R Morales 777 Pleasanton Rd, Rm 327 Fort Bliss, TX 79916-6812 (915) 568-2779	0	0	0	0	2	0	0	0

ELECTRONIC MAINTENANCE FACILITY DESIGN SUBMITTAL DISTRIBUTION MATRIX								
Activity & Address	Full Size Drawings	Half-Size Drawings	Design Analysis	Specs	CD w/D.A, specs, .pdf & CADD dwgs	Furniture, Furnishings & Equipment Submittal	Structural Interior Design Submittal	BIM DVD (Per 01 33 16, Attach F)
IMWE-BLS-PWM ATTN: Albert Garcia 777 Pleasanton Rd., Rm 327 Fort Bliss, TX 79916-6812 (915) 568-2766	0	0	0	0	2	0	0	0
IMWE-BLS-PWM ATTN: Carlos H. Molina 777 Pleasanton Rd., Rm 327 Fort Bliss, TX 79916-6812 (915) 568-8855	0	0	0	0	2	0	0	0
Marisela Leyva DPW-Energy, 777 Pleasanton Rd. Rm 301, Ft. Bliss, TX 79916 (915)568-6514	0	1	1	1	1	0	0	0
Installation Safety Office Attn: Patty Akin Bldg 723, Rm 101 1733 Pleasanton Road Ft. Bliss, TX 79916 915-568-3772	0	0	0	0	1	0	0	0
Physical Security Office ATZC-PM ATTN: Thomas Cain Bldg 115, Pershing Road Ft. Bliss, TX 79916 915-568-5151	0	1	1	1	1	0	0	0
Angel Velasquez NEC Bldg 58, Doniphan Road Ft. Bliss, TX 79916 (915) 568-1265	0	1	1	1	1	0	0	0
Barton Wynn NEC Bldg 58, Doniphan Road Ft. Bliss, TX 79916 (915) 568-2097	0	1	0	0	1	0	0	0
FESD, DES ATTN: James L. Narlock Building 11211 Wright Street Ft. Bliss, TX 79916 (915)568-819	0	1	0	0	3	0	0	0
William Beaumont Army Medical Ctr Department of Preventive Medicine ATTN: IH Service, Miguel Alvarado Bldg 21, (Rear) Room 130, Corner of Slater Road & Chafee Ft. Bliss, TX 79916 915-569-1254	0	0	0	0	1	0	0	0
DPTMS, P&O (IOC) ATTN: Ron Wells, AT/FP Antiterrorism Ofcr 2 Sheridan Road Fort Bliss, TX 79916 (915)569-8663	0	1	1	1	2	0	0	0
Fred Chizek Facility Engineer AFSB Bldg 89010 Ft. Hood, TX 76550 (254)287-3399	0	1	1	1	2	0	0	0
James Cain Building 21 1733 Pleasanton Rd Ft. Bliss, TX 79916 (915)568-678	0	1	1	1	2	0	0	0

ELECTRONIC MAINTENANCE FACILITY DESIGN SUBMITTAL DISTRIBUTION MATRIX								
Activity & Address	Full Size Drawings	Half-Size Drawings	Design Analysis	Specs	CD w/D.A, specs, .pdf & CADD dwgs	Furniture, Furnishings & Equipment Submittal	Structural Interior Design Submittal	BIM DVD (Per 01 33 16, Attach F)
US Army Sustainment Command ATTN: Peter Delcourt, Building 390 1 Rock Island Arsenal Rock Island, IL 61299-6500 (309)782-4085	0	0	0	0	1	0	0	0
CECOM LCMC ATTN: Zola Steele Bldg 19029 Rod & Gun Club Loop Ft Hood, TX 76544 (254)287-289	0	1	1	1	2	0	0	0
USA CECOM, Ofc of the G4 ATTN: Mike Vetter AMSEL-LE, RM D1340 6002 Combat Drive Aberdeen Proving Ground, MD 21005-1845	0	0	0	0	1	0	0	0
USA CECOM, Ofc of the G4 ATTN: Laurie Martinez AMSEL-LE, RM D1340 600 Combat Drive Aberdeen Proving Ground, MD 21005-1845 (443)861-6773	0	0	0	0	1	0	0	0
Scott A. Mallette USA CECOM Logistics & Readiness Ctr. HQ ATTN: AMSEL LC 6001 Combat Drive Aberdeen Proving Ground, MD 21005-1845	0	0	0	0	1	0	0	0
IMCOM Public Works (West Region) ATTN: IMWE-PWD-M, Patrick Caraway Bldg 2000, 1835 Army Blvd Ft. Sam Houston San Antonio, TX 78233-5498 (210)295-2287	0	1	0	0	1	0	0	0
USAISEC-FDED ATTN: AMSEL-IE-DE-IN-OP George Gaffney 1435 Porter St, Suite 230 Fort Dietrick, MD 21702 (301)619-650	0	1	1	1	1	0	0	1
US Army Corps of Engineers ATTN: Phil Brinson CESAS-EN-DA 100 W. Oglethorpe Ave. Savannah, GA 31402-0889 (912)652-5566	0	1	1	1	3	0	0	1
Huitt Zollars ATTN: Scott Graves 1717 McKinney Ave, Suite 1400 Dallas, TX 75202 (214)871-3311	0	1	1	1	1	0	0	0
Jacobs-Huitt Zollars ATTN: Catherine Zultner P140A - Annex Corner of Velez St & Sapper St Ft. Bliss, TX 79906 214-708-2845	0	1	1	1	2	0	0	0

