US Army Corps
of Engineers®
New York District

# Design-Build Request for Proposal

## Indoor Range 1BCT
## PN 71727
## FY 2010
## Fort Drum, NY

August 2010

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REV 1.10 – 31 JAN 2010

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**Indoor Range 1BCT, PN 71727, FY 2010**
**Fort Drum, New York**

**CONTRACT LINE ITEM SCHEDULE**

| Item No. | Description | Quantity | Unit | Unit Price | Line Item Amount |
|---|---|---|---|---|---|
| **BASE OFFER** | | | | | |
| 0001 | All work required to design the Indoor Range. | 1 | LS | $ *** | $ _____ |
| 0002 | Construction of all site work outside the 5' line of the Indoor Range building. | 1 | LS | $ *** | $ _____ |
| 0003 | Construction of the Indoor Range including all work within the 5' line of the building. | 1 | LS | $ *** | $ _____ |
| | | **TOTAL BASE OFFER** | | | **$** _____ |
| **OPTIONS** | | | | | |
| 0004 | **OPTION NO. 1, Target Systems**: Provide and Install Target System as described in Section 01 10 00, paragraph 6.18.2. This option may be awarded at the sole discretion of the Government within 180 calendar days from initial task order award. **Note to Government Personnel: this is an OPA funded option.** | 1 | LS | $ *** | $ _____ |
| 0005 | **OPTION NO. 2, Recirculating Range Ventilation System**: Provide and Install Recirculating Range Ventilation System. The base bid includes a 100% purge type system. This CLIN represents the difference in price from the base bid for a recirculating system, as described in Section 01 10 00, paragraph 6.11.4.4. This option may be awarded at the sole discretion of the Government within 30 calendar days from initial task order award. **Note to Government Personnel: this is an MCA funded option.** | 1 | LS | $ *** | $ _____ |

| | | | | | |
|---|---|---|---|---|---|
| 0006 | **OPTION NO. 3, Geothermal:** Provide and incorporate a ground source heat pump (geothermal) system into heating and cooling systems for the Administrative and Support Spaces and the In-Floor Radiant heat system in the Firing Range Area, as described in Section 01 10 00, paragraph 6.11.4.5. This CLIN represents the difference in price for a geothermal heating and cooling system in lieu of the system included in the base bid. This option may be awarded at the sole discretion of the Government within 30 calendar days from initial task order award. **Note to Government Personnel: this is an MCA funded option.** | 1 | LS | $ *** | $ _____ |

**TOTAL OPTIONS** **$** _____

**TOTAL OFFER (BASE + ALL OPTIONS)** **$** _____

**PROPOSED CONTRACT DURATION (CALENDAR DAYS FROM NOTICE TO PROCEED). The maximum acceptable duration is 540 Calendar Days; award of any or all options will not increase the contract duration.** _____**Days**

**SECTION 00 22 30 (IDIQ)**
REV 2.9 – 31 MAY 2010 Task Order Specific

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7.6. NOT USED

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## 1.0 OVERVIEW

1.1. This is a "Best Value" solicitation for the Design and Construction of an Indoor Range 1BCT located at Fort Drum, NY. The Government will evaluate the proposals in accordance with the criteria described herein, and award a firm fixed price task order to the responsible firm, whose proposal conforms with all the terms and conditions of the solicitation and whose proposal is determined to represent the overall best value to the Government.

General Description of Work: This project consists of a single story All Weather Marksmanship Facility (Indoor Range) at Fort Drum, NY. The project includes an indoor firing range with ten lanes of 25 meters each, an observation/control area, office, telecommunications room, storage areas, two classrooms, ammunition/weapons temporary storage, latrines, mechanical/electrical spaces and a waiting area. The project also includes grading, support utilities, entry drive, parking lot, service road and landscaping.

## 2.0 BASIS OF AWARD

2.1. The Contracting Officer will award a firm fixed-price task order to that responsible Firm whose proposal the Task Order Selection Authority has determined conforms to the solicitation, is fair and reasonable, and offers the best overall value to the Government, considering all non-price factors described herein, and price. **All evaluation factors, other than price, when combined, are considered significantly more important than the price.** The intent of this solicitation is to obtain the best proposal within the cost target. There is no obligation to approach or match the cost target in the offer. After the Government individually evaluates and rates each proposal, the Contracting Officer/Task Order Selection Authority will compare proposals to determine which proposal represents the best value. The Government reserves the right to accept other than the lowest priced offer or to reject all offers. The Government will not award a contract to a Firm whose proposal contains a deficiency, as defined in FAR 15.001. If there is a lower priced, conforming offer(s), the Contracting Officer must determine that the added value of a more expensive proposal would justify award to that firm.

2.2. As part of the evaluation, the Government will evaluate betterments in proposals relative to the minimum standards in the RFP to determine if they offer additional value to the Government. In addition, innovations in proposals will be evaluated to determine if creative ideas of the Firm are a better value to the Government compared to the minimum criteria.

## 3.0 GENERAL INSTRUCTIONS

3.1. Submit proposals initially on the most favorable terms from a price and technical standpoint. Do not assume that firms will be contacted or afforded an opportunity to clarify, discuss or revise their proposals. Submit proposals in tabbed, three-ring binders. Note that the Government will not evaluate any material that exceeds the page limits, where indicated below.

## 4.0 PROPOSAL CONTENTS AND RELATED EVALUATION FACTORS AND SUBFACTORS

### VOLUME 1 – DESIGN TECHNICAL

| Factor/Sub Factor | Location | Description | Relative Importance |
|---|---|---|---|
| **FACTOR 1** | | DESIGN TECHNICAL | Most Important Factor |
| **Subfactor 1** | Vol. 1 TAB A | Building Functional and Aesthetics | Equally important with Subfactor 2 |
| **Subfactor 2** | Vol. 1 TAB B | Quality of Building Systems and Materials | Equally Important with Subfactor 1 |
| **Subfactor 3** | Vol. 1 TAB C | Site Design | 3rd Most Important Subfactor (less important than Subfactors 1 and 2, which are equal in importance.) |

| Factor/Sub Factor | Location | Description | Relative Importance |
|---|---|---|---|
| **Subfactor 4** | Vol. 1 TAB D | Sustainability Requirements | 4th Most Important Subfactor (less important than Subfactor 3) |

**VOLUME 2 –PERFORMANCE CAPABILITY**

| Factor/Sub Factor | Location | Description | Relative Importance |
|---|---|---|---|
| **FACTOR 2** | | PERFORMANCE CAPABILITY | 2nd Most Important Factor (less important than Factor 1) |
| **Subfactor 1** | Vol. 2 TAB A | Proposed Contract Duration and Summary Schedule | 2nd Most Important Subfactor ( less important than Subfactor 2) |
| **Subfactor 2** | Vol. 2 TAB B | Key Subcontractors | Most Important Subfactor |
| **Subfactor 3** | Vol. 2 TAB C | Past Performance | 2nd Most Important Subfactor (equally important as Subfactor 1) |

**VOLUME 3 – PRICE AND PRO FORMA INFORMATION**

| Factor/Sub Factor | Location | Description | Relative Importance |
|---|---|---|---|
| **FACTOR 3** | Vol. 3 TAB A | Price (Standard Form 1442 and Proposal Bid Schedules) | All evaluation factors, other than price, when combined, are considered significantly more important than the price |
| **N/A** | Vol. 3 TAB B | Bid Guarantee | Not Rated |
| **N/A** | Vol. 3 TAB C | Required Pre-Award Information | Not Rated |

## 5.0 VOLUME 1 – FACTOR 1 – DESIGN-TECHNICAL

5.1. GENERAL: The design-technical Factor consists of conceptual level presentation drawings, technical approach narratives and information regarding material and system quality. It must clearly define the proposed scope and quality levels that the design-build team is offering to the Government in enough detail for the Government and the Firm to mutually understand whether or not the proposal meets or exceeds the minimum Solicitation requirements. **The use of BIM to prepare or submit proposals is NOT required. Fully developed drawings, details, or specifications are not required or desired. Unless, specifically stated, herein, the Government will not be performing a detailed engineering analysis or design review at the proposal stage.** The intent during the proposal submission and review process is not to require detailed design effort or to perform a detailed design engineering review but to focus on the proposed quality levels of materials and systems If the Government evaluators have actual knowledge or strong suspicion that a proposed product or solution is inappropriately sized, being used in the wrong application or otherwise does not meet the contract requirements, the Government will inform the proposer in the event that discussions are conducted with the firm. But the Government is not asking for design analyses in the proposal and is not obligated to perform an engineering design review at this stage. After, award, In the event of conflict between the contractor's accepted proposal and the requirements in the final, amended RFP, the order of precedence is indicated in Special Contract Requirement 1.2, DESIGN/BUILD CONTRACT – ORDER OF PRECEDENCE. The Firm shall identify what it considers to be Betterments in its proposal for Subfactors 1-3 (See Section 00 73 00, SCR "Proposed Betterments").Note that the Government will not evaluate any material that exceeds the page limits, where indicated below. The final design

must comply with the RFP requirements except that accepted betterments become the new contract minimum requirements.

5.2. VOLUME 1 - TAB A –SUBFACTOR 1 – BUILDING FUNCTIONAL, AESTHETICS AND SPACE

5.2.1. **Submission Requirements:**

5.2.1.1. **Presentation Drawings:**

(a) Exterior Elevations of each facility clearly noting proposed materials and colors.

(b) At least one (1) Exterior Perspective Rendering (may be CADD rendering) for each facility type included in the contract.

(c) At least one building section demonstrating typical exterior wall sections, typical exterior construction materials, finished floor elevations, and ceiling heights.

NOTE: The Government will use this information to evaluate functional and aesthetic considerations ,such as floor to ceiling heights and may use it to help evaluate exterior aesthetics and appearance. The Government may also use this information in conjunction with the submission information under the subfactor: QUALITY OF BUILDING SYSTEMS AND MATERIALS, below, to evaluate quality of wall finishes as well as looking at how the proposer has considered air barrier . **The Government is NOT evaluating the structural system or solution.**

(d) Schematic floor plans for each floor of each facility. Not necessary if the Government provides the floor plans in the solicitation and the proposer proposes to use them, without change. In that event, the proposer must clearly acknowledge that it will provide the floor plan without change. If the proposer intends to change any Government provided floor plan, it must clearly identify any and all proposed changes to the floor plans, either on a floor plan or in a narrative.

(e) A color board including primary interior and exterior finish materials.

5.2.1.2. **Technical Approach Narratives**

Provide technical approach narratives, both qualitative and quantitative, defining the elements of the proposal. Preface the narratives with a design concepts narrative, providing the design rationale and basis of the proposal.

(a) Minimum Space and Facility Size. Describe the spaces provided for each facility, in accordance with Section 01 10 00, ***Statement of Work***. As a minimum, include a tabulation of the net square footage for rooms, zones, or other areas, the total gross square footage for each floor of each facility, and the total gross square footage for each facility to clearly demonstrate compliance with the project requirements. See the sample spreadsheets at the end of this section attachments 8 and 9.

(b) Architectural Theme and Materials. This narrative shall be no longer than three (3) typewritten pages. Describe the architectural themes of the various facilities and spaces which demonstrate how the proposal achieves the results desired by the ***Statement of Work.*** Narrative should address how the selection of materials and colors enhances the exterior and interior aesthetics of the facilities and improves the living and/or working conditions for the soldier populations who will utilize the facilities. This narrative is not intended to be a material listing, but to explain/reflect how the selections were made and how they address the requirements.

5.2.2. **Evaluation Criteria:**

The following three areas are equal in importance.

5.2.2.1. **Building Functional Arrangement**: This subfactor considers the overall functional layout (Floor Plan) and interaction of the spaces in the facilities as well. This subfactor considers the planning and design of the spaces with respect to soldier working conditions and the operations of the facility.

The following criteria will be considered in the evaluation of the functional arrangement of the various facilities:

(a) How well the floor plan responds to the Functional Relationship requirements described in the ***Statement of Work***

(b) How well the floor plan and space arrangement facilitate work flow and access necessary to successfully operate this facility in accordance with its mission.

(c) Do the facilities provide acceptable life safety and fire safety measures?

(d) Do the proposed plans demonstrate compliance with the mandatory requirements for circulation, furnishings (e.g., for UEPH's, will the required furniture fit in the rooms?), equipment, and other specifically identified items in the ***Statement of Work***?

5.2.2.2. **Building Aesthetics:** This element considers the overall "appeal" of the facility and the desire that both the interior and exterior of the facilities present a professional, attractive appearance. The following two areas will be considered under this element and are equal in consideration (not separately rated):

(a) Exterior Considerations:

To the extent possible within the government identified contract cost target, the proposal must comply with the look and feel of the Installation architectural theme identified in the Request for Proposals. The first priority in order of importance is how well the proposal provides comparable building mass, size, height, and configuration in comparison with the architectural theme expressed in the Solicitation. The second priority in order of importance is how well the proposal provides compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching the architectural theme expressed in the Solicitation.