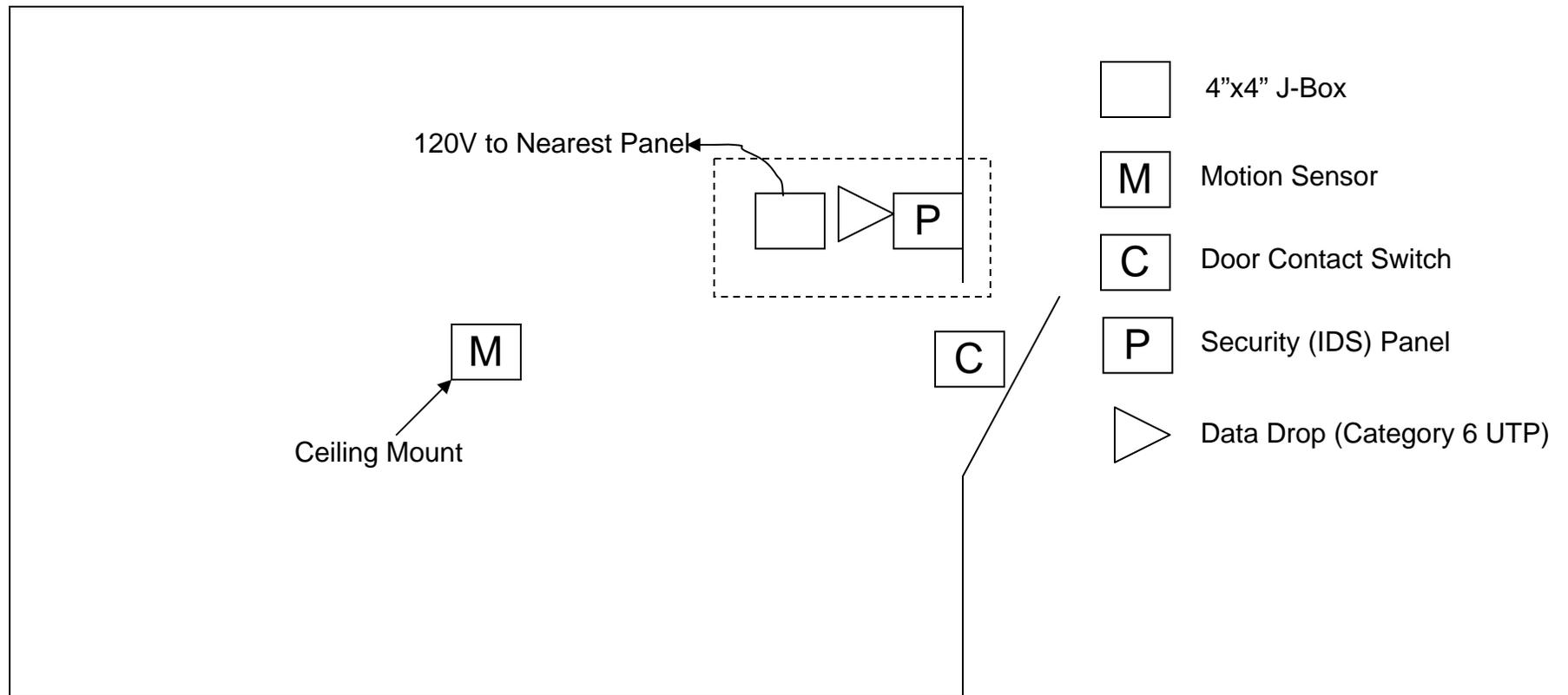
APPENDIX II

Intrusion Detection System Schematic

Typical Arms or Comsec Vault

IDS Layout

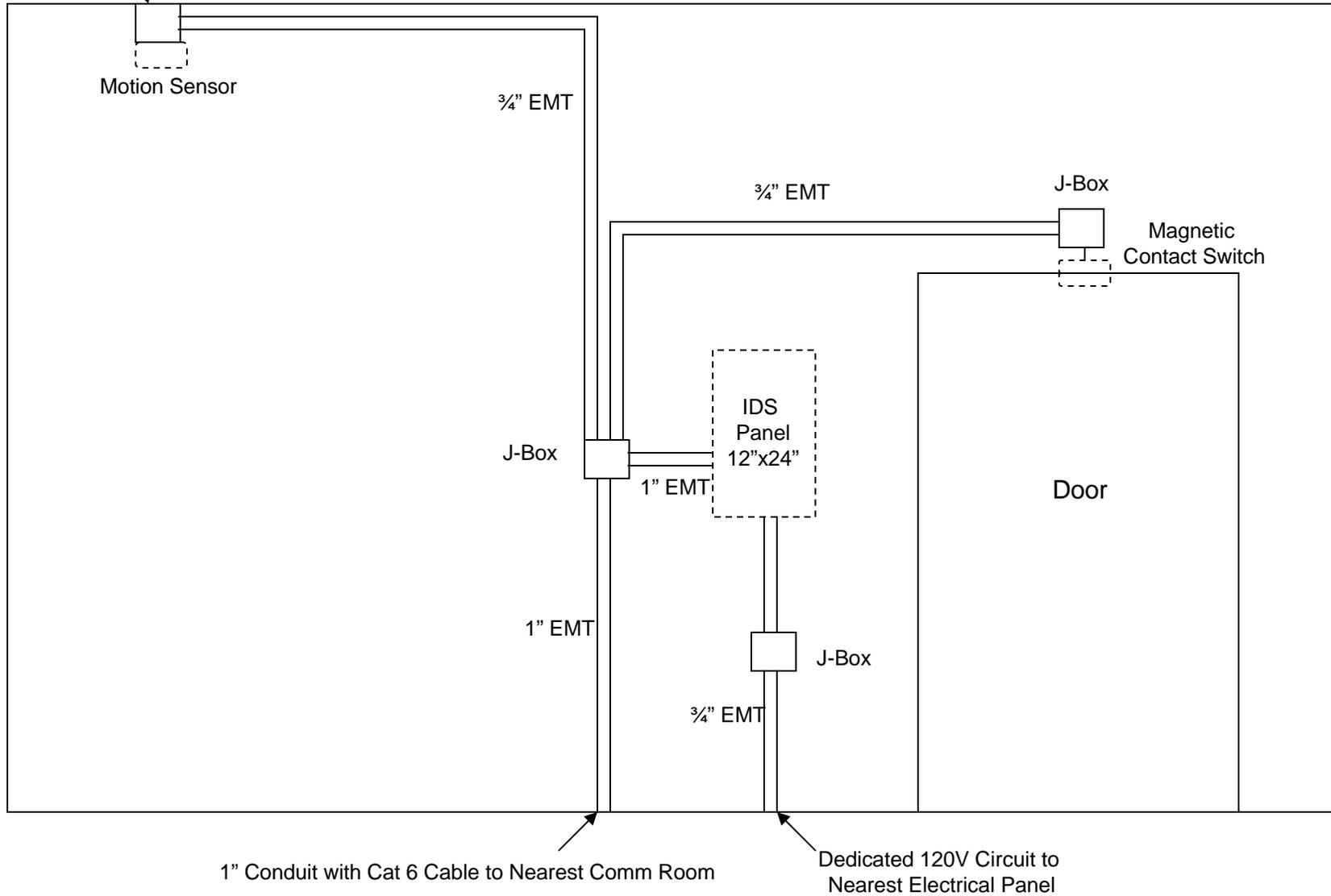
Not to Scale



This j-box is ceiling mounted near center of room

Typical Wall IDS Detail

Not to Scale



APPENDIX JJ

SITE SURVEY - SEE APPENDIX J

APPENDIX KK

UMCS CHECKLIST

Contractor BAS Turnover Checklist

The Building Automation System (BAS) consists of multiple buildings using LonWorks control systems with LNS databases. During the integration of each building to the BAS server the individual building databases will be merged into a larger LNS database and the field devices re-commissioned. Completing this process requires the items shown in the table below. For organized record keeping please submit all files on a single CD or DVD. The exception would be any licensed programming software which can be submitted as a separate CD or DVD.

Note: Once this turnover is complete and the integration process has started field modification may affect the integration. Refer to the "Guidelines for Warranty & Maintenance" for instructions on how to modify files on any building turned over to the CORPS & DPW. If integration has not been started prior to changes being made in the field then an updated CD/DVD must be turned over with the same information outlined in the following table.

REQUIREMENT	COMMENTS	TCC INITIALS	INTEG INITIALS
CD or DVD labeled and dated	Real building # such as 30200 not BuildingX		
Commissioned LNS Database	All LNS credits paid for by controls contractor		
All controllers and routers (except BPOC) should be online	The integrator will configure BPOC IP settings and connect it to the IP network.		
Controllers are programmed to allow monitoring and control from the front end using SNVTs or NCIs.	Network occupied command from BAS but unit programmed with a local backup schedule if comm. is lost longer than 15 – 60 minutes.		
	Software Network Emergency Shutdown command in addition to any local spec req		
	Network setpoint adjustment		
	Network monitoring of hardware I/O values		
	Network monitoring of software alarm points and calculated reset values such as the effective discharge air temp reset value.		

Contractor BAS Turnover Checklist

Provide all controller LonMark resource files	<ul style="list-style-type: none"> • XIF as a minimum • TYP and FPT files if UNVTs are used and a points list to indicate how UNVTs are used i.e. bit field 1 = fan status etc. 		
LNS plug-ins if applicable	Must provide a LNS plug-in if one exists		
Licensed programming tool if applicable	DPW may waive the requirement to provide a licensed copy of the programming tool for each project but waiver must be granted prior to document(s) turnover.		
All controller programming files for each programmable controller. For Example: Trane = RCF and TGP files JCI = GPI files TAC I/A series = Visio & Bin files	<ul style="list-style-type: none"> • Hardware I/O definition file(s) if applicable • Software I/O definition file(s) if applicable • Logic programming file(s) if applicable 		
Points list for all programmable controllers	Provide SNVT and LMO names for hardware and software points.		
Points list for all remote I/O modules	Provide SNVT and LMO names for hardware and software points on I/O devices.		
Points list for any application specific controller used for side loop control	Provide SNVT and LMO names for hardware and software points used for side loop control on an application specific controller.		

Temperature Controls Contractor Information

Company Name: _____

Contact Name: _____

Contact Phone Number: _____

APPENDIX LL

ADDITIONAL ENERGY ENHANCEMENT CONSIDERATIONS

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. Use minimum R/U values listed in Table 1 of the Building Envelope section of the Energy and Water Conservation Design Guide referred to above.
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 xB)
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/m² per day according to the National Renewable Energy Lab (<http://www.nrel.gov/gis/solar.html>).
20. Maximum flow rates for plumbing fixtures per ASHRAE 189.1
 - a. Dual-flush toilets
21. Stormwater management: Meet local codes and Low Impact Development (LID) best practices.

APPENDIX MM

**INFRASTRUCTURE PACKAGE
FOR ELECTRONIC MAINTENANCE & VEHICLE
MAINTENANCE TEMFS**

**(Provided separately, for Information. Work by
Others)**

APPENDIX NN

***AM3 VEHICLE MAINTENANCE FACILITY**

FULLY-DESIGNED

LARGE TEMF

**(PROVIDED SEPARATELY
FOR INFORMATION ONLY.**

**THE VEHICLE MAINTENANCE FACILITY (VMF)
CONSTRUCTION IS NOT PART OF THIS CONTRACT.**

**CONTRACTOR TO USE THE VMF FACILITY
FOR THE ARCHITECTURAL THEME FOR THE EMF TEMF.***

APPENDIX OO
PRIVATIZED UTILITY SERVICE AGREEMENTS

Rio Grande Electric Co-op
Fort Bliss Water Services Co.
Texas Gas Service Company

APPENDIX PP

SUPPLEMENTAL REQUIREMENTS

PROJECT SPECIFIC REQUIREMENTS

FORT BLISS, OK

This appendix contains supplemental requirements to Section 01 10 00 STATEMENT OF WORK, Paragraphs 3 and 6 in addition to Appendix MM, that must be included in the project design and construction.

The following paragraph supersedes paragraph 3.1.5 (3):

3.1.5 Architecture

(3) Natural Lighting. Repair and maintenance bays, storage and admin areas shall be illuminated using innovative solutions of hybrid lighting systems which includes electric lighting with electronic daylight controls in combination with daylighting. The daylighting should maintain the intent of the Area Development Guide and consist of translucent panels above overhead doors and skylights with reflective tube that channels the light into the work area and a lens that diffuses the light and/or combination of skylights and clerestory windows. Open maintenance and storage sheds shall use hybrid lighting systems with a dome-shape skylights. Provide operable windows for natural lighting and ventilation in administration and shop control, training room, break/training/conference room, and consolidated bench repair shop. Preference will be given for designs providing vision panels in overhead doors.

The following supersedes paragraph 3.2 (g), Electrical TEMF Features Matrix, Note 9:

9. NOT USED.

APPROVED DEVIATIONS

Note rough grading and utility demarcations to infrastructure trunk mains (water, sewer, communications, gas and electric), roadways and organizational vehicle parking, etc. following a design developed by the Infrastructure Designer shown in Appendix J and MM. Coordinate work with Infrastructure Designer and COE Representative.

Design will be in accordance with the Infantry Brigade Combat Team Area Development Guide in Appendix F. The use of the term "Guide" in titles such as "Infantry Brigade Combat Team Area Development Guide" and "Technical Guide for Information Infrastructure Architecture" does not imply that the requirements of these guides are optional. The requirements of all Guides and standards are mandatory; deviations must be approved by Fort Bliss and the Contracting Officer.

SITE PLANNING AND DESIGN

Plan, design and construct all functional and technical site requirements listed in this project, including erosion control measures, underground conduit, piping, utility service lines and connections (electrical, communications, cable, water, sewer, stormwater, gas, mechanical), etc. within the project limits. The project limits are shown on the drawings. Base the site design

upon conceptual site layouts in Appendix J. The D/B Contractor will be allotted an area as shown in the Access and Haul Route Plans in Appendix J for the placement of a construction trailer complex and storage for the D/B Contractor and all Sub-Contractors. Additional trailer space will not be allocated for Sub-contractors and therefore must be contained within the D/B Contractors' complex/building envelope. Permanent Trailers will not be permitted within the building envelope work areas. Trailers within the work area may be required to be relocated at no additional cost to the Government to accommodate other site activities. An access path shall be provided for emergency response vehicles and jobsite access for the construction trailer complex and building envelope work area and shall be clear in the event of fire or medical emergency as per NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.

Confine construction limits to the construction site boundaries for the specific facility location for the project. Construction limits shall be confined to the construction site boundaries as shown in Appendix J.

Demarcation: Verify and coordinate demarcation lines for design and demarcation lines for construction as shown in Appendix J, MM and NN with the Government. The additional cost, if any, resulting from DB Contractor-requested deviations outside the design demarcation lines will be borne by the DB Contractor. Any such deviations must be reviewed and approved by the Government.

SITE ENGINEERING

Add the following paragraph 6.4.2.2 (RE: Appendix J):

6.4.2.2. Geotechnical borings, a boring location map, and raw data on the subsurface conditions described in 5.2.2 are furnished as part of the RFP in Appendix A. After contract award, the successful Contractor shall perform additional subsurface investigations and laboratory analysis to better characterize the site and develop the final design. Investigations and laboratory analysis shall be performed under the direction of a licensed geotechnical engineer and shall be the full responsibility of the Contractor. Changes from the information presented in Appendix A will be handled in accordance with Clause 52.236-2 DIFFERING SITE CONDITIONS. Refer to Section 01 33 16 DESIGN AFTER AWARD for additional requirements.

Site Structures and Amenities

See Appendix AA, H, J, MM and NN for additional requirements for Site Structures and Amenities.

ARCHITECTURAL THEME

The architectural theme is identified in the Infantry Brigade Combat Team Area Design Guide at Appendix F. Site and Architectural conceptual drawings that meet this objective are shown in Appendix J, F and AA.

BUILDING ELEMENTS, MATERIALS AND COLORS SHALL ALSO BE CONSISTENT WITH THE FULLY-DESIGNED VEHICLE MAINTENANCE SHOP TEMF, PN 68305 AT APPENDIX NN.

Additional Installation Architectural Requirements:

Standing Seam Metal Roof (SSMR) system with a non-reflective, factory applied color finish is the recommended roof system. Roof systems shall comply with UFC 3-600-01 for applicable fire rating. Roof systems shall be UL 90 rated or Factory Mutual Global (FM) I-90 rated.