- Proposals shall be evaluated on mass, size, height, and configuration in comparison with the architectural theme expressed in the Solicitation, design of facades, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, architectural character (period or style), exterior color schemes.
- How compatible is the proposed design with the installation architectural theme expressed in the RFP? If not an exact "copy" of the theme, how well does it harmonize or blend with the expressed theme?
- How well does the proposal provide comparable building mass, size, height, and configuration in comparison with the architectural theme expressed in the Solicitation?
- How well does the proposal provide compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching the architectural theme expressed in the Solicitation?
- Is the building's scale and proportion complimentary of the adjacent structures?
- Is the building an attractive addition to the Installation?
- How well does the building harmonize with its environment, including surrounding facilities?
- Has the proposer addressed/coordinated the arrangement of stacks, louvers, vents, and roof mounted equipment, etc. to provide a visually attractive structure?

(b) Interior Considerations:

- Are the proposed colors and material finishes conducive to the working environment of the facility?
- For administrative areas, does the interior design provided establish a positive working environment?
- Has the proposal addressed/provided for natural and artificial light in the living and working spaces and is the arrangement of fenestration and lighting fixtures in the spaces conducive to furniture placement and space usage?
- Do the proposed ceiling material, elevation, and design enhance the environment?
- Has "support item" placement been considered and addressed in the proposal to enhance the environment? For example: placement of supply/exhaust devices, placement of electrical panels, placement of exhaust fans, etc.
- Does the proposal provide for acoustic control of noise from service/support spaces to administrative areas?

5.2.2.3. **Minimum Space and Facility Size**

The proposal must include all the mandatory spaces in response to the requirements set forth in Section 01 10 00, ***Statement of Work***. Proposals will be evaluated on compliance with these requirements. Proposals shall identify any individual areas which are less than the required areas and describe how such deviation would enhance the building function. Individual areas may slightly exceed the requirements, so long as building function is not compromised elsewhere and as long as the overall square footage is not greater than that as described in Section 01 10 00, as authorized by Congress

5.3. VOLUME 1- TAB B – SUBFACTOR 2 - QUALITY OF BUILDING SYSTEMS AND MATERIALS

5.3.1. **General.** As part of this Subfactor, the Government has identified certain items as desirable features or preferable items. Desirable features are identified below in the evaluation criteria. Preferable items are listed in order of priority, These items, along with any proposer-identified betterment, will be given additional consideration

during the evaluation process, provided that they are included within the contract cost target identified in the Solicitation.

1. Use transpired solar air collector systems (solar walls) to pre-heat intake air.

5.3.2. **Submission Requirements:**

5.3.2.1. **Presentation Drawings**

(a) At a minimum, the firm must provide a concept level drawing of the firing range mechanical ventilation system. The firm has the option of providing concept level drawing information for other specific materials and/or systems which the firm feels are necessary to describe the proposed systems or materials.

5.3.2.2. **Technical Approach Narratives:**

Provide technical approach narratives, both qualitative and quantitative, defining the elements of the proposal. It is acceptable to include all the sub-items shown below into a single combined narrative for the entire facility. It is the responsibility of the proposer to ensure that all aspects identified in the evaluation criteria below are addressed. Whether individual narratives or a single combined narrative is provided, the maximum length for all narratives combined shall be fifteen (15) pages total.

(a) Architectural Finishes:

(1) For the overall building, describe how the materials selected provide for a suitable environment for the expected population of the facility. Discuss how these selections provide value to the Government and how they address the minimum requirements of the solicitation. Narrative should focus on aesthetics, durability and maintenance of the finishes proposed.

(2) For the firing range area, specifically address how the selected materials provide ease of cleaning of the firing range area. Demonstrate an understanding of the requirements for the ballistics envelope. Identify materials to be used for the range safety ceiling and baffles. Describe the range noise control strategy, including identification of acoustic panels and how those selections are appropriate for ease of cleaning, noise control, and minimizing dust accumulation.

(b) Bullet Trap: Demonstrating an understanding of the design and construction challenges associated with indoor small arms range bullet capturing. Identify the bullet trap system, including accessories, and describe how the trap will safely and effectively contain the anticipated rounds. Describe how the selected bullet trap minimizes the maintenance requirements, and placement of the trap within the range provides proper access to complete the maintenance tasks.

(c) Mechanical Systems:

(1) For the facility in general, describe how the mechanical systems selected provide for a highly efficient environmental control system including information about provisions for indoor air quality maintenance. Discuss how these selections provide value to the Government and how they address the minimum requirements of the solicitation. Narrative should focus on maintenance considerations, limiting energy consumption, and suitability of the proposed systems for the expected usage.

(2) For the firing range, demonstrate an understanding of the design and construction challenges associated with indoor small arms range ventilation. Describe the key system components, including at a minimum the radial diffuser, exhaust components and locations, sensors and contaminant monitoring devices, energy recovery devices, filter types and locations, and DDC control system. Discuss the method of achieving and ensuring negative pressure in the range area. Discuss how the range ventilation system interfaces with the overall building systems and means of ensuring that access through the range air lock vestibule minimizes disturbance to the range ventilation system. Discuss routine maintenance requirements and how these selections maximize ease of maintenance and reliability of the system. Explicitly acknowledge the requirements for required pressure, velocity, laminar flow, and the contractor's responsibility to test, adjust, and balance the system to achieve the required results.

(3) Describe the approaches for the base bid mechanical systems and optional bid item systems, separately.

(d) Plumbing Systems: Describe how the plumbing systems selected provide for a highly efficient domestic hot water system and an efficient piping system. Discuss how these selections provide value to the Government and how they address the minimum requirements of the solicitation. Narrative should focus on maintenance considerations, energy consumption, and suitability of the proposed systems for the expected usage.

(e) Electrical Systems: Describe how the electrical power and lighting systems, telephone, data, and cable television systems selected provide for a highly efficient electrical system. Discuss how these selections provide value to the Government and how they address the minimum requirements of the solicitation. Narrative should focus on maintenance considerations, energy consumption, and suitability of the proposed systems for the expected usage (give specific consideration to the range lighting and control requirements).

(f) ATFP Considerations: Describe how the proposed materials, systems, and designs address the mandatory building ATFP requirements included in the Statement of Work.

(g) Site Utilities and Site Systems: Describe how the site utility systems selected provide for an efficient piping system. Discuss how these selections provide value to the Government and how they address the minimum requirements of the solicitation. Narrative should focus on maintenance considerations and suitability of the proposed systems for the expected usage. Include information regarding coordination with privatized utility providers where applicable.

(h) Interoperability: Describe how systems integrated into the new facilities which require connection and interface with existing Installation wide systems will be accommodated in the proposed project. Narrative should address the following systems as minimum: Fire Alarm, Telephone, Cable Television, UMCS, and privatized utility companies where applicable.

5.3.2.3. **Proposed Material Identifications:** In order to evaluate and rate the quality of the materials being proposed, including any material or equipment warranties exceeding the one year warranty in the contract clause "Warranty of Construction", the Firm shall include in the proposal material identification for major materials in each of the areas shown below. Provide this information in tabular form supported, if necessary to clearly identify level of proposed quality, by catalog information (may provide on CD-ROM). Table should include manufacturer's name, model number if known or at least model series, length of warranty, size/capacity (where available), efficiency (where applicable), and any other notes or information selected by the Firm. The Government will evaluate and consider materials and equipment proposed by brand name and model series or number as a quality standard. Unless substitution of a manufacturer, brand name or model is otherwise specifically prohibited in the contract, if the successful Firm desires to substitute manufacturers, brand names or models after award, the substituted product must meet the contract requirements and be approved by the designer of record and the Government as equal in function, performance, quality and salient features to that initially proposed. Acceptance of the proposal is not a guaranty that the proposed products meet the contractual requirements.

(a) Architectural Finishes

- Interior Walls
- Floors
- Ceilings
- Exterior Walls
- Any Special Features
- Hardware systems (not individual hardware sets)
- Door systems/types (not individual doors)
- Window systems/types (not individual windows)
- Roofing Systems

(b) Bullet Trap

(c) Mechanical Systems

- Central Heating/Cooling Equipment
- Pumps
- Air Handling Equipment
- HVAC System Control Equipment
- Energy Conservation Features
- Sensors and Contaminant Monitoring Devices

(d) Plumbing Systems

- Fixtures

(e) Electrical Systems

- Lighting Fixtures
- Data, Telephone, Cable TV, Intercom, CCTV, or Other Special Systems as Identified in the SOW

5.3.2.4. Provide a list of quality improvements that are above the minimum stated with the performance specifications. Develop the following table, or similar, to identify quality betterments.

| | Improved Quality | Concise description of improved quality | Feature is included within the Construction Cost Target – YES/NO |
|---|---|---|---|
| **Arch. Finishes** | | | |
| **Etc.** | | | |

5.3.3. **Evaluation Criteria:**

5.3.3.1. **General:** It is the Army's objective that these buildings will have a 25-year useful design life before a possible reuse/repurpose or renovation requirement, to include normal sustainment, restoration, modernization activities and a 50-year building replacement life. Within that overriding theme the Government will evaluate the firm selected systems and components proposed in terms of extended warranties provided, maintenance considerations (frequency, estimated cost, access, equipment locations), operability (ease of use, placement of control features, simplicity), durability (withstand troop usage, ease of cleaning), sustainability, and energy consumption (HVAC, lighting, power). The minimum acceptable level of quality for finishes and materials for these buildings are those materials suitable for the expected population and usage. Residential or similar grade finishes and materials are not acceptable for inclusion in these buildings, unless otherwise specifically stated as allowed in Section 01 10 00. Acceptance of the proposal is not a guaranty that the proposed products meet the contractual requirements or that they are the appropriate size or application for the design which will be developed after award. The intent during the proposal submission and review process is not to require detailed design effort or to perform a detailed design engineering review but to focus on the proposed quality levels of materials and systems If the Government evaluators have actual knowledge or strong suspicion that a proposed product or solution is inappropriately sized, being used in the wrong application or otherwise won't meet the contract requirements, the Government will inform the proposer in the event that discussions are conducted with the firm. But the Government is not asking for design analyses in the proposal and is not obligated to perform an engineering design review at this stage. After award, In the event of conflict between the contractor's accepted proposal and the requirements in the final, amended RFP, the order of precedence is indicated in Special Contract Requirement 1.2, DESIGN/BUILD CONTRACT – ORDER OF PRECEDENCE.

5.3.3.2. The Government encourages the Firm to place emphasis on those design features which optimize and emphasize functional/operational requirements; interior/exterior finishes and systems; life cycle/ energy efficiency, and address the engineering considerations for the climate at the project location. The Firm may choose the lowest "Type of Construction" allowed by the Building Code for this occupancy/project and put the money into durable finishes and efficient systems. **The features that the Government has identified below as desirable features will be given additional consideration in the evaluation. The items that the Government identified in paragraph 5.3.1 as preferable will be also be given additional consideration during the evaluation process, provided that they are included within the contract cost target identified in the Solicitation. Proposer-identified betterments may also be given additional consideration during the evaluation process, provided that they are included within the contract cost target identified in the solicitation**. The order of importance for proposed betterments for rating purposes is as follows: desirable features, preferable items and other Proposer identified betterments. Unsubstantiated claims or narrative information will not be given evaluation credit during the evaluations. The following elements (not rated separately) will be considered in the evaluation of the building systems and materials of the various facilities:

(a) Architectural Finishes, Components and Systems:

Acceptable proposals include finishes, components and systems which provide usable spaces for the intended purposes and that provide the basic function necessary. Proposals will receive additional consideration for materials, and systems offered that include extended warranties, longer life expectancies, sustainability, durability (stand up to troop usage), have low maintenance requirements, and enhance the overall life cycle cost efficiency of the facility.

(b) Bullet Trap:

Acceptable proposals include system from a commercial bullet-trap manufacturer ensuring safe containment of live-fire pistol ammunition though 0.45 caliber and automatic rifle ammunition up to 7.62 mm, meeting the requirements described in Section 01 10 00.

Specific examples of desirable features: exceed the containment capability minimum requirements (ability to contain larger/higher energy rounds). Include anti-adhesion coating for granular rubber.

(c) Mechanical Components and Systems:

Acceptable proposals include components and systems that provide the basic environmental control function necessary and meet the requirements for range ventilation. Proposals will receive additional consideration for components and systems offered that include extended warranties, better reliability, longer life expectancies, reduce energy consumption, sustainability, maintainability (cyclical maintenance, access, equipment placement), and enhance the overall life cycle cost efficiency of the facility.

Specific examples of desirable features: sheet metal ductwork systems; high efficiency central equipment (i.e. 0.5 kW/ton chillers, variable speed pumping and air handlers, etc.)

(d) Plumbing Components and Systems:

Acceptable proposals include components and systems that provide the basic function necessary. Proposals will receive additional consideration for components and systems offered that include extended warranties, longer life expectancies, sustainability, durability (stand up to troop usage), have low maintenance requirements, and enhance the overall life cycle cost efficiency of the facility.

Specific examples of desirable features: lifetime domestic hot water storage tank warranty; high efficiency equipment; easy/local availability of replacement/repair parts; zoned/valved sub-systems to allow repair without building shutdown; shower heads on hoses

(e) Electrical Components and Systems:

Acceptable proposals include components and systems that provide the basic function necessary. Proposals will receive additional consideration for components and systems offered that include extended warranties, longer life expectancies, sustainability, durability (stand up to troop usage), have low maintenance requirements, and enhance the overall life cycle cost efficiency of the facility.