Exterior Door Finish Hardware: Provide AR-1 keyways for all mechanical, electrical and communications rooms.

Exterior Windows: All operable windows must be lockable.

Exterior Signage: All buildings constructed under this Task Order shall have exterior building identification signs in accordance with Appendix H, Exterior Signage. Exterior building identification signage shall also be provided for Hazardous Waste Storage Buildings and POL Storage Buildings even if providing pre-fabricated, fire-rated, self-contained, movable steel safety storage buildings.

Interior Partitions and Walls:

a. Walls in areas with direct contact with automotive liquids, such as the Fluid Distribution Room shall be finished with gloss paint for ease of maintenance and cleaning as a minimum.

b. Walls that are not tiled in areas with direct contact with water, such as Latrines and Break, Training and Conference Rooms, shall be finished with a semi-gloss paint for ease of maintenance and cleaning.

Interior Door Finish Hardware: Provide AR-1 keyways for all mechanical, electrical and communications rooms.

Provide furniture design that includes furnishings for 'Unassigned' spaces consistent with that provided in 'Admin and Shop Control' spaces as identified in 3.1.11.(b) Table 7. Building design shall support these furnishings in the 'Unassigned' spaces including, but not limited to, power, data, lighting, etc.

PLUMBING

Automatic infrared metered-flow faucets shall not be used.

Provide low-flow cut-off valves for each automotive lubricant air driven pump assembly identified for the Fluid Distribution Room in Section 01 10 00, paragraph 3.1.2 (12) (h).

SITE ELECTRICAL SYSTEMS

Exterior Communications: Install communications infrastructure as required by the drawings in Appendix J, MM and NN. Cable TV is to be included in the site communications duct bank. Coordinate with Ft Bliss NEC Plans Office. Underground conduit and copper voice/data cables

extending to any building shall be routed to a specific manhole or hand hole. The buildings shall not be daisy chained together.

FACILITY ELECTRICAL SYSTEMS

Provide weather-tight through-roof conduit from Comm. Room to roof for installation of communication cable and Government installed roof mounted antenna. Provide accommodations for user-provided VSAT antenna exterior to the TEMF. VSAT antenna shall be adjacent to an interior space capable of supporting the associated user-provided modem case (approximately the size of a medium suitcase). Provide a 3-inch sealable penetration through the exterior wall to allow a cable connection between the VSAT antenna and modem. Provide two (2), 1-inch diameter rigid conduit runs with eight (8), Cat 6 cables (4 per conduit) from the modem case location to above the lay-in ceiling in the Administration and Shop Control space. The eight Cat 6 cables shall be provided with adequate length above the lay-in ceiling to reach any cubical in the Administration and Shop Control space. The D/B Contractor shall also provide design and construction of a steel stand to support the VSAT antenna including appropriate grounding for the antenna, mounting hardware and stand. Provide two (2) bollards of the same size and type identified in the TEMF Standard Design, UFC 4-214-02 to protect the VSAT antenna. Antenna must have a clear line-of-sight to the southwest.

In stairwells with exterior windows, any lighting that is not on an emergency circuit shall be controlled by a switch and photocell.

Arms Rooms / Vaults: A tamper-proof light fixture on a separate switch is to be provided outside the entrance to each Arms Room / Vault. Switch is to be positioned so that unauthorized personnel may not have access.

There shall be a minimum of one telephone outlet/jack for wall mount telephone connected to the telecommunications room with Category 6 cable in all common areas, mechanical rooms, communication rooms, and electrical rooms. Provide data outlets in mechanical and electrical rooms

HEATING, VENTILATING AND AIR CONDITIONING

Evaporative cooling shall not be used for the TEMF or associated buildings under this Task Order.

Repair, Maintenance and Circulation Bays: Exhaust makeup and ventilation air for all the bays shall be provided by makeup air handling units. Makeup air may be minimally tempered by natural gas although it is not mandatory as other heating media may be used. Continuous mechanical ventilation of the bays to provide makeup air (for all vehicle exhausts, etc.) and people ventilation shall be provided. It is preferred that all mechanical equipment is installed inside the facility. In general, coordination of overhead space with cranes, heating equipment, lighting, etc. is very important.

Provide a complete soldering station exhaust system/station that captures and exhaust soldering contaminants from the workstation to outside from the central soldering station in the consolidated bench space. The station shall include a fan, a wall or ceiling supported articulated exhaust boom arm with conical intake hood with hood light, and ductwork and louvers to

exterior. Also, included will be a wall mounted control start/stop station preferably by the exhaust boom manufacturer. It is preferable that the same manufacturer provide a exhaust station package include fan, articulated boom arm/hood, wall and ceiling supports, controls and lighting, etc. Min hood capture velocity shall be recommended for soldering contaminants at a distance of 10 to 12" from the work as prescribed by the ACGIH guide / handbook and exhaust hood manufacturer.

MECHANICAL

The following paragraph supersedes Section 01 10 00, paragraph 6.11.6:

6.11.6 Integration of Buildings and Facilities into the Existing Fort Bliss Post-wide Energy and Utility Monitoring and Control Systems (EMCS, aka UMCS).

1. The existing post-wide UMCS is an Open Lonworks system; specifically, the system is a Johnson Controls Metasys Utility Monitoring and Control System.

2. All Building and Facility Controls Systems shall be fully integrated into the existing post-wide UMCS. This will include fully testing, commissioning and Government acceptance in all cases.

3. All utility meters shall be connected to the postwide UMCS to enable metering and all other available data to be centrally tracked, monitored and utilized. All meter data shall be mapped and integrated to be fully available at the UMCS; for electric "smart" meters, the number of data points and types of data are significant.

4. All points available to the UMCS from building controls and metering shall be fully trendable.

5. To hookup and integrate the building or facility, the Contractor shall provide all conduit (for instance, from DDC control panel to comm. room for connection and from DDC panel(s) to meters), wiring and comm. cabling to all connected points and devices, power, backup power (as necessary), communications devices (routers, etc.), programming, labor, installation hardware, testing, commissioning, etc. to ensure full integration and complete Government acceptance.

6. The UMCS shall provide supervisory and as desired by the post direct control for energy savings and all normal and available energy savings software routines shall be instrumented and fully implemented in the UMCS integration and local controls. Energy saving controls by UMCS shall include but not be limited to, Scheduled and Optimal Start/Stop, Duty Cycling, Economization, Selection of plant equipment for best efficiency, Trending, Reset of Supply Air and Water Temperatures based upon Loads and space conditions, Reset of space control temperatures. UMCS shall be able to see and control all zone/space temperatures and humidities, where applicable and monitor, log, etc. all building and equipment alarms. UMCS shall be able to control (start/stop, enable) all HVAC equipment. Additionally, UMCS shall be able to do demand limiting control.

7. Specific Requirements:

a. Provide a 3/4" conduit with CAT 6 cable from the UMCS router to the Communication Room for connection to the building LAN.

- b. Main DDC building controls panels, all UMCS, equipment, etc. shall be installed in facility/building mechanical room. Any DDC controls sub-panels shall be installed next to or near the equipment controlled, unless there is an environment problem.
- c. DDC panels and all UMCS and control equipment shall be designed or equipped to handle temperature or humidity conditions in the installed locations for long life.

The following paragraph supersedes paragraph 6.11.15 (c):

6.11.15. (c) NOT USED.

FIRE PROTECTION

Add or replace the following paragraphs to Section 01 10 00:

6.13.1.1. Fire alarm control panel is NOT required to be a Monaco product; only compatible with the Monaco system and Monaco transceiver.

6.13 5. Provide and install a fire department connection at location identified in the infrastructure package near the PIV and fire hydrant. Coordinate exact location of fire department connection location with LDE and Ft Bliss Fire Department.

6.13.7.10.1. Provide fire alarm pull stations at every personnel exit at Humidity-Controlled Warehouse.

6.13.9. Provide signage consistent with TEMF Standard Design (UFC 4-214-02), applicable codes and authority having jurisdiction at local operator console (LOC) stating, "FOR EMERGENCY USE ONLY."

6.13.11.2 Program the following eight (8) pre-recorded messages into the system:

(1) MESSAGE #1 – "FIRE" (Siren X 5 Seconds) (Female voice) "ATTENTION, ATTENTION, A FIRE EMERGENCY HAS BEEN REPORTED. PLEASE LEAVE THE BUILDING USING THE NEAREST EXIT OR EXIT STAIRWAY. DO NOT USE THE ELEVATORS IF INSTALLED WITHIN THIS FACILITY".

(2) MESSAGE #2 – "SEVERE WEATHER" (1 KHz Steady tone X 5 Seconds) (Female voice) THIS IS THE FORT BLISS INSTALLATION OPERATIONS CENTER. THE NATIONAL WEATHER SERVICE HAS ISSUED A SEVERE WEATHER ALERT FOR THIS AREA. TURN ON YOUR RADIOS OR TELEVISIONS FOR THE LATEST UPDATE AND TAKE REQUIRED ACTION. AGAIN, THIS IS THE FORT BLISS INSTALLATION OPERATIONS CENTER. THE NATIONAL WEATHER SERVICE HAS ISSUED A SEVERE WEATHER ALERT FOR THIS AREA. TURN ON YOUR RADIOS OR TELEVISIONS FOR THE LATEST UPDATE AND TAKE REQUIRED ACTION.

(3) MESSAGE #3 – "BOMB" (Horn sound X 5 Seconds) (Female voice) "ATTENTION, ATTENTION. THIS BUILDING HAS RECEIVED A BOMB THREAT. ALL PERSONNEL ARE TO EVACUATE IMMEDIATELY USING THE NEAREST EXIT AND TO REPORT TO OUR DESIGNATED RE-ASSEMBLY AREA FOR ACCOUNTABILITY AND ADDITIONAL INSTRUCTION. AGAIN, THIS BUILDING HAS RECEIVED A BOMB THREAT. ALL PERSONNEL ARE TO EVACUATE IMMEDIATELY USING THE NEAREST EXIT AND TO

REPORT TO OUR DESIGNATED RE-ASSEMBLY AREA FOR ACCOUNTABILITY AND FOR ADDITIONAL INSTRUCTION.

(4) MESSAGE #4 – “SHELTER IN PLACE” (Three 1 KHz tones X 1 Second each) (Female Voice) “ATTENTION, ATTENTION. A TOXIC CHEMICAL HAZARD HAS BEEN REPORTED, PLEASE REMAIN CALM. ALL PERSONNEL ARE DIRECTED TO “SHELTER IN PLACE”. TURN OFF FANS, HEATING, VENTILATION AND AIR CONDITION SYSTEMS. CLOSE ALL DOORS AND WINDOWS AND REMAIN INDOORS UNTIL THE “ALL CLEAR” ANNOUNCEMENT IS GIVEN.”

(5) MESSAGE #5 – “FPCON C” (HI/LOW Tones X 3 Seconds) (Female voice) “ATTENTION, ATTENTION. FORT BLISS IS NOW AT FPCON CHARLIE. IMPLEMENT FPCON ALPHA, BRAVO AND CHARLIE SECURITY PLANS IMMEDIATELY. AGAIN, FORT BLISS IS NOW AT FPCON CHARLIE. IMPLEMENT FPCON ALPHA, BRAVO AND CHARLIE SECURITY PLANS IMMEDIATELY AND STAND BY FOR ADDITIONAL INFORMATION FROM THE FORT BLISS INSTALLATION OPERATION CENTER.”

(6) MESSAGE # 6 – “FPCON D” (HI/LOW Tones X 3 Seconds) (Female voice) “ATTENTION, ATTENTION. FORT BLISS IS NOW AT FPCON DELTA. IMPLEMENT ALL FPCON SECURITY PLANS, ALPHA THROUGH DELTA IMMEDIATELY. AGAIN, FORT BLISS IS NOW AT FPCON DELTA. IMPLEMENT ALL FPCON SECURITY PLANS, ALPHA THROUGH DELTA IMMEDIATELY AND STAND BY FOR ADDITIONAL INFORMATION FROM THE FORT BLISS INSTALLATION OPERATION CENTER.”

(7) MESSAGE #7 – “ALL CLEAR”. (Chime sound X 5 Seconds) (Female voice) “THE EMERGENCY HAS NOW ENDED. PLEASE RESUME NORMAL OPERATIONS. THANK YOU FOR YOUR COOPERATION.”

(8) MESSAGE #8 – “TEST” (1 KHz tone X 2 Seconds) (Female voice) “MAY I HAVE YOUR ATTENTION, PLEASE? THIS IS THE FORT BLISS INSTALLATION OPERATIONS CENTER CONDUCTING A TEST OF THE MASS NOTIFICATION SYSTEM. REPEAT, THIS IS ONLY A TEST.”

ENVIRONMENTAL

Add the following paragraph to Section 01 10 00:

6.15.3. See Appendix E for more information.

ADDITIONAL FACILITIES

Add the following paragraph to Section 01 10 00:

6.18.1. Humidity-Controlled Warehouse: Provide one building of no more than 5,000 SF.

6.18.1.1. General: Provide a fully fire sprinklered and alarmed, conditioned, humidity-controlled warehouse within the organizational vehicle parking hardstand at the location identified in Appendices J and MM. This facility will be approximately 66.6-feet by 75-feet for operational purposes. The preference is to provide a column free interior to allow for the greatest flexibility in use. The minimum clear interior and eave height shall be 25'-0". Unless specifically noted elsewhere, engineering, design and construction requirements for this

facility shall be the same as the Tactical Equipment Maintenance Facility (TEMF) for like occupancies and systems and energy savings goals (40% baseline with an option for 50%), renewable energy usage, etc. Design facility for 24-hour operations.

6.18.1.2. Civil/Site: General demarcation for site work and utilities shall be approximately 10 feet from the building face unless noted otherwise. Refer to Appendix J. The D/B Contractor shall be responsible for all design and construction from the building to this demarcation point. Coordinate all utility and paving design and construction with the infrastructure design at Appendices J and MM and COE Representative. Provide bollards IAW Section 01 10 00, paragraph 3.1.4. (18).

6.18.1.3. Architectural: Exterior of the warehouse shall be the same material and finish as the exterior of the Tactical Equipment Maintenance Facilities. Refer to "ARCHITECTURAL THEME" this Appendix. The warehouse shall have one 14'W x 14'H overhead door for forklift access with bollards both sides and associated personnel door. Provide a pair (double) 3' x 7' doors on east and west sides of the facility and other personnel doors as required. Provide interior wall design for impact protection. Floor shall be sealed concrete. Provide wire mesh enclosures that are continuous to structure for security. The facility shall include translucent and/or clear glazing and skylights to make full utilization of controlled daylighting to save energy. Facility shall be fully ADA accessible.