Specific examples of desirable features: all copper conductors; additional telephone/data/cable TV outlets

(f) ATFP Considerations: This consideration verifies the inclusion/compliance with the building related (laminate windows, design for progressive collapse, etc.) ATFP minimum standard constraints included in the Statement of Work. All proposals must be compliant with the ATFP requirements of the Statement of Work to be considered for award. Acceptable proposals are compliant with all ATFP requirements. Acceptance of the successful proposal does not constitute acceptance of a design that does not conform to ATFP requirements. Final designs must comply with the ATFP requirements.

(g) Site Utilities Components and Site Systems:

Acceptable proposals include components and systems that provide the basic function necessary. Proposals will receive additional consideration for components and systems offered that include extended warranties, longer life expectancies, sustainability considerations, have low maintenance requirements, and enhance the overall life cycle cost efficiency of the facility.

Specific examples of desirable features: enhanced parking/roadway construction/surfaces; sidewalks above the minimum size and construction required; corrosion resistance; valves for isolation/repair of fluid systems;

placement to allow future replacement/maintenance without significant impact to other systems or access to facilities.

(h) Interoperability: Fire Alarm, Telephone, Cable Television, UMCS, and privatized utility systems (where applicable) must be integrated into the new facilities which require connection and interface with existing installation-wide systems must be accommodated in the proposed project.

5.4. VOLUME 1 - TAB C – SUBFACTOR 3 – SITE DESIGN

5.4.1. **Submission Requirements:**

5.4.1.1. **Presentation Drawings:**

(a) Schematic/Conceptual Site Plans showing site improvements for drainage, buildings, paving, walks, and landscaping. Indicate all building setbacks and separations, which must meet antiterrorism design requirements. Delineate vehicle circulation and pedestrian access to allow evaluation of the integration of this new development into the existing surrounding infrastructure. Select the format of the drawings provided to best illustrate compliance with the requirements of the Statement of Work.

5.4.1.2. **Technical Approach Narrative:**

Provide technical approach narrative, both qualitative and quantitative, defining the elements of the proposal. The narrative may include simple sketches or drawings to help illustrate the Proposer's solutions to the Statement of Work Requirements. Begin the narrative with a preface concerning the design concepts. It is acceptable to include all the sub-items shown below into a single combined narrative for the entire project. It is the responsibility of the proposer to ensure that all aspects identified in the evaluation criteria below are addressed. Whether individual narratives or a single combined narrative is provided, the maximum total length for narratives shall be ten (10) typewritten pages.

(a) Grading

- Cut/Fill Considerations

(b) Landscaping

- Plant Material Selection
- Other Feature Selection
- Site Lighting Considerations

(c) Pedestrian Circulation

- Development of Circulation Patterns
- Way Finding Between Facilities
- Separation from Vehicular Circulation

(d) Vehicle Circulation

- Development of Circulation Patterns
- Parking Locations and Quantities
- Interface with Existing Street/Roadway Systems

(e) Anti-Terrorism/Force Protection

- Compliance with the *Statement of Work* Requirements.

5.4.2. **Evaluation Criteria:**

5.4.2.1. This Subfactor considers the overall layout of the site and the various specialties which define a workable, pleasing environment for the soldiers. The proposed site development plan must incorporate all the specific requirements from the *Statement of Work* as well as comply with all statutory and regulatory requirements outlined therein. All site related Anti-Terrorism/Force Protection (ATFP) considerations must be included and/or addressed in the proposal.

Elements one (1) and two (2) below are equal in importance and are not separately rated. Element (3) is not separately rated but must meet the Solicitation requirements to be rated acceptable.

**(1) Grading and Landscaping:** Acceptable proposals include reasonable amounts of cut/fill and regarding as necessary to ensure proper drainage and positive drainage away from facilities and parking areas. Landscaping provided would be the minimums required by the *Statement of Work.* Proposals which include innovative solutions to storm water management, landscaping to enhance the complex environment, or other similar improvements beyond the basic requirements will receive additional consideration during the proposal evaluation process.

**(2) Pedestrian and Vehicle Circulation and Storage:** Acceptable proposals address and include all the specific requirements of the Statement of Work.

The following items will be considered with respect to pedestrian and vehicle circulation and storage. These are not sub-factors.

Pedestrian Considerations:

- Are all parking areas served by sidewalks?
- Are all facility entrances/exits served by a paved sidewalk system?
- Does the proposed sidewalk system provide direct, convenient access to all facilities?
- Is the new sidewalk system an extension of the existing adjacent sidewalk system?
- Are sidewalk systems enhanced by appropriate landscaping?

Vehicle Considerations:

- Are the vehicle entrance/exit ways pathways clear?
- Have a sufficient number of parking spaces for privately owned vehicles (POV) been provided?
- Do the new vehicle roadways and access points tie into the existing roadway network in an efficient manner?
- Does the proposal provide for a separation of parking area entrance/exits from street intersections?
- Internal circulation patterns within the parking areas.

**(3) ATFP Considerations**: This element verifies the inclusion/compliance with the site related (setbacks, etc.) ATFP constraints included in the ***Statement of Work***. All proposals must be compliant with the ATFP requirements of the ***Statement of Work*** to be considered for award. Acceptable proposals are compliant with all ATFP requirements. Acceptance of the successful proposal does not constitute acceptance of design that does not conform to ATFP requirements. The final design must comply with the ATFP requirements.

5.5. VOLUME 1 - TAB D – SUBFACTOR 4 – SUSTAINABILITY REQUIREMENTS

5.5.1. **Submission Requirements:**

The Firm shall acknowledge that it understands the contract requirements for sustainable design and construction and that the final project will achieve at a minimum a LEED Silver rating, and shall be certified by the Green Building Certification Institute (GBCI). The Firm shall submit LEED-NC v3 Project Checklist for each facility demonstrating how it will achieve the minimum Silver LEED rating. One checklist may be provided for multiple identical facilities. Firms proposing to achieve higher levels of certification such as Gold or Platinum will receive additional consideration. The firm shall specifically address its strategy for EA Credit 1, Optimize Energy Performance.

5.5.2. **Evaluation Criteria:**

All requirements identified as mandatory in Section 01 10 00 or elsewhere in the Solicitation must be included and the proposal must meet the requirements of the LEED v3 for a minimum Silver rating. The Government will provide additional evaluation consideration for proposals which include LEED points identified as preferred, and for proposals for higher certification levels (Gold or Platinum).

**6.0 VOLUME 2 - FACTOR 2 – PERFORMANCE CAPABILITY VOLUME 2**

6.1. VOLUME 2 - TAB A – SUBFACTOR 1– PROPOSED CONTRACT DURATION AND SUMMARY SCHEDULE

6.1.1. **Submission Requirements:**

6.1.1.1. The firm shall propose the contract duration in the appropriate line on the CLIN Schedule, not to exceed the maximum contract duration specified on the CLIN Schedule.

6.1.1.2. Submit a summary level schedule for integrated design and construction. Schedules or diagrams may be provided separately in a size that is easily read, but shall be bound and clearly labeled as Tab B. This summary schedule will, after contract award, be replaced with a project schedule as required by Section 01 32 01.00 10: *Project Schedule*. The summary schedule shall be task oriented, indicating the number of calendar days, after notice to proceed, by which milestones are to be achieved. Firm may use a critical path or other method of his choice; however, schedules shall be graphically represented. The proposed project schedule shall reflect the proposed contract duration. Give attention to the following features:

(a) Provide a narrative, describing the design packaging plan for separate design packages, based on the firm's plan for fast tracking. Describe all design and construction to be "fast-tracked" (only Site/Utilities may be fast-tracked, see section 01 33 16: ***Design After Award***). If long lead item equipment must be ordered prior to completion of a design phase, describe the requirement in the narrative and show the required ordering date in the schedule.

(b) Show the design phase, including events associated with coordinating the interim and final design submittals for each package and the proper handling of the review comments for each design package (See section 01 33 16).

(c) Show the overall construction phase for each facility, for the site work, and for utilities. Show fast track starts for design packages but it isn't necessary to show the detailed breakdown construction (e.g., by trades) of each facility, site work and utilities.

(d) Show turnover of each facility. Identify any proposed phased turnovers. The time to complete the facility and turnover to the Government must consider the requirement for the Contractor's CQC completion inspection and the subsequent joint Contractor-Government turnover inspection. Specifically show the testing, adjusting, and acceptance of the range ventilation system.

(e) Show as-built submissions (See section 01 78 02.00 10).

(f) Constraints**:** Firm must demonstrate the capability and flexibility to plan and schedule the complete project to meet the proposed contract completion period. Clearly identify any constraints on the schedules presented (e.g., labor or material availability, permits, weather, etc.). Indicate the anticipated overall critical path on the schedule.

6.1.2. **Evaluation Criteria:**

6.1.2.1. **Proposed Contract Duration:** This duration will become the contractually binding completion period. The Government will evaluate the contract duration, as proposed by the Firm in the Contract Line Item Schedule, not to exceed the maximum allowed duration of 540 days. In assessing the reasonableness of the proposed contract duration, the Government may take into account how well the proposed summary schedule supports the proposed duration, as well as use other information, such as but not limited to independent judgment concerning logic, constraints and typical construction durations. The Government will rate a proposed contract duration matching the maximum allowed contract duration as "acceptable" A proposed contract duration shorter than the maximum allowed duration will receive additional rating consideration, provided it is realistic and deemed to be achievable. The Government will consider an unreasonably condensed contract duration, which places additional cost or schedule risk on the Government or which may create a risk of contract or performance failure, as a significant weakness or a deficiency, depending upon the evaluators' judgment. During the subsequent comparison between proposals, differences between proposed contract durations of at least three weeks (differences of 21 calendar days between proposals) will be considered an advantage to the Government, with greater differences also considered, accordingly. No advantage will be considered between proposals for differences less than 21 calendar days.

6.1.2.2. **Summary Schedule:** The Government will evaluate the summary schedule for integrated design and construction. The length of the schedule must match the proposed contract duration. If it is shorter than the proposed contract duration, it offers no advantage to the Government because it is non-binding, only representing a preliminary planned schedule. A Schedule shorter than the proposed contract duration may indicate the Firm is placing additional risk on the Government for any delays between the scheduled completion date and the required contract completion period. Both parties shall assume field overhead costs are included in the contract price for the full proposed contract duration. Therefore, the Government believes that there is no valid need to shorten the schedule less than the full proposed contract duration. The Government will evaluate the schedule to assess the

strength of understanding of the project scope, restrictions which must be considered in the schedule e.g., permitting (see Section 01 10 00), long lead items, etc. The Government will evaluate the strength of understanding of events associated with coordinating design submittals, reviews and incorporating review comments, the firm's capability to schedule the complete project within the proposed contract duration and the realism of the schedule. The Government will evaluate the design packaging plan for logic, reasonableness, how it facilitates meeting the proposed contract duration and how it facilitates the Government's ability to timely perform its design reviews. The packaging plan should minimize risk to the Contractor and to the Government for tear-out and coordination for reviews. For example, is the footing and foundation plan based on adequate design for building loads; etc.? A schedule that offers advantage(s) to the Government over one that merely indicates an adequate understanding of the scope, restrictions, major milestones and general understanding of the various events that can affect start and completion of construction will receive additional consideration.

6.2. VOLUME 2 - TAB B– SUBFACTOR 2– KEY SUBCONTRACTORS

6.2.1. **Submission Requirements:**

Identify the Key Subcontractor chosen for Range Ventilation for this task order, describing the extent of their involvement in the project. Submit no more than five (5) Specialized Experience forms (attachment 10) for each Key Subcontractor, using the same requirements as described in the base MATOC Specialized Experience submission requirements, including past performance ratings. The ratings may be from either the owner or the prime contractor, if the firms were subcontractors on the cited projects. The Firm shall document unequivocal teaming arrangements with its key subcontractors. Use the Letter of Commitment (attachment 11) at the end of this section.

Separate Experience Narrative shall be included for the Range Ventilation Contractor (RVC) demonstrating experience with indoor small arms range ventilation systems. The RVC shall be responsible for mechanical systems to include ventilation of the firing range area. (Ventilation for the Office, Classroom, and all other spaces may be designed by the Project Mechanical Engineer, provided that the Offeror describes how the systems shall be effectively interfaced and its plan for effective coordination between the designers) The sub-contractor providing the range ventilation systems shall have experience in both design and construction of ventilation systems meeting NIOSH and Navy Environmental Health Center Technical Manual NEHC-TM6290.99-10 Rev.1 requirements or similar to those included in this project and specifically, providing ventilation for multi-lane ranges having an air flow averaging 70 to 80 fpm when measured at each firing location across the width of the firing line, with no reading less than 50 fpm and maintaining a negative pressure of -0.04 (+/- 0.02) inches water gauge, with similar controls to those required for this project. The range ventilation sub-contractor shall submit on the Specialized Experience forms at least 3 ranges in operation within the continental United States having at least a 24 foot wide firing line and meeting these requirements. At least one of the projects submitted must include energy recovery. For each range listed, include range location, width, number of lanes, a description of the control system, in-house personnel (including phone number) responsible for the project, name/address of owner, the criteria the range was designed to, and a copy of any air flow testing that documents the ventilation system met the required criteria. The experience pertains to only work which the range ventilation subcontractor has done with in-house personnel currently employed and proposed to perform the work on this project (i.e. work done through sub-contractors does not count.)

6.2.2. Evaluation Criteria:

6.2.2.1. This Subfactor is composed of two equal elements (not separately rated): Specialized Experience and Past Performance.

6.2.2.2. The Government will evaluate the specialized experience and past performance of the Key Subcontractors for Range Ventilation, using the same criteria as in the base MATOC evaluation, as applicable to their role on this project. After award, the section 00 73 00 Special Contract Requirement *Key Personnel, Subcontractors and Outside Consultants* will apply to the selection, which establishes the minimum quality standard. No substitution will be allowed without adequate reason and possible consideration to the Government.

6.3. VOLUME 2 - TAB C– SUBFACTOR 3 – PAST PERFORMANCE

6.3.1. **Submission Requirements:**

There are no specific submission requirements for this subfactor.

6.3.2. **Evaluation Criteria:**

The Government will evaluate the firm's current performance on on-going task orders under this contract, if any, as well as the firm's past performance record for contracts or task orders underway or completed within the past three years of the date of the solicitation for this task order. The Government will perform a risk assessment with respect to Past Performance. The Government will consider the currency and relevance of the information, source of the information, context of the data, and general trends in contractor performance. If any firm has multiple functions or divisions, the Government will only evaluate past performance of the division or unit submitting the proposal. If interviews are used, Government references on other task orders or contracts may be asked to comment on items such as quality of design or construction, timeliness, management of the work subcontractor management, including timely payment to subs or suppliers, safety, relations between owner and designer or contractor, level of support for such things as as-built documentation, O&M manuals, training, correcting design or construction errors, warranty work, etc. The Government will not release Past Performance Evaluation or telephone interview forms to the Firm at any time, in order for the Government to solicit candid, unbiased interview comments. The Government also places a higher value on performance, which document successful outcomes and are supported by outside source confirmation, for example, but not limited to CCASS/ACASS or other agency performance databases or personal knowledge. The Government's evaluation is not limited to past performance information on the cited example projects.

Each entity (firm) will be rated on its own performance or that of its predecessor, if relevant. An entity may not establish past performance based on the past performance of proposed key personnel, apart from that of the entity. If the Government does not obtain past performance information and cannot establish a past performance record for the Firm through other sources, past performance will be rated neither favorably nor unfavorably. The performance risk will be considered "unknown".

## 7.0 VOLUME 3 – PRICE AND PRO FORMA INFORMATION

7.1. GENERAL

Submit the Pro Forma information in a separate envelope labeled: "Volume 3 – Pro Forma Requirements."

7.2. TAB A – FACTOR 3 – PRICE (STANDARD FORM 1442 AND CONTRACT LINE ITEM SCHEDULE).

7.2.1. **Submission Requirements:**

Submit the properly filled out and executed SF 1442, along with the CLIN Schedule, containing proposed line item and total pricing, as well as the proposed contract duration. See instructions in Section 00 21 00, *"Instructions to Offerors"*.

7.2.1.1. Supplemental Price Breakdown. If deemed necessary to evaluate the price proposals, the Government's will request a price breakdown of the Contract Line items in a sealed envelope marked "Price Breakdown Information", in Excel format. The Government will provide details on where and how to send the breakdown. This information will not be needed sooner than three working days after the proposal submission due date. This information may be required for the initial Task Order proposal and, if requested, for any revised proposals. This information is not an opportunity for a firm to revise its non-price or price proposal.

7.2.2. **Evaluation Criteria:**

7.2.2.1. Price will not be rated or scored, but will be evaluated for fairness and reasonableness through the use of a price analysis. The price evaluators will also check for appearance of unbalanced line item prices. Firms are cautioned to distribute direct costs, such as material, labor, equipment, subcontracts, etc. and to evenly distribute indirect costs, such as job overhead, home office overhead, bond, etc., to the appropriate contract line items. Both parties shall presume that field overhead costs through the proposed contract duration are inclusive in the offered price for the contract.

7.2.2.2. If deemed necessary, the supplemental price breakdown information will be used to assist the Government in performing the price evaluations described above.

7.2.2.3. Award may not be made for project cost for design and construction exceeding the cost target described herein.

7.3. TAB B – BID GUARANTEE

7.3.1. **Submission Requirements**

Submit the Bid Bond in accordance with the task order request for proposals.

7.3.2. **Evaluation requirements:**

This item is not rated. The Government will review the Bid Bond for legal sufficiency. The Bond must be legally sufficient.

7.4. TAB C – SELF- PERFORMED WORK

7.4.1. **Submission Requirements:**

7.4.1.1. The Firm shall confirm that it understands and that it shall perform the amount of work required to be self-performed, in accordance with the appropriate clause in Section 00 72 00 (see Base ID/IQ contract) that applies to the contract performance (see Base ID/IQ contract Section 00 73 00 for a description of the applicable clause for self-performance of work).

7.4.2. **Evaluation Requirements:**

7.4.2.1. This is a GO/NO-GO requirement. In order to assure adequate interest in and supervision of all work, the Contractor shall be required to perform a significant part of the contract with its own forces. This public policy is expressed in various Statutes, as well as in the Federal Acquisition Regulations and in the Small Business Administration Code of Federal Regulations. The Firm must confirm that it understands the amount of work performed, based on the status of the firm, and that it will self perform the required amount of work with its own forces. This is also a statutory requirement for any set-aside for Small Business or Small Disadvantaged Business or Hubzone firms before contract award can be made.

7.5. NOT USED

7.6. NOT USED

**8.0 EVALUATION PROCEDURES**

8.1. TASK ORDER SELECTION EVALUATION BOARD (TOSEB)

8.1.1. The TOSEB will be established to conduct the evaluation of proposals received in response to this solicitation. The evaluation will be based on the content of the proposal and any subsequent discussions required, as well as information obtained from other sources, e.g. past performance information. The TOSEB will not consider any information incorporated by reference, except as expressly allowed by this solicitation.

8.2. EVALUATION

8.2.1. The TOSEB will evaluate the proposals and assign a consensus rating for each evaluation factor and subfactor, except that performance risk ratings are assigned to past performance (see below).

8.2.2. The Government intends to award without discussions. Firms are cautioned to put forth their best efforts, and to furnish all information clearly to allow the Government to evaluate proposals. Firms should not assume that they will have an opportunity to clarify or correct anything in their proposal after submitting it.

8.2.3. A “Competitive Range” is a subjective determination of the most highly rated proposals in the event that the Government decides that discussions with competing firms are required or are considered to be in the Government’s best interests. In such an event, the Contracting Officer will establish a competitive range of all the most highly rated proposals.

8.2.4. If discussions are held, the Government may engage in a broad give and take with those firms in the competitive range, in accordance with FAR 15.306 (d). The Government will provide the Firm an advance agenda for the discussions. During discussions, the Government may ask the Firm to further explain its proposal and to answer questions about it.

8.2.5. Upon conclusion of discussions, those firms still considered the most highly rated, will be afforded an opportunity to submit their proposal revisions for final evaluation and selection.

8.3. DEFINITIONS

8.3.1. **Deficiency:** A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

8.3.2. **Weakness:** A flaw in the proposal that increases the risk of unsuccessful contract performance

8.3.3. **Significant Weakness:** A flaw in the proposal that appreciably increases the risk of unsuccessful contract performance

8.3.4. **Strength:** Any aspect of a proposal that, when judged against a stated evaluation criterion, enhances the merit of the proposal or increases the probability of successful performance of the contract.

8.3.5. **Significant Strength:** A significant strength appreciably enhances the merit of a proposal or appreciably enhances the probability of successful contract performance.

8.3.6. **Deviation:** Proposal implies or specifically offers a deviation below the specified criteria. The firm may or may not have called the deviation to the Government's attention. **A deviation is a deficiency.** The proposal must conform to the solicitation requirements for award.

8.4. EVALUATION RATING SYSTEM

8.4.1. **General:** The Government will review the proposals and rate the quality of each evaluation factor and subfactor (if any). The TOSEB will rate each proposal against the specified evaluation criteria in the Solicitation requirements. They will not compare proposals at this time. After all proposals are rated, the Government will compare the ratings and relative advantages and disadvantages of proposals against each other.

8.4.2. **Review Write-up**: The Government will support each rating with a narrative, separately listing all strengths or advantages, weaknesses or disadvantages, deficiencies, and required clarifications.

8.4.3. **Rating System**: After listing proposal strengths, weaknesses and deficiencies, the TOSEB will assign an adjective rating of "Excellent", "Good", "Acceptable", "Marginal", "Susceptible to Being Made Acceptable", or "Unacceptable" to each factor and subfactor (except those factors rated as GO/NO-GO), which reflect the Government's confidence in each firm's ability, as demonstrated in its proposal, to perform the requirements stated in the RFP. The adjectival ratings shall be assigned, using the following criteria, which incorporate a proposal risk assessment:

8.4.3.1. **Excellent**: Proposal has exceptional merit and reflects an excellent approach which will clearly result in the superior attainment of all requirements and objectives. This clearly achievable approach includes numerous advantageous characteristics of substance, and essentially no disadvantages, which can be expected to result in outstanding performance. The risk of unsuccessful performance is very low as the proposal solutions which are unquestionably feasible and practical. These solutions are further considered very low risk in that they are exceptionally clear and precise, fully supported, and demonstrate a clear understanding of the requirements. Risk level: Very Low.

8.4.3.2. **Good**: Proposal demonstrates a sound approach which is expected to meet all requirements and objectives. This sound approach includes advantageous characteristics of substance, and few relatively minor disadvantages, which collectively can be expected to result in acceptable performance. The risk of unsuccessful performance is low as the proposal contains solutions which are considered feasible and practical. These solutions

are further considered to be low risk in that they are clear and precise, supported, and demonstrate an understanding of the requirements. Risk level: Low.

8.4.4. **Acceptable:** Proposal demonstrates an approach which is capable of meeting all requirements and objectives. The approach includes both advantageous and disadvantageous characteristics of substance, where the advantages are not outweighed by the disadvantages. Collectively, the advantages and disadvantages are likely to result in acceptable performance. The risk of unsuccessful performance is moderate, as the proposal solutions are generally feasible and practical. These solutions are further considered to reflect moderate risk in that they are somewhat clear and precise, partially supported, and demonstrate a general understanding of the requirements. Risk Level: Moderate.

8.4.5. **Marginal**: The proposal demonstrates an approach which may not be capable of meeting all requirements and objectives. The approach has disadvantages of substance and advantages, if they exist, are outweighed by the disadvantages. Collectively, the advantages and disadvantages are not likely to result in acceptable performance. The risk of unsuccessful performance is high as the proposal contains solutions which may not be feasible and practical. These solutions are further considered to reflect high risk in that that they lack clarity and precision, are generally unsupported, and do not demonstrate a complete understanding of the requirements. Risk Level: High to Very High.

8.4.6. **Susceptible to Being Made Acceptable.** Proposal demonstrates an approach which, as initially proposed, cannot be rated marginal because of error(s), omission(s) or deficiency(cies), which are capable of being corrected without a major rewrite or revision of the proposal. These solutions are further considered to reflect high to very high risk in that they lack clarity and precision, are generally unsupported, and do not demonstrate a complete understanding of the requirements. Risk Level: High to Very High.

8.4.7. **Unacceptable.** The proposal demonstrates an approach which, based on a very high risk, will very likely not be capable of meeting all requirements and objectives. This approach has numerous disadvantages of substance, and advantages, if they exist, are far outweighed by disadvantages. Collectively, the advantages and disadvantages will not result in acceptable performance. The risk of unsuccessful performance is very high as the proposal contains solutions which are not feasible and practical. The solutions are further considered to be very high risk in that they lack any clarity or precision, are unsupported, and do not demonstrate an understanding of the requirement. Risk Level: Very High.

8.5. PAST PERFORMANCE RISK RATINGS

8.5.1. Risk ratings shall be done for each Past Performance factor. Past Performance Risk Ratings assess the risks associated with each firm's likelihood of success in performing the requirements stated in the RFP based on the firm's demonstrated performance on recent contracts. TOSEB members and the SSA may use personal knowledge or information from other sources in its evaluation of an firm’s past performance, provided such information is consistent with the established evaluation criteria of the RFP. Firms that have no relevant performance record will be given a neutral/unknown risk rating for these factors.

8.5.1.1. **Unknown Risk:** Firm has little or no relevant performance record identifiable; equates to an unknown risk rating having no positive or negative evaluation significance.

8.5.1.2. **Low Risk**: Little doubt exists, based upon the Firm’s performance record, that the Firm can perform the proposed effort.

8.5.1.3. **Moderate Risk:** Some doubt exists, based on the Firm's performance record, that the Firm can successfully perform the proposed effort.

8.5.1.4. **High Risk:** Significant doubt exists, based on the Firm's performance record, that the Firm can successfully perform the proposed effort.