Provide shelving/storage rack system similar to that shown in Attachment 2 located the end of this appendix.

6.18.1.4. Structural: Floor slab shall be designed for use of loaded 10,000 pound capacity forklifts within the warehouse and exterior perimeter concrete slab to the 10-foot demarcation.

6.18.1.5. Plumbing: Building shall be fully sprinklered. Provide unisex restroom within warehouse building; include a floor drain with trap primer. Provide an electric water cooler at or near the restroom. Provide exterior freeze proof wall hydrant (front). Provide utility hose bibs and a floor sink next to the lavatory to allow for filling of a janitor's mop bucket and other janitorial functions. In the warehouse, outside/adjacent to the latrine, provide a trap primed floor floor drain and valved water connection for a refrigerator and ice maker.

6.18.1.6. Electrical: Electrical systems shall support single shift or 24 hour year-round operations. Provide 120V single phase power throughout warehouse. Provide telephone and data connections. Provide mass notification system in conjunction with the TEMF building. Provide lightning protection in accordance with NFPA 780 and other referenced criteria. Overhead doors shall be motor operated. Building mounted light fixtures may be used around the building perimeter to supplement pole mounted light fixtures. Building mounted light fixtures used solely for building perimeter and door way lighting may be fluorescent. Illumination level around the perimeter of the building shall be 5 foot candles within 10 feet of the building. Provide metering at the entrance of the building and shall be connected to UMCS.

Incidental Forklift Charging Area: Provide a 208V, single-phase, 20 Amp (minimum) circuit for incidental charging. Provide adequate ventilation as required and epoxy floor coating at forklift charging area.

6.18.1.7. Heating, Ventilation and Air Conditioning: Facility shall meet the same energy requirements as the TEMF, namely the facility shall be 40% more energy efficient than required by ASHRAE std 90.1-2007. Provide heating, ventilation and air-conditioning with full dehumidification and humidification control and equipment for this facility to maintain temperatures between 55 and 80 degrees and a relative humidity between 30 and 70% with a target relative humidity of 50%. Fossil fuel (propane, diesel or gas) powered forklifts (10,000 lb capacity) will be used in the warehouse. Increase continuous ventilation rates above ASHRAE std 62 requirements to provide dilution and remove of the fork lift exhaust year-round using a pollutant detection and control system. Additionally, the warehouse will be occupied; min. occupancy for design is 5 persons. HVAC air distribution shall provide for ventilation, cooling and heating in all areas of the warehouse even with storage racks fully loaded up to the minimum clear height of 25 feet; this will require a fully air distribution system with distributed return air and registers or industrial diffusers that diffuse air to all portions of the warehouse. The HVAC design shall allow for a min. of 1 air change per hour of infiltration. Provide min. Merv 13 filtration on HVAC equipment. All HVAC equipment shall be either installed with permanent access ladders, catwalks, etc. Exterior HVAC equipment shall be located adjacent to the building while not impeding operations and shall be cages and enclosed as necessary and determined by Post ATFP authorities.

6.18.1.8. Fire Protection: Design fire protection system assuming potential for future high rack, or high piled, highest combustible material and packaging/storage in warehouse space with provision for in-rack fire sprinklers. Note that fossil fuel (propane, diesel or gas) powered forklifts will be used in the warehouse with a maximum load capacity of 10,000 pounds. The fire riser shall be designed in a caged, space separated from the main warehouse but within it, with heat for freeze protection and an exterior door with concrete stoop and sidewalk to the front of the warehouse.

6.18.1.8 EMCS: The building shall be metered, water, gas and electric and each meter shall have a meter pulser output and pulse accumulator which shall be integrated into the postwide EMCS.

6.18.1.9 Provide meters for all utilities. Water meter to be outside in a vault and meet water utility provider (UP) requirements; gas meter shall be immediately outside the building and meet gas UP requirements, electric meter shall be a shadowing meter. For all meters see additional info for EMCS integration text and diagram below.

Integration of Buildings and Facilities into the Existing Fort Bliss Post-Wide Energy and Utility Monitoring and Control Systems (EMCS, aka UMCS).

6.18.1.9.1 The existing post-wide UMCS is an Open Lonworks system; specifically, the system is a Johnson Controls Metasys Utility Monitoring and Control System.

6.18.1.9.2. All Building and Facility Controls Systems shall be fully instrumented, documented, wired in conduit, etc. in fully preparation to be integrated into the existing postwide UMCS by a separate Post contract. Preparation for integration shall include fully testing, commissioning and Government acceptance in all cases, along with turnover of all deliverables such as software modules, points lists, etc. The DDC Control System shall operate the building HVAC system and perform all required functions until the system is integrated into the UMCS and at times when the UMCS is not communicating with the building DDC Control System. Initial set points and schedules are to be used unless overridden by UMCS.

6.18.1.9.3. All utility meters shall be connected to the post-wide UMCS via the building control to enable metering and all other available data to be centrally tracked, trended, monitored and utilized. All meter data shall be mapped and integrated to be fully available at the UMCS; for electric "smart" meters (Wattnode) and for the gas and water meters, provide scale factors for the pulse kit installed. The number of data points and types of data are significant.

6.18.1.9.4. All points available to the UMCS from building controls and metering shall be fully logged and fully trendable by the EMCS.

6.18.1.9.5. To prepare for hookup and integration of the building to the postwide UMCS, the Contractor shall provide all conduit and wire or fiber optic cable (for instance, from DDC control panel to comm. room for connection and from DDC panel(s) to meters), wiring and comm. cabling to all connected points and devices (meter pulsers for gas and water, wattnode electric meters, power, communications devices (routers – I-LON 600, etc.), programming, labor, installation hardware, testing, commissioning, etc. to ensure full integration and complete Government acceptance. All supplied devices shall be wired, powered and power surge/brownout protect and fully tested and accepted.

6.18.1.9.6. The Contractor shall provide a DDS control system which will allow the UMCS to provide supervisory and, as desired by the post, energy savings controls of the system. All normal and energy saving software routines shall be instrumented and fully implemented in the DDC control system and capable of being integrated into the UMCS. Energy saving controls shall include but not be limited to Scheduled and Optimal Start/Stop, Duty Cycling, Economization, Selection of plant equipment for best efficiency, Trending, Reset of Supply Air and Water Temperatures based on loads and space conditions, Reset of space control Temperature. The UMCS shall be able to monitor and log all applicable points including status for all fans, pumps, boilers, chillers and similar equipment. The UMCS shall be able to see and control all zone/space temperatures. UMCS shall be able to control (start/stop) all HVAC equipment. Additionally, UMCS shall be able to do demand limiting control.