**FORMAT FOR TABLE OF FACILITIES**
**SECTION 00 22 30 - ATTACHMENT 8**

| FACILITY (1) | SOLICITATION REQUIREMENTS (2) | | PROPOSAL PROVIDED (3) | | DIFFERENCE (+/-) (4) | | NOTES/REMARKS (5) |
|---|---|---|---|---|---|---|---|
| | Net SF | Gross SF | Net SF | Gross SF | Net SF | Gross SF | |
| | | | | | | | |
| TOTAL INDOOR RANGE | 9,164 | 13,159 | | | | | |

Notes:

(1) Facility column shall identify building, e.g. Dining Facility, TEMF, UEPH, etc. Where different designs are offered for the same overall building type, each different design shall be identified and tabulated separately.

(2) Complete these columns directly from information in the solicitation. If the solicitation is silent on net square feet for a particular facility, leave this blank.

(3) Complete these columns directly from the information in your proposal.

(4) This column represents the mathematical difference between the proposal and the solicitation requirements + differences represent areas above the solicitation requirements and – differences represent areas below the solicitation requirements. Proposers are cautioned that exceeding the statutory limitations on building size will cause a proposal to be considered non-compliant.

(5) This column is provided to allow the proposers to place additional relevant information with respect to building area.

**FORMAT FOR TABLE OF SPACES**
**SECTION 00 22 30 - ATTACHMENT 9**

**FACILITY: INDOOR RANGE**

| SPACE DESIGNATION (1) | SOLICITATION REQUIREMENTS MIN REQUIRED (2) NSF | PROPOSAL PROVIDED (3) NSF | DIFFERENCE (+/-) (4) NSF | NOTES/REMARKS (5) |
|---|---|---|---|---|
| Classroom 1 | 870 | | | |
| Classroom 2 | 870 | | | |
| Men's Bathroom | 200 | | | |
| Women's Bathroom | 65 | | | |
| Janitor's Closet | 25 | | | |
| Telecommunications Room | 150 | | | |
| Office | 180 | | | |
| Storage | 80 | | | |
| Ammo/Weapons Storage | 300 | | | |
| Control Room | 100 | | | |
| Airlock | 86 | | | |
| Range Storage | 28 | | | |
| Firing Range Area | 6,100 | | | |
| Range Shower | 55 | | | |
| Mech. Rm. Shower | 55 | | | |
| TOTAL | 9,164 | | | |

Notes:

(1) The proposer shall list all spaces within the identified facility in this column.

(2) The proposer shall complete this column by taking the information directly from the solicitation ***Statement of Work***. Where a particular space does not have a specific solicitation requirement, this column may be left blank.

(3) The proposer shall complete this column directly from the information contained in the proposal.

(4) This column represents the mathematical difference between the proposal and the solicitation requirements. + differences represent areas above the solicitation requirements and – differences represent areas below the solicitation requirements.

(5) This column is provided to allow the proposers to place additional relevant information with respect to spaces provided.

(6) Where multiple facilities of the same type (e.g. Dining Facility, UEPH, etc) are included in a single contract, each facility shall be identified in a separate table.

**COMPANY SPECIALIZED EXPERIENCE**
**KEY SUBCONTRACTOR (OR PRIME IF WORK NOT TO BE SUBCONTRACTED)**
**SECTION 00 22 30 - ATTACHMENT 10**

Provide the following information to show examples of projects your company constructed within the last **five** years indicating experience with projects of similar type and scope. Use one form per project.

(a) Type of Facility Represented _____

(b) Your Firm's Name _____

(c) Name of project _____

(d) Owner _____

(e) General Scope of Construction Project _____

_____

_____

(f) Your Role (Prime, Joint Venture, or Subcontractor, etc.) and Work Your Company Self-Performed :

_____

_____

(g) Your Contract or Subcontract Amount _____

(h) Detailed Description of Your Self-Performed Work _____

_____

(i) Describe any Work You Subcontract to Others _____

_____

(j) Dates Your (sub) contract: Started _____ Completed_____

(k) Your Performance Evaluation by Owner, if any _____

By Prime: _____

(l) Were You Terminated or Assessed Liquidated Damages? _____

(If either is "Yes", attach an Explanation)

(m) Name and Company of Point of Contact (POC) for reference (If you were a subcontractor, also list the firm you were hired by): _____

(n) Current Telephone Number of Reference POC _____

**LETTER OF COMMITMENT OF KEY SUBCONTRACTOR**
**(USE SUBCONTRACTOR'S COMPANY LETTERHEAD)**
**SECTION 00 22 30 - ATTACHMENT 11**

TO: Contracting Officer

SUBJECT: Letter of Commitment for Proposed Contract for _____

Dear Sir or Madam:

I hereby make the unequivocal commitment that, in the event of an award of a contract to (Fill in name of Proposer), that (insert name of design firm) will fulfill the duties of (state role on a project)

Sincerely, (Authorized Official)

Date: _____

End of Section 00 22 30

**SECTION 00 73 10 (TASK ORDER**
REV 1.2 – 31 MAR 2010

**SUPPLEMENTAL CONTRACT REQUIREMENTS**

## 1.0 GENERAL

1.1. COST TARGET

1.2. 52.211-10 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK (APR 1984).

1.3. 52.211-12 LIQUIDATED DAMAGES – CONSTRUCTION (SEP 2000).

1.4. 252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (AUG 2000).

1.5. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15) (OCT 1989).

1.6. PHYSICAL DATA (FAR 52.236-4) (APR 1984).

1.7. IDENTIFICATION OF GOVERNMENT-FURNISHED PROPERTY.

1.8. PAYMENT FOR MATERIALS DELIVERED OFF-SITE (EFARS 52.232-5000) (MAR 1995).

1.9. TASK ORDER SITE SAFETY AND HEALTH OFFICER REQUIREMENTS AND QUALIFICATIONS (APR 10)

1.10 ENDANGERED SPECIES

1.11 CONTRACTOR PROVIDED GOVERNMENT FIELD OFFICE

## 1.0 GENERAL

### 1.1. COST TARGET

The cost target for this task order is $7,200,000.00

### 1.2. 52.211-10 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK (APR 1984).

a. The Contractor shall be required to (i) commence work under this contract within 5 calendar days after the date the Contractor receives the notice to proceed, (ii) prosecute the work diligently, and (iii) complete the entire work ready for use not later than 540 calendar days after the date the Contractor receives the notice to proceed, except in case the Contracting Officer determines that seeding is not feasible during the construction period, the Contractor shall accomplish such seeding in the first planting period following the contract completion date. This action will not operate to extend the performance time for the balance of the work. The time stated for completion shall include final cleanup of the premises.

b. Location: The site of work is located at Fort Drum, New York. The site of the work is on a military reservation and all rules and regulations issued by the Commanding Officer covering general safety, security, and sanitary requirements, etc., shall be observed by the Contractor.

c. The Contractor shall furnish all labor, materials, equipment, and services for the following work: design and construction for infrastructure upgrades as described in the solicitation package.

d. All work shall be in accordance with the drawings and specifications or instructions attached hereto and made a part thereof, or to be furnished hereafter by the Contracting Officer and subject, in every detail, to his supervision, direction, and instructions.

Notes:

(1) If the Offeror proposes a shorter duration than what is shown above, the Offeror's duration will become the contractually binding completion period, inclusive of all review periods and Government phasing requirements specified. If the Government accepts a proposal for a completion period of lesser duration, and such proposal alters the time periods for review and phasing, the Contract shall be read to include the original periods for review and phasing.

(2) As-Built Drawings. The Contractor shall complete work on the final as-built drawings upon his receipt of the approved working as-built drawings. The Contractor shall provide final as-built drawings as specified in Section 01 78 02.0010 Closeout Submittals. Upon satisfactory completion of this work the Contractor shall have earned the withholding amount shown for Final As-Built Drawings in Section 01 78 02.0010 Closeout Submittals.

(3) O & M Manuals. O & M Manuals shall be developed and submitted in accordance with Section 01 78 02.00 10 Closeout Submittals, at least 60 calendar days prior to the scheduled contract completion date. Upon approval of fully developed O & M Manuals, the Contractor shall have earned the withholding amount shown for "Operations and Maintenance Manuals" in Section 01 78 02.00 10 Closeout Submittals.

(4) In the event the Heating and/or Air Conditioning Systems cannot be tested at or near design temperatures during the above period, beneficial occupancy and use of the facilities may be accepted and final testing and adjustments of the heating and/or air conditioning deferred as specified in the appropriate testing clauses of the Technical Provisions. The HVAC Testing that the Contractor schedules after substantial completion has a value to the Government of not less than 10 percent of the value of the equipment to be tested or as determined by the Contracting Officer. The Contractor shall reserve that amount to be paid on any equipment that will require testing after substantial completion pursuant to the above referenced specification paragraph.

### 1.3. 52.211-12 LIQUIDATED DAMAGES – CONSTRUCTION (SEP 2000).

a. The targeted award date is 30 Sep 2010. The targeted Notice to Proceed (NTP) date is 30 Oct 2010. If a delay to the NTP date is a result of the Contractor, an extension will not be given. If the Contractor fails to complete the

work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of $945.24 for each day of delay.

b. If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

c. If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted. At a time before the project is physically complete but is functionally complete to the satisfaction of the Government, the Government at its sole discretion may agree to accept transfer of the facility or project provided that the remaining work to be done ("punchlist") is completed no later than 30 days from the date of transfer. In this case the contractor shall pay liquidated damages for punchlist items not completed in the daily amount of $939.44 per day commencing after 30 days of project transfer or after date required for project completion (including all extensions), whichever occurs later.

1.4. 252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (AUG 2000).

(a) The Contract shall consist of the documents enumerated in clause DESIGN-BUILD CONTRACT-ORDER OF PRECEDENCE. It is the Contractor’s responsibility to reproduce a set of contract drawings and specifications from the solicitation, including amendments.

The Government will not provide the Contractor contract drawings or specifications beyond the documents provided during the solicitation stage. The Government will not provide the Contractor any hard copy paper drawings or specifications for any contract resulting from this solicitation. Publications incorporated into the technical provisions by reference will not be provided except as chosen by the Contracting Officer.

(b) The Contractor shall—

(1) Check all drawings furnished immediately upon receipt;

(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(c) In general--

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

1.5. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15) (OCT 1989).

a. This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the contract clause titled DEFAULT (FIXED-PRICE CONSTRUCTION). The listing below defines the monthly-anticipated adverse weather for the contract period and is based upon NOAA or similar data for the geographic location of the project. In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

STATION LOCATION: Fort Drum, NY

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS FOR FORT DRUM

| JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (13) | (11) | (10) | (10) | (9) | (6) | (7) | (6) | (7) | (9) | (10) | (15) |

b. Upon start of actual construction and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. The above schedule of anticipated adverse weather will constitute the base line for monthly (or portion thereby) weather time evaluations. Actual adverse weather days will be required on a Calendar day basis (include weekends and holidays) and compared to the monthly-anticipated adverse weather in subparagraph "a" above. For purposes of subparagraph "d" the term actual adverse weather days shall include days impacted by actual adverse weather days.

c. The number of actual adverse weather days shall be calculated chronologically from the first to the last day in each month. Once the number of actual adverse weather days anticipated in subparagraph "a" above have been incurred, the Contracting Officer will examine any subsequently occurring adverse weather days to determine whether a Contractor is entitled to a time extension. These subsequently occurring adverse weather days must prevent work for 50 percent or more of the Contractor's workday and delay work critical to the timely completion of the project. The Contracting Officer will convert any delays meeting the above requirements to Calendar days and issue a modification in accordance with the clause titled DEFAULT (FIXED-PRICE CONSTRUCTION).

d. The Contractor's schedule must reflect the above anticipated adverse weather delays on all weather dependent activities.

1.6. PHYSICAL DATA (FAR 52.236-4) (APR 1984).

Data and information furnished or referred to below is for the Contractor’s information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys, borings, and test pits.

1.7. IDENTIFICATION OF GOVERNMENT-FURNISHED PROPERTY.

(a) The Government will furnish to the Contractor the property identified in the Schedule to be incorporated or installed into the work or used in performing the contract. If the property will be furnished from storage at Fort Drum, New York, the Contractor will be required to load and transport the property to the job site at its own expense. If the listed property will be furnished f.o.b. railroad cars at the place specified in the contract schedule or f.o.b. truck at the project site, the Contractor is required to accept delivery, pay any demurrage or detention charges, and unload and transport the property to the job site at its own expense. When the property is delivered, the Contractor shall verify its quantity and condition and acknowledge receipt in writing to the Contracting Officer. The Contractor shall also report in writing to the Contracting Officer within 24 hours of delivery any damage to or shortage of the property as received. All such property shall be installed or incorporated into the work at the expense of the Contractor, unless otherwise indicated in this Contract.

(b) Each item of property to be furnished under this clause shall be identified in subparagraph (d).

(c) The Government will deliver the listed property between the dates shown. The Contractor will be responsible for the proper storage and maintenance of the property from the time of acceptance until such time as it is returned to the Government.

(d) Government-Furnished/Contractor-Installed Property: None

1.8. PAYMENT FOR MATERIALS DELIVERED OFF-SITE (EFARS 52.232-5000) (MAR 1995).

(a) Pursuant to FAR clause 52.232-5, Payments Under Fixed Priced Construction Contracts, materials delivered to the contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items delivered to locations other than the work site will be limited to: (1) materials required by the technical provisions; or (2) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

(b) Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of material and labor incorporated into the item. In addition to petroleum products, payment for materials delivered off-site is limited to the following items: None.

1.9. TASK ORDER SITE SAFETY AND HEALTH OFFICER REQUIREMENTS AND QUALIFICATIONS (APR 10)

(a) The Contractor shall employ a competent person at each project to function as the Site Safety and Health Officer (SSHO) in accordance with EM 385-1-1, Section 01.A.17. The SSHO shall report to the senior project official or to a senior corporate official. Submit the qualifications of the proposed SSHO for Government Approval.

(b) The SSHO may be a collateral duty responsibility.

1.10 ENDANGERED SPECIES

(1). The federally endangered Indiana bat is present on Fort Drum and must be considered in all actions. Actions on Fort Drum, must be in accordance with requirements negotiated with the U.S. Fish & Wildlife Service under Section 7 of the Endangered Species Act. Projects involving ANY habitat modification (e.g., vegetation removal) must be addressed by Fort Drum's Fish and Wildlife Management Program. In general, no trees greater than 4 inches (diameter breast height) may be cut from 15 April - 01 October to avoid any direct adverse effects to the Indiana bat. Clearing of natural vegetation (e.g., shrubs and trees) less than 4 inches (diameter breast height) should typically occur between August 1 - April 15 to minimize the impact to migratory birds and to maintain foraging areas for bats. The contractor (and all subcontractors) shall be responsible for coordination with Fort Drum's Fish & Wildlife Management Program to ensure compliance with the Endangered Species Act and all other applicable laws and regulations pertaining to wildlife. Overall the contractor (and all subcontractors) shall minimize interference with, disturbance to, and damage to plants, fish, wildlife, and their habitats on and adjacent to the project area.

(2). Flagging or signs must be used to demarcate areas to be cleared vs. not cleared prior to any construction activities or tree clearing for a given project. Clearing must only occur within the flagged area, and flagging must be removed upon completion of the project.

(3). If any bats are discovered during the demolition or repair of buildings (to include work such as complete and partial building demo, removal/replacement of roofs, siding, etc.), all work must cease and Fort Drum's Fish and Wildlife Management Program (772-9636 or 772-4999) must be immediately contacted. If the building has pre-existing known bat colonies, then Fort Drum's Fish and Wildlife Management Program must be contacted before demolition is to occur. (At this time, the only structures known to contain bat colonies are within the historic LeRay Area.).

(4). All found bats must be immediately reported to Fort Drum's Fish and Wildlife Management Program (772-9636 or 772-4999). Do not attempt to handle any live bats, regardless of condition. If a live bat is found in a building please contact 772-2072 or 772-4999.

(5). Light minimization measures are to be incorporated for all exterior lighting that may include but are not limited to full cutoffs, reflectors, shields, and/or downward angling of lights. The following are guidelines that have been established for light minimization within the draft Installation Design Guide and must be followed to the maximum extent possible.

a. Maximum light at the edge of parking lot/road pavement will be 2 foot candles or its equivalent.

b. Light levels for parking lots/sidewalks shall be in accordance with Illuminating Engineering Society (IES) Lighting Handbook.

c. A Professional Engineer must review the lighting plan and ensure it is sound and meets minimization requirements.

d. Use full cutoff luminaires for road, parking lot, and sidewalk illumination. These are luminaires that allow no direct light emissions above a horizontal plane through the luminaire's lowest light emitting part.

e. Use downward-angling lights and appropriate shields in all applicable locations.

(6). No night lighting for construction projects is authorized without prior coordination and authorization from the project manager and Fort Drum's Fish and Wildlife Management Program.

(7). Project planning and design should attempt to minimize building footprints by combining infrastructure (i.e. roads, utility lines, etc.) for multiple buildings or by constructing multi-story versus multiple or expanded single story buildings whenever possible.

1.11 OUTDOOR LIGHTING MINIMIZATION

The purpose of the Fort Drum Outdoor Lighting Guidelines is to regulate outdoor lighting in order to reduce or prevent light pollution. This means to the extent reasonably possible the reduction or prevention of glare and light trespass, the conservation of energy, and promotion of safety and security. These Guidelines will ensure appropriate outdoor lighting in compliance with the Endangered Species Act and in accordance with the Fort Drum's Army Strategic Plan for Sustainability.

Definitions

a. Fixture Height: height of the fixture shall be the vertical distance from the ground directly below the centerline of the fixture to the lowest direct light emitting part of the fixture.

b. Foot-candles: a unit of illumination of a surface that is equal to one lumen per square foot. For the purposes of these regulations, foot-candles shall be measured at a height of 3 ft. above finished grade.

c. Fully Shielded Light: light fixtures shielded or constructed so that no light rays are directly emitted by the installed fixture at angles above the horizontal plane as certified by a photometric test report. The fixture must also be properly installed to effectively down direct light in order to conform with the definition.

d. Light Trespass: the shining of light produced by a light fixture beyond the boundaries of the property on which it is located.

e. Lumen: the unit of luminous flux, the total amount of light falling uniformly on or passing through an area of 1 square foot, each of which is 1 foot from a 1-candela source, yielding an illuminance of 1 foot candle at that distance (the output of lamps and bulbs is customarily measured in lumens, a common 100 watt incandescent light bulb, for example, having an output less than 1,800 lumens).

f. Point Light Source: the exact place from which illumination is produced (i.e., a light bulb filament or discharge capsule).

g. Sag-lens or Drop-lens: A clear or prismatic refracting lens that extends below the lowest opaque portion of a light fixture.

Applicability

All outdoor lighting fixtures installed, retro-fitted, or replaced on Fort Drum property shall comply with these regulations. These regulations do not apply to interior lighting.

Exemptions

The following are exempt from the provisions of these guidelines:

a. Traffic control signals and devices.

b. Temporary emergency lighting (i.e. fire, police, repair workers).

c. Moving vehicle lights.

d. Navigation lights (i.e. airports, heliports, radio/television towers).

e. Seasonal decorations with individual lights in place no longer than 60 days.

f. Lighting for flags. Efforts should be made in these areas to minimize sky glow and light trespass whenever feasible.

g. Sports field outdoor lighting (i.e. ball fields, football, soccer, ice rink, etc.). Sports outdoor lighting is to be turned off when a sporting event is not occurring.

h. Other special situations for temporary or periodic events (i.e. fairs, festivals, carnivals, night-time construction).

i. Security lights of any wattage that are controlled by a motion-sensor switch and which do not remain on longer than 10 minutes after activation.

j. Access points, Army Supply points, or other high security areas subject to AR 190-11 or TM-8-583-2. Efforts should be made in these areas to minimize sky glow and light trespass whenever feasible.

Additional exemptions may be provided after coordination with Fort Drum's Fish and Wildlife Management Program.

General Standards

The following general standards shall apply to all outdoor lighting installed, retrofitted, or replaced on Fort Drum, which is not exempted above:

a. Outdoor lighting must be hooded, fully shielded (i.e. full cutoff fixtures), and/or aimed downward. Outdoor lighting used to illuminate parking spaces, driveways, maneuvering areas, or buildings shall conform to the definition for "fully shielded light fixtures" and be designed, arranged and screened so that the point light source shall not be visible from adjoining lots (i.e. woodlands) or streets.

b. The intensity of light within a site shall not exceed two (2) footcandles at any property line, edge of pavement, or road.

c. The hood or shield must mask the direct horizontal surface of the light source. The light must be aimed to insure that the illumination is only pointing downward onto the ground surface, with no escaping light permitted to contribute to sky glow by shining upward into the sky.

d. Any bright light shining onto adjacent properties (i.e. woodlands) or streets which would result in a nuisance glare or a disabling glare shall not be permitted. Light trespass beyond property boundaries or above the horizontal plane shall be considered non-compliant.

e. Existing fixtures may be adapted to comply with these guidelines by adding a properly designed hood or shield, or by pointing any upward-mounted, shielded fixture downward onto the ground surface.

f. All outdoor lighting fixtures shall be designed, installed, located and maintained such that nuisance glare onto adjacent properties (i.e. woodlands) or streets shall be minimized and all direct illumination kept within the boundaries of a building's property.

g. Accent lighting shall be directed downward onto the building or object and not toward the sky or onto adjacent properties (i.e. woodlands). Direct light emissions shall not be visible above the roof line or beyond the building edge.

h. Spotlighting on landscaping and foliage shall be limited to 150 watts (2220 lumens output) and lighting is to be angled downwards. The lamp shall be fully shielded and not create disabling or nuisance glare.

i. No sag-lens or drop-lens are to be used.

1.12 CONTRACTOR PROVIDED GOVERNMENT FIELD OFFICE

(a) The Contractor shall furnish at the job site, prior to the start of work, a 600 square feet (SF) field office for the use by Government representatives for the duration of the contract. Field office and contents remain the property of the contractor. The exact location will be designated by the Contracting Officer. Each building shall be well constructed and properly ventilated and shall contain a closet and door and windows which shall be capable of being locked, four (4) new ergonomically-designed chairs, two (2) plan racks and drawing boards, four (4) desks, four (4) two-drawer filing cabinets, and a conference table approximately 5 feet by 6 feet with 6 chairs.

The Contractor shall also provide adequate electric lighting, for each building: minimum 6 duplex electrical receptacles, drinking water, heat, plumbed functional toilet facilities, air conditioning, janitorial services and maintenance services. In addition the contractor shall make arrangements and pay connection and monthly service /usage fees for electrical, 2 line telephone service (phone), and four (4) DSL or Cable computer connections. The connection speed must at a minimum be 2 Mbps (megabits per second). The field office shall be removed from the project site when and as directed by the Contracting Officer. In addition to the above, the Contractor shall provide the following office equipment, and other items for use by the Government during the contract, the contractor shall retain these items after contract completion:

5 cubic foot refrigerator and 1000 watt microwave

All-in-One printer, copier, fax, scanner that can handle paper up to 11' x 17" with associated printer supplies for the duration of the contract.

(b) No separate payment will be made for providing the above items and all costs in connection therewith will be considered the obligation of the Contractor.

End of Section 00 73 10

Section 00 73 46

**APPLICATION OF WAGE DECISIONS**

**Contract No.**: W912DS-09-D-0004, -0005, -0006, -0007 Task Order RFP 0004
**Project**: Indoor Range BCT1, Project Number 71727, Fort Drum, NY

**Location**: Fort Drum, Jefferson County, New York

1. **Davis-Bacon Act Wage Decision, NY100100, Building Construction Projects**, will be applicable to the construction, alteration and painting or repair of buildings, installations within buildings, appurtenances to buildings, and utilities within five feet of buildings for those construction activities performed in **Jefferson County, New York**.
2. **This project is classified as Building, NY100 is applicable.**

NOTE:

(1) PAYROLL RECORDS ARE REQUIRED. UNDER THE DAVIS-BACON ACT, TO BE SUBMITTED TO THE U.S. ARMY CORPS OF ENGINEERS FOR ALL CONSTRUCTION WORK TO BE PERFORMED.