6.18.1.9.7. Specific Requirements:

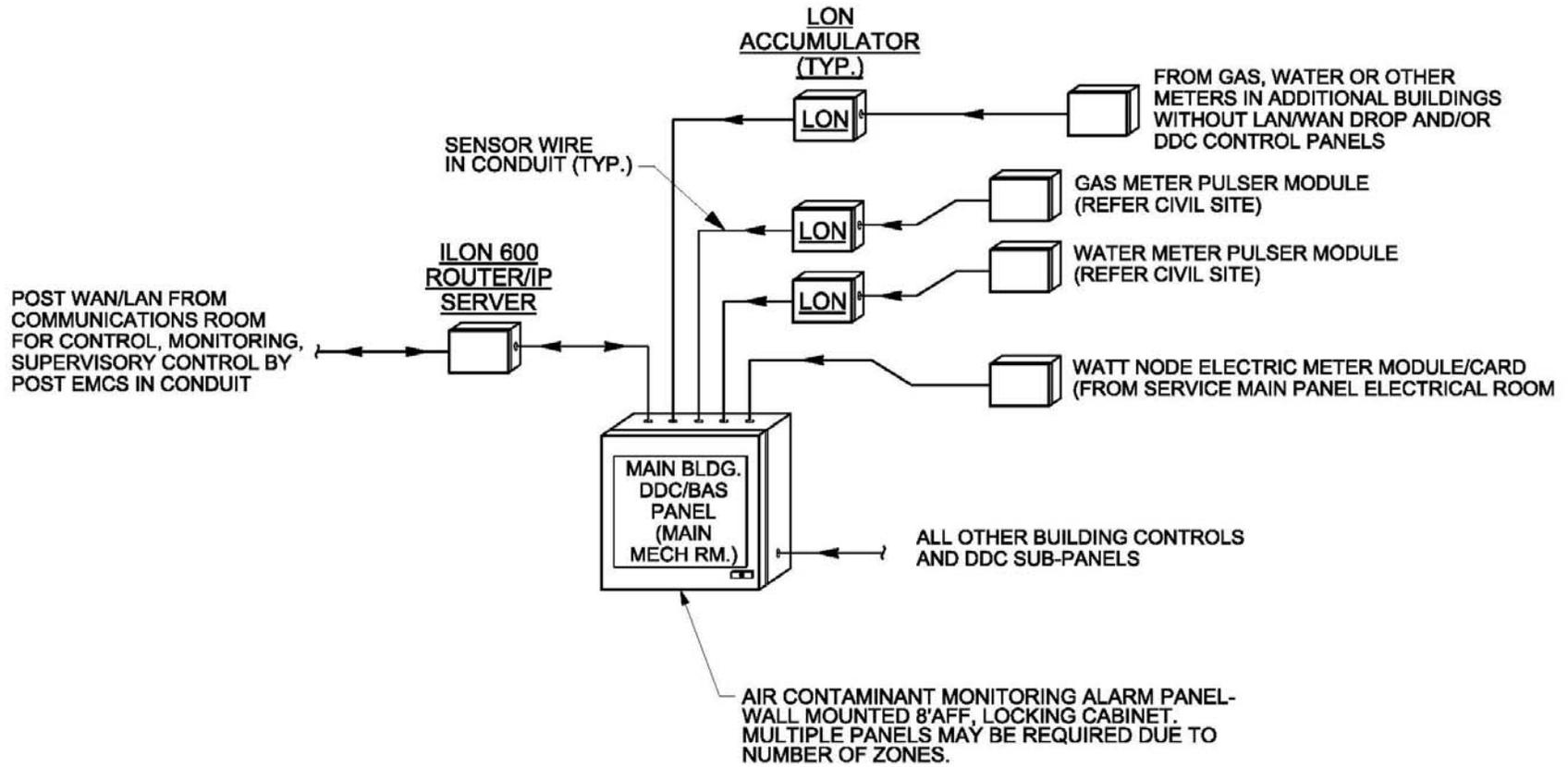
a. Provide a 3/4" conduit with the proper communications cable from the UMCS I-LON 600 router to the Communication Room for connection to the building LAN and Post WAN.

b. The main DDC building controls panels; all UMCS, equipment, etc. shall be installed in facility/building mechanical room. Any DDC controls sub-panels shall be installed next to or near the equipment controlled, unless there is an environment problem.

c. DDC panels and all UMCS and control equipment shall be designed or equipped to handle temperature or humidity conditions in the installed locations for the life of the facility life (min. of 25 years).

APPENDIX PP

ATTACHMENT 1
EMCS SCHEMATIC



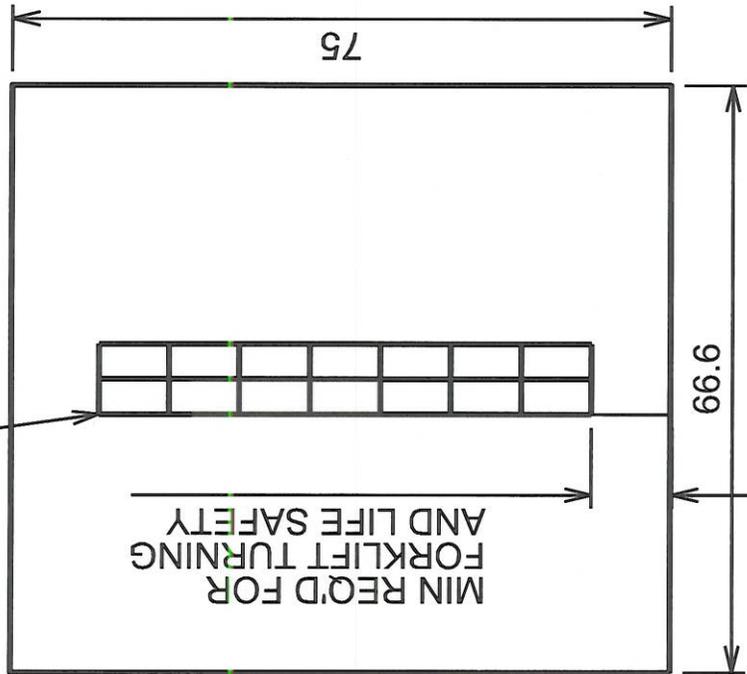
EMCS SCHEMATIC FOR INTERFACE, COMMUNICATIONS AND METERING CONNECTIONS

APPENDIX PP

ATTACHMENT 2

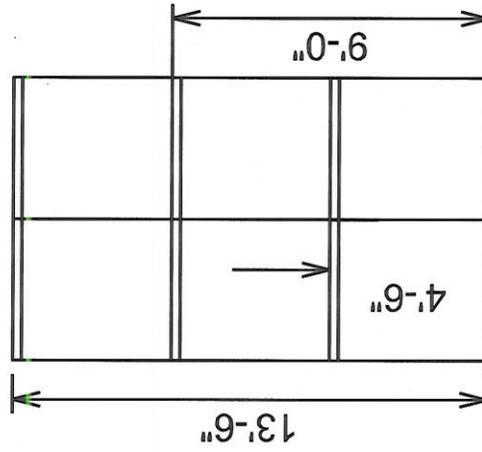
SHELVING/STORAGE RACKS

4'X8' PALLET
RACK STORAGE
SYSTEM



WAREHOUSE
PLAN VIEW
NOT TO SCALE

PROVIDE FORKLIFT
CHARGING AREA
WITH ADEQUATE
ELECTRIC



PALLET RACK
SHELVING SYSTEM
NOT TO SCALE

SECTION 41 53 23

STORAGE RACKS

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 2794 (1993; R 2004) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
- ASTM D 3359 (2002) Measuring Adhesion by Tape Test
- ASTM D 522 (1993a; R 2001) Mandrel Bend Test of Attached Organic Coatings

MATERIAL HANDLING INDUSTRY OF AMERICA INC (MHIA)

- MHI MH28.1 (1997) Specification: Industrial Steel Grade Shelving

1.2 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-01 Preconstruction Submittals

Shelving Units

SD-03 Product Data

Storage Racks
Accessories
Installation instructions

SD-04 Samples

Finish

SD-06 Test Reports

Storage Racks
Finish

RFP ~~W912BV-12-R-0016~~

1.3 DELIVERY, STORAGE, AND HANDLING

Deliver materials in original packages, containers or bundles bearing the brand name and identification of the manufacturer. Store inside under cover. Protect surfaces from damage.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

MHI MH28.1. Provide storage racks designed for full dead and live load, designated heavy duty. Provide units with base plates for floor anchorage indicated.