(2) THE WAGE DECISION/TASK ORDER NUMBER APPLICABLE TO THE WORK PERFORMED IS TO BE SHOWN ON ALL THE CERTIFIED PAYROLL RECORDS SUBMITTED:

General Decision Number: NY100100 06/11/2010 NY100

Superseded General Decision Number: NY20080100

State: New York JR 30 JUNE 2010

Construction Type: Building

County: Jefferson County in New York.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

| Modification Number | Publication Date |
|---|---|
| 0 | 03/12/2010 |
| 1 | 06/11/2010 |

BOIL0175-002 10/01/2007

| | Rates | Fringes |
|---|---|---|
| BOILERMAKER | $ 27.23 | 17.97 |

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BRNY0002-008 06/01/2009

WATERTOWN CHAPTER

| | Rates | Fringes |
|---|---|---|
| TILE FINISHER | $ 20.41 | 13.00 |
| TILE SETTER | $ 23.61 | 13.40 |

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* CARP0747-004 06/01/2010

| | Rates | Fringes |
|---|---|---|
| CARPENTER, Including Drywall Hanging | $ 25.09 | 14.75 |

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ELEC0910-004 04/01/2009

| | Rates | Fringes |
|---|---|---|
| ELECTRICIAN (Including Low Voltage Wiring and Installation of Alarms, Computers, Phones, & HVAC Temperature Controls Including Teledata & Sound Technicians) | $ 29.25 | 15.28 |

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ENGI0545-017 06/01/2009

| | Rates | Fringes |
|---|---|---|
| OPERATOR: | | |
| Bobcat/Skid Loader; Bulldozer; Drill Rigs, Tractor Mounted; Self Contained Hydraulic Bench Drill | $ 25.51 | 18.80+a |
| Crane Oiler | $ 22.07 | 18.80+a |
| Excavator; Concrete Pump, Truck Mounted; Blast or Rotary Drill (Truck or Cat Mounted) | $ 27.23 | 18.80+a |

FOOTNOTE:

a. PAID HOLIDAYS: New Year's day, Memorial day, Independence Day, Labor day, Thanksgiving Day and Christmas Day, provided the employee has worked five consecutive working days before the holiday and the working day after the holiday

CRANE PREMIUMS (ADD TO BASE RATE):

30 to 64 Ton: +$.50
Hydraulic 65 to 79 Ton: +$1.10
Hydraulic 80 to 99 Ton: +$1.25
Lattice Boom 65 Ton & Over, Hydraulic 100 Ton & Over: +$1.75

Boom length incl. jib over 150 ft 1.25 Boom length incl. jib over 200 ft 2.25
Boom length incl. jib over 300 ft 3.25

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IRON0060-013 05/01/2009

Townships of Adams, Alexandria, Brownsville, Cape Vincent, Clayton, Ellisburg, Henderson, Housfield, Le Ray, Lorraine, Lyme, Orleans, Pamelia, Rodman, Rutland, Theresa, Watertown and Worth

| | Rates | Fringes |
|---|---|---|
| IRONWORKER, REINFORCING AND STRUCTURAL | $ 25.75 | 18.15 |

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LABO0322-007 06/01/2009

| | Rates | Fringes |
|---|---|---|
| LABORER | | |
| Grade Checker; Landscape; Brick Mason Tender; Mortar Mixer | $ 20.07 | 13.81 |

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PAIN0004-052 05/01/2007

| | Rates | Fringes |
|---|---|---|
| PAINTER (Drywall Finishing/Taping Only) | $ 20.24 | 10.79 |

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PLUM0073-006 05/01/2009

| | Rates | Fringes |
|---|---|---|
| PIPEFITTER, Including HVAC Pipe Installation | $ 26.44 | 13.71 |

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SHEE0058-007 05/01/2009

| | Rates | Fringes |
|---|---|---|
| SHEETMETAL WORKER (HVAC Duct Work Only) | | |
| Projects 10 million or less | $ 25.85 | 15.56 |
| Projects over $10 million | $ 26.85 | 15.56 |

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SUNY2009-024 09/30/2009

| | Rates | Fringes |
|---|---|---|
| ASBESTOS WORKER/HEAT & FROST INSULATOR | $ 26.54 | 0.00 |
| BRICKLAYER | $ 19.75 | 5.82 |
| CARPENTER (Form Work Only) | $ 18.01 | 5.99 |
| CEMENT MASON/CONCRETE FINISHER | $ 19.75 | 5.82 |
| IRONWORKER, ORNAMENTAL | $ 22.13 | 13.43 |
| LABORER: Asphalt Shoveler | $ 20.89 | 8.95 |

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LABORER:  Common or General......$ 18.72            9.81

LABORER:  Mason Tender -
Cement/Concrete.................$ 18.72            9.51

LABORER:  Pipelayer.............$ 21.06           14.30

LABORERS: Asbestos Abatement
(Removal from Floors,
Ceiling, Walls and Mechanical
Systems)........................$ 19.76            9.45

OPERATOR:  Auger................$ 21.19           15.85

OPERATOR:  Backhoe..............$ 25.05            7.45

OPERATOR:  Crane................$ 23.94           11.40

OPERATOR:  Forklift.............$ 21.80            8.26

OPERATOR:  Loader...............$ 18.00            0.00

OPERATOR:  Paver................$ 23.59            9.95

OPERATOR:  Roller...............$ 17.75            5.89

PAINTER:  Brush, Roller and
Spray...........................$ 18.98            9.66

PLUMBER.........................$ 23.48           10.80

ROOFER, Including Modified
Bitumen, Rubber, Shake,
Shingle, Single Ply and Tear
Off.............................$ 21.00           11.32

SHEETMETAL WORKER, Excluding
HVAC Duct Work..................$ 24.30           13.26

SPRINKLER FITTER (Fire
Sprinklers).....................$ 25.16            5.15

TRUCK DRIVER:  Dump Truck........$ 16.00            2.62
-----------------------------------------------------------------

WELDERS - Receive rate prescribed for craft performing operation to which welding
is incidental.


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Unlisted classifications needed for work not included within the scope of the
classifications listed may be added after award only as provided in the labor
standards contract clauses (29 CFR 5.5(a)(1)(ii)).

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In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor

200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

**NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)**

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

| **Goals for Minority Participation for Each Trade** | **Goals for Female Participation for Each Trade** |
|---|---|
| *2.5%* | *6.9%* |

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the *Federal Register* in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on

(1) its implementation of the Equal Opportunity clause,

(2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction,'' and

(3) its efforts to meet the goals.

The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

(1) Name, address, and telephone number of the subcontractor;
(2) Employer's identification number of the subcontractor;
(3) Estimated dollar amount of the subcontract;
(4) Estimated starting and completion dates of the subcontract; and
(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is **Jefferson County, New York**.

End of Section 00 73 46

# SECTION 01 10 00.
# TASK ORDER STATEMENT OF WORK

**1.0 PROJECT OBJECTIVES**

1.1. SECTION ORGANIZATION

**2.0 SCOPE**

2.1. INDOOR BAFFLE RANGE

2.2. SITE

2.3. GOVERNMENT-FURNISHED GOVERNMENT INSTALL EQUIPMENT (GFGI)

2.4. FURNITURE REQUIREMENTS

**3.0 INDOOR BAFFLE RANGE**

3.1. GENERAL REQUIREMENTS

3.2. FUNCTIONAL AND AREA REQUIREMENTS

**4.0 APPLICABLE CRITERIA**

4.1. INDUSTRY CRITERIA

4.2. MILITARY CRITERIA

**5.0 GENERAL TECHNICAL REQUIREMENTS**

5.1. SITE PLANNING AND DESIGN

5.2. SITE ENGINEERING

5.3. ARCHITECTURE AND INTERIOR DESIGN

5.4. STRUCTURAL DESIGN

5.5. THERMAL PERFORMANCE

5.6. PLUMBING

5.7. ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

5.8. HEATING, VENTILATING AND AIR CONDITIONING

5.9. ENERGY CONSERVATION

5.10. FIRE PROTECTION

5.11. SUSTAINABLE DESIGN

5.12. CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT

5.13. SECURITY (ANTI-TERRORISM STANDARDS)

## 6.0 PROJECT SPECIFIC REQUIREMENTS

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6.2. APPROVED DEVIATIONS

6.3. SITE PLANNING AND DESIGN

6.4. SITE ENGINEERING

6.5. ARCHITECTURE

6.6. STRUCTURAL DESIGN

6.7. THERMAL PERFORMANCE

6.8. PLUMBING

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.11. HEATING, VENTILATING AND AIR CONDITIONING

6.12. ENERGY CONSERVATION

6.13. FIRE PROTECTION

6.14. SUSTAINABLE DESIGN

6.15. ENVIRONMENTAL

6.16. PERMITS

6.17. DEMOLITION

6.18. ADDITIONAL FACILITIES

## 1.0 PROJECT OBJECTIVES

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 |
|---|---|
| INDOOR BAFFLE RANGE | INDOOR SHOOTING RANGE |

It is the Army's objective that these buildings will have a 25-year useful design life before a possible re-use/re-purpose or renovation requirement, to include normal sustainment, restoration, modernization activities and a 50-year building replacement life. Therefore, 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 site infrastructure will have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles.

The project site should be developed for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

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 lowest 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 INDOOR BAFFLE RANGE:

Provide an All-Weather Marksmanship Facility (Indoor Range). This project type is to provide a facility for year-round live-fire training to more efficiently support Soldiers in meeting weapons proficiency and qualification standards, and minimize the amount of time required to complete training. Assume 20% of facility users are female unless otherwise indicated.

The project will include a range facility with ten (10) firing lanes, classrooms, administrative space, control room, storage, restrooms, and other support spaces. Access roads, sidewalks, and POV parking are required.

The maximum gross area for the Indoor Range facility is limited to 13,159 SF.

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2.2. SITE:

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

Approximate area available 5.00 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: None

2.4. FURNITURE REQUIREMENTS

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

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

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

2.5. NOT USED

**3.0 INDOOR RANGE**

3.1 GENERAL REQUIREMENTS

3.2 FUNCTIONAL AND AREA REQUIREMENTS

3.3 GENERAL TECHNICAL REQUIREMENTS

3.4 ARCHITECTURE AND INTERIOR DESIGN

3.5 STRUCTURAL DESIGN

3.6 PLUMBING

3.7 ELECTRICAL AND TELECOMMUNICATIONS

3.8 HEATING, VENTILATING AND AIR CONDITIONING

3.9 TESTING, ADJUSTING AND BALANCING

3.10 COMMISSIONING

3.11 ENERGY CONSERVATION

3.12 FIRE PROTECTION

**3.0 INDOOR RANGE**

3.1. GENERAL

(1) Functional Areas. The Indoor Range is composed of two main types of functional areas:

Firing Range

Administrative and Support Spaces

Refer to the included floor plans for a sample 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 2100 mm (6 ft 11 inches) measured from the underside of the structural system and with perimeter walls measuring a minimum of 1500 mm (4 ft 11 inches) 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 Floor Area. The net floor area includes the total gross area excluding: (a) Basements not suited as office, special, mechanical, or storage space. (b) Elevator shafts and machinery space. (c) Exterior walls. (d) Interior partitions. (e) Mechanical equipment and water supply equipment space. (f) Permanent corridors and hallways. (g) Stairs and stair towers. (h) Toilet and cleaning equipment space. (i) Electrical equipment space. (j) Electronic/communications equipment space. 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. The administrative and support portion of the building shall be handicapped accessible.

(6) Site Design and Functional Areas. Site features include vehicular access, POV and military vehicle parking, utilities, and site improvements.

3.1.1 Firing Range Area

The Firing Range provides ten (10) firing positions for known distance live-fire practice and qualification. The facility must support weapons training for individual pistol, individual rifle and squad automatic weapons marksmanship training and infantry squad conduct-of-fire training in various scenarios. The facility must be capable of supporting live-fire with pistol ammunition through 0.45 caliber and automatic rifle ammunition up to 7.62 mm. Each lane will have an individual firing position accommodating standing to prone firing positions. The

intent of this project is to provide a safe multi-purpose facility which meets environmental health criteria and allows the individual to maximize the training values regardless of inclement weather encountered at this location.

(a) The perimeter walls, floor and ceiling of the firing range area shall be constructed as a 'ballistic envelope', with full containment of specified ammunition types by the structural shell. All walls, floors, ceiling, doors and windows that comprise the designated envelope boundary will each be required to meet specified ballistic standards for U.L. Rating for Level 5. In addition, the entire ballistic envelope plus adjacent floors, roof, etc, and all connections and intersections of each will be required to be airtight to facilitate proper balancing of range ventilation systems.

The perimeter of the ballistic envelope for this project is:

• Side walls of range
• Floor of range
• Wall behind the bullet trap
• Wall separating the firing range area from the administrative and support spaces

(b) Bullet Trap. Provide bullet trap including area and access for maintenance and ancillary spaces for bullet trap components such as dust collection units (if applicable), discharge, and storage. Design facility such that bullet trap maintenance does not require access to the mechanical/electrical room.

(c) Firing Line. Provide a minimum of 15'-0" of open space between the wall of the firing range and the firing line. The range ventilation designer shall certify that sufficient space is provided to achieve the required laminar airflows with furnishings in place.

(d) Firing Lanes. Provide ten (10) firing lanes. Each firing lane shall have a width of 5'-0". The lanes adjacent to walls shall have a width of at least 5'-2". The height of the firing range shall be at least 10'-0", with larger heights permissible only as necessary to accommodate the bullet trap, if required.

(e) Air-Lock. The entrance to the firing range area shall be through an air-lock vestibule. The air-lock shall be located conveniently to the Ammo/Weapons storage. The doors shall have a switchable interlock mechanism such that during normal use only one door can be opened at a time.

(f) Range Storage. Provide a room accessible from within the range firing line area for storage of targets.

3.1.2 Administrative and Support Spaces

(1) Ancillary. Ancillary spaces include circulation spaces and mechanical/electrical rooms.

(a) Circulation Spaces. Provide a main entrance vestibule with interior and exterior double doors and recessed floor mat. Minimum width of corridors is 8'-0". Provide a minimum of one (1) drinking fountain and one (1) hand washing sink in corridor.

(b) Mechanical/Electrical Rooms:

Utility space must be provided for heating and cooling equipment. Locate mechanical rooms adjacent to exterior walls for external maintenance access and ventilation. Mechanical, Electrical and Telecommunications rooms shall be keyed separately for access by Installation maintenance personnel. Walls enclosing mechanical rooms shall be designed to have sound isolation of STC 45, minimum. Provide a hose bib in all mechanical rooms.

Boiler Room: provide exterior access through double doors.

Electrical Room: Provide exterior access.

Telecommunications Room (TR): The TR shall be sized to at least 1.1 percent of the area that it serves, as required to accommodate the required equipment, or 8'-0" x 10'-0", whichever is greater. In no case shall the

dimensions be less than 8’-0” x 10’-0”. The telecommunications rooms shall be designed in accordance with the Technical Criteria for Installation Information Infrastructure Architecture I3A and ANSI/EIA/TIA-569-B.