2.1.1 Pallet Rack Frames

Pallet Rack Upright Frames: Provide load carrying range indicated; letter code stamped into the face of the post to indicate the frame type; minimum 14-gage steel, all-welded construction. Depth of 4 feet by 16 feet high by 8 feet wide. Double posted and cantilever leg custom upright configurations.

Beam heights adjust on 3 inch vertical centers, independent on each side of the frame. Various load rated frames can be combined in a row of rack for maximum economy. Beams cannot be placed at locations where a splice is positioned.

Pallet Rack Upright Frames furnished completely fabricated, welded into rigid units. Standard finish for upright frames is 028 Gray baked enamel.

All upright frames shall be securely anchored to the floor for safety with 1/2-inch by 13 inch by 3-3/4 inch wedge anchor. Verify with local code officials about anchoring; many jurisdictions have approved different anchors. For seismic installation provide 5 inch by 8 inch by 9/16-inch foot plates.

2.1.2 Pallet Rack Beams

Roll-formed one piece beam to achieve the highest possible strength-to-weight ratios in the most frequently desired load ratings through the use of efficient design and high strength steel.

Beams are offered in eight basic styles with different vertical profiles and steel gauges. Beam step heights of 7/8-inch and 1-5/8-inch are available for a wide variety of accessory use. Both the overlapping seam and the beam end connector are securely MIG welded for strength.

The face of the beam shall have an M-design recessed configuration for added strength, protecting the locking key, and to accept pressure sensitive labeling. Each beam is stamped with an identifying letter referring to the load bearing capacity. Beams shall be finished in 710 Sagebrush Yellow or Safety Yellow baked enamel for high visibility.

2.1.3 Beam Locking Key for Safety

Provide a recessed safety key made from heavy gauge steel engages a slot in the side of the post. As soon as beams are installed, the locking keys should be slid into place. They will resist an upward force from material handling equipment up to 1000 pounds. It is an integral part of the beam assembly, can be engaged easily without tools, and is clearly visible for

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checking.

2.1.4 Heavy Duty Beam End Connector

Beam ends are made from extra heavy gauge steel. They feature a three prong connection which assures positive beam to post alignment along the 8-1/2 inch length of the connector, and uniform load distribution. Tabs extend along the face of the beam to provide extra protection to the prongs during transit and installation.

2.1.5 Welded Upright Frame Bracing

Upright frame columns shall be securely MIG welded together with channel type braces for maximum rigidity.

2.1.6 Upright Column

A continuous post roll formed into an "M" design for added strength. Slanted slots on the column allow for beam placement on 3 inch vertical centers. The greater the unit load the tighter the beam-upright connection becomes. Slots on column sides accept the safety beam locking key. The design allows for standard beams to be placed flush with the top, or as close as 9 inches from the floor.

2.1.7 Foot Plate

A heavy gauge foot plate is securely welded to each post to provide load distribution over 13.7 square inches, and two 9/16-inch holes allow for floor anchoring on either side of the frame. Standard duty footplates are 7 ga. thick

2.2 ACCESSORIES

2.2.1 Plywood Supports

For supporting plywood or other wood decking. Styles are available for 1/2 inch deck on 7/8 inch step beams and 3/4 inch deck on 1-5/8 inch step beams.

2.2.2 Plywood Supports

For supporting loads smaller than unit depth.

2.2.3 General Duty Cross Bars

2.2.3.1 Heavy Duty Flanged Cross Bar

Supports heavier loads smaller than unit depth on 1-5/8 inch step beams.

2.2.3.2 Fork Clearance Bar

Provides proper fork clearance for unpalletized stock, 2 inch wide by 2-3/4 inch high.

2.2.3.3 Heavy Duty Skid Channel Assembly

Provide a channeled base for skid runners, 4 inch wide by 2 inch high.

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2.2.3.4 Frame Protector

Anchors to floor at front of post. Provides protection against damage from material handling vehicles.

2.2.3.5 Frame Deflector

Fastens to front of upright post on 3 inch increments.

2.2.3.6 Rigid Row Spacer

Structurally connects and spaces two rows of rack back-to-back to satisfy NFPA requirements. Bolted into place. Provide hardware.

2.2.3.7 Decking

Provide wire decks for the Pallet Racks.

2.3 FINISH

Provide the shelving units in the manufacturer's standard colors as indicated. Clean metal by multiple stage phosphatizing and sealing process, for rust resistance and paint adhesion. Provide electrostatically applied enamel finish coats, baked hard for a minimum of 30 minutes at 300 degrees F.

2.4 SOURCE QUALITY CONTROL

- a. MHI MH28.1, for tests of shelf capacity, lateral stability and shelf connections.
- b. Finish flexibility, ASTM D 522, Method A, 1/8 inch diameter, 180 degree bend, no evidence of fracturing to the naked eye.
- c. Finish adhesion, ASTM D 3359, Method B. There shall be no film removed by tape applied to 11 parallel cuts space 1/8 inch apart plus 11 similar cuts at right angles.
- d. Impact resistant finish, ASTM D 2794, no loss of adhesion after direct and reverse impact equal to 1.5 times metal thickness in mm, expressed in inch pounds.

PART 3 EXECUTION

3.1 EXAMINATION

Before installation, examine shelving units for dents and scratches. Replace damaged shelving.

3.2 INSTALLATION

Install shelving according to manufacturer's installation instructions. Make wall and floor connections as indicated.

3.3 PROTECTION

Cover and protect shelving from damage during the completion of

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construction. Remove prior to acceptance of project.

-- End of Section --

APPENDIX ZZ CONTRACT DURATIONS

CONTRACT DURATIONS
FROM SECTION 00 73 10 – COMMENCEMENT PROSECUTION & COMPLETION OF WORK

UNIT/BRIGADE	*AM4 PAD SITE AVAILABILITY FOR FINAL GEOTECH* (CALENDAR DAYS AFTER NTP) ¹	PERMANENT UTILITIES FOR FIRE PROTECTION AVAILABILITY (CALENDAR DAYS AFTER NTP) ²	PERMANENT ELECTRIC AVAILABILITY (CALENDAR DAYS AFTER NTP)	COMPLETION DATE FROM NOTICE TO PROCEED (CALENDAR DAYS)
INDUSTRIAL COMPLEX (SITE WORK BY OTHERS)				
ELECTRONICS MAINTENANCE (PN68993)	*AM4 100 150*	*AM4 130 180*	*AM4 330 390*	540
AM3 VEHICLE MAINTENANCE (PN68305)	400	130	330	

¹ *AM3 Pads Pad provided by Infrastructure Contractor to EMF-VMF* Contractor for final geotechnical investigations within the calendar days indicated.

² Water, fire, sewer, gas and communications to the EMF *AM3 and VMF pads pad provided to the EMF-VMF* Contractor within the calendar days indicated.