Heating and Ventilation Equipment Room: Provide exterior access only for both maintenance and equipment replacement.

(2) Classroom Group. Provide two (2) classrooms with normal access from the main corridor. The classrooms shall be adjacent to each other and equipped with an overhead supported operable wall with a minimum sound transmission class (STC) 52 rating. Each classroom is intended to support thirty-five (35) soldiers. The classrooms shall have the capability of being made completely dark during daylight hours though the use of commercial grade blackout shades on all windows.

(3) Toilets. Provide separate male and female rest rooms. Fixture counts shall be determined in accordance with the International Plumbing Code as modified by UFC 3-420-01 using a ratio of 80% male/20% female.

(4) Janitor Closet. Provide a janitor closet with, as a minimum, a mop sink, mop rack and space for buckets, vacuum and storage for janitorial supplies.

(5) Office. The office shall support two (2) personnel. Provide vision panel with direct line of sight from office to main entry. Provide counter and solid pull-down shutter to corridor.

(6) Ammo/Weapons Temporary Storage. Provide a room for ammunition and weapons temporary storage. The room shall be accessed by a dutch-style door with attached shelf to be used as an issue counter. Ammo and weapons will not be left unattended while stored in this room.

(7) Shower. Provide two (2) shower rooms with changing space. One located behind bullet trap for range personnel, and one located in Mechanical Room area for Public Works maintenance personnel. Include built in changing bench, sink, mirror, soap dispenser, paper towel dispenser with waste receptacle.

3.1.4 DESIGN FREEDOM:

The layouts provided in Appendix J indicate functional arrangements that meet user operability requirements. Modifications to the indicated building shape, exterior materials, colors, construction materials, building systems, etc. are possible as long as established functional arrangements, minimum areas, adjacencies, and safety/operability requirements are maintained. The contractor shall not provide sand filled, gravel filled, granular filled, or flammable material walls.

## 3.2 FUNCTIONAL AND AREA REQUIREMENTS

### 3.2.1 ROOM SUMMARY MATRIX

| ROOM: | CORRIDOR | | | |
|---|---|---|---|---|
| | Function/adjacencies: | Provides access from Exterior to Required Rooms | | |
| | Special Dimensions: | Minimum Width: 8'; Minimum Ceiling Height: 8’ | | |
| | Acoustics: | Acoustic qualities should only be considered if the Firing Range abuts the corridor. | | |
| | Access: | Two doors from exterior, one of which is a double-door serving as the main entrance. Numerous other doors will lead to other spaces, one of which is the airlock/vestibule into the firing range. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Fire Extinguisher Cabinets: | AR | AR | Semi-recessed or Fully-recessed Cabinet(s) |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Linoleum or VCT |
| | Wall Base: | AR | AR | Resilient |
| | Ceiling Finishes: | AR | AR | Suspended acoustical tile |
| | Plumbing: Drinking Fountain | 1 | AR | Hi/Lo type combination water cooler, sensor-operated. |
| | Plumbing: Hand Wash Sink | 1 | AR | Stainless Steel with soap and paper towel dispensers |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per UFC 3-520-01 |
| | | | | |
| **ROOM:** | **OFFICE** | | | |
| | Function/adjacencies: | Reception/Control, administration, repair. Provide vision panel with direct line of sight to main entrance. | | |
| | Special Dimensions: | Minimum Ceiling Height: 9’ | | |
| | Acoustics: | Provide sound insulation to meet a minimum rating of STC 42 at interior walls and floor/ceiling assemblies. | | |
| | Access: | Provide access to corridor. | | |
| | Number of Occupants: | 2 | | |
| | Other/Special Requirements: | Provide counter and pull-down shutter (solid) to corridor. | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Linoleum or VCT |
| | Wall Base: | AR | AR | Resilient |
| | Ceiling Finishes: | AR | AR | Painted GWB |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Repair Work Bench | 1 | 2'x6' | Provide 30" high work bench area for repairs. |
| | Telecommunications | AR | AR | Outlet types and density per I3A |
| | | | | |
| **ROOM:** | **STORAGE** | | | |
| | Function/adjacencies: | Locate adjacent to Office. | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’ | | |
| | Acoustics: | Acoustic qualities should only be considered if the Firing Range abuts the storage room. | | |

| | | | | |
|---|---|---|---|---|
| | Access: | Provide access to corridor. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Linoleum or VCT |
| | Wall Base: | AR | AR | Resilient |
| | Ceiling Finishes: | AR | AR | Suspended acoustical tile |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Telecommunications | AR | AR | Outlet types and density per I3A |
| | | | | |
| | | | | |
| **ROOM:** | **CLASSROOMS (2)** | | | |
| | Function/adjacencies: | In-Brief/Out-Brief and misc. training. Locate off main corridor. | | |
| | Special Dimensions: | Minimum Ceiling Height: 9’ | | |
| | Acoustics: | Provide acoustic barriers or isolation to allow for optimum functional use of this space during range operations. Rooms shall meet maximum Noise Criteria (NC) 30 rating in accordance with ASHRAE Fundamentals. | | |
| | Access: | Provide access to corridor. | | |
| | Number of Occupants: | 35 | | |
| | Other/Special Requirements: | The classrooms shall be adjacent to each other and equipped with an overhead supported operable wall with a minimum sound transmission class rating of STC 52. | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Linoleum or VCT |
| | Wall Base: | AR | AR | Resilient |
| | Ceiling Finishes: | AR | AR | Suspended acoustical tile |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Window Coverings | AR | AR | Commercial grade blackout shades on all windows |
| | Telecommunications | AR | AR | Outlet types and density per I3A |
| | White Board | 2 ea. | 4'x8' | Dry-Erase Marker Board, Porcelain on Steel, min 1/4" thick, framed |
| | Projection Screen | 1 ea. | 120" | Motorized retractable, concealed, above-ceiling mounted |
| | Overhead projector support | 1 ea. | AR | Provide wiring for computer connection. Terminate in wall terminal. Provide power receptacle. Ceiling mounted. |
| | Equipment Hooks | 35 ea. | AR | Provide 35 equipment hooks in two tiers, 2' on center |
| | | | | |
| **ROOM:** | **MENS TOILET** | | | |
| | Function/adjacencies: | Locate off main corridor. To be used by male users and staff. | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’ | | |
| | Acoustics: | N/A | | |

| | | | | |
|---|---|---|---|---|
| | Access: | Single Door from corridor. Ensure that room configuration and/or door placement precludes visibility into functional portions of room from corridor with door open 45 degrees. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | Meet the requirements of ABA and, Section 504 of the Rehabilitation Act, including fixtures and accessories. | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | ceramic tile / porcelain tile (Utilize water resistant/ mold resistant cement board backer board) |
| | Floor Finishes: | AR | AR | ceramic tile / porcelain tile |
| | Wall Base: | AR | AR | ceramic tile / porcelain tile |
| | Ceiling Finishes: | AR | AR | Painted Gypsum Board |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Toilet tissue dispenser | 1/WC | AR | |
| | Mirror and Soap Dispenser | 1/Lav | AR | |
| | Paper Towel dispenser/ waste receptacle | 2 | AR | |
| | Toilet partitions with doors, latches and urinal screens | AR | AR | Provide coat hook at toilet partition doors. |
| | | | | |
| **ROOM:** | **WOMENS TOILET** | | | |
| | Function/adjacencies: | Locate off main corridor. To be used by female users and staff. | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’ | | |
| | Acoustics: | N/A | | |
| | Access: | Single Door from corridor. Ensure that room configuration and/or door placement precludes visibility into functional portions of room from corridor with door open 45 degrees. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | Meet the requirements of ABA and, Section 504 of the Rehabilitation Act, including fixtures and accessories. | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | ceramic tile / porcelain tile (Utilize water resistant/ mold resistant cement board backer board) |
| | Floor Finishes: | AR | AR | ceramic tile / porcelain tile |
| | Wall Base: | AR | AR | ceramic tile / porcelain tile |
| | Ceiling Finishes: | AR | AR | Moisture resistant Acoustical Tile |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Toilet tissue dispenser | 1/WC | AR | |
| | Mirror and Soap Dispenser | 1/Lav | AR | |
| | Paper Towel dispenser/ waste receptacle | 2 | AR | |
| | Toilet partitions with doors, latches and urinal screens | AR | AR | Provide coat hook at toilet partition doors. |
| | | | | |
| **ROOM:** | **JANITORS CLOSET** | | | |
| | Function/adjacencies: | Storage of building maintenance supplies, tools and mop sink. | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’ | | |
| | Acoustics: | N/A | | |

| | | | | |
|---|---|---|---|---|
| | Access: | Single Door from Corridor with vision panel. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | Floor Drain | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | ceramic tile / porcelain tile |
| | Wall Base: | AR | AR | ceramic tile / porcelain tile |
| | Ceiling Finishes: | AR | AR | Moisture resistant Acoustical Tile |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Shelving | 3 | 1'x3' | Provide three (3) 12"x36" minimum heavy duty stainless steel shelves on adjustable standards |
| | Mop Holder | 1 | AR | Provide one wall mounted utility shelf with mop holder |
| | Mop Sink | 1 | AR | 24” square mop receptor with heavy duty faucet |
| | | | | |
| **ROOM:** | **SHOWERS (2)** | | | |
| | Function/adjacencies: | One (1) to be used by range staff. One (1) to be used by PW maintenance personnel | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’ | | |
| | Acoustics: | N/A | | |
| | Access: | One must be accessible without the need to enter the mechanical room. The other must be accessible from within the mechanical room. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | Floor Drain | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | ceramic tile / porcelain tile (Utilize water resistant/ mold resistant cement board backer board) |
| | Floor Finishes: | AR | AR | ceramic tile / porcelain tile |
| | Wall Base: | AR | AR | ceramic tile / porcelain tile |
| | Ceiling Finishes: | AR | AR | Moisture resistant Acoustical Tile |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Shower | 1 | AR | Provide seamless, 1-piece shower stall |
| | Mirror and Soap Dispenser | 1/Lav | AR | |
| | Paper Towel dispenser/ waste receptacle | 1 | AR | |
| | | | | |
| **ROOM:** | **TELECOMMUNICATIONS ROOM** | | | |
| | Function/adjacencies: | Contains all Required Communication-related Equipment | | |
| | Special Dimensions: | Minimum Clear Ceiling Height: 8’; The TR shall be sized to at least 1.1 percent of the area that it serves, as required to accommodate the required equipment, or 8’-0” x 10’-0”, whichever is greater. In no case shall the dimensions be less than 8’-0” x 10’-0”. | | |
| | Acoustics: | N/A | | |
| | Access: | Single Door from Corridor. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | Comply with I3A requirements | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |

| | | | | |
|---|---|---|---|---|
| | Floor Finishes: | AR | AR | Sealed concrete |
| | Wall Base: | AR | AR | Resilient |
| | Ceiling Finishes: | AR | AR | Painted GWB |
| | Mechanical: HVAC | AR | AR | Provide independent climate control; heating, ventilation, humidity control and air conditioning. Room shall be positively pressured to exclude dust. Meet I3A criteria. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01, and I3A |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01, and I3A |
| | Communications Furnishings | AR | AR | Provide equipment racks, patch panels, punch down blocks, spare patch cords and terminations in accordance with functional and I3A requirements |
| | | | | |
| **ROOM:** | **AMMO/WEAPONS TEMPORARY STORAGE ROOM** | | | |
| | Function/adjacencies: | Provides temporary storage for ammunition and weapons. Locate door near firing range access. | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’ | | |
| | Acoustics: | N/A | | |
| | Access: | Fully lockable dutch-door with shelf to be used as issue counter. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Linoleum or VCT |
| | Wall Base: | AR | AR | Resilient |
| | Ceiling Finishes: | AR | AR | Acoustical Tile |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Telecommunications | AR | AR | Outlet types and density per I3A |
| | Partitions | AR | AR | Provide expanded metal cages and doors conforming to ASTM F1267 to separate the space into a weapons area, ammo area, and distribution. |
| | | | | |
| **ROOM:** | **CONTROL ROOM** | | | |
| | Function/adjacencies: | Observation of firing range area, target and systems control. Provide direct visibility to all firing lanes for two (2) employees. | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’; Design floor height to provide optimal visibility for operators. | | |
| | Acoustics: | Acoustically separated from firing range. | | |
| | Access: | Single door off main corridor. | | |
| | Number of Occupants: | 2 | | |
| | Other/Special Requirements: | Provide window with pass through counter to corridor opposite firing range. Windows separating control room from firing range shall be bullet resistant. | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |

| | | | | |
|---|---|---|---|---|
| | Floor Finishes: | AR | AR | Linoleum or VCT |
| | Wall Base: | AR | AR | Resilient |
| | Ceiling Finishes: | AR | AR | Acoustical Tile |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Telecommunications | AR | AR | Outlet types and density per I3A. |
| | Workspace counter | AR | AR | Provide counter top 24" deep, 36" high; for the full width of the control room on the firing range side. |
| | | | | |
| **ROOM:** | **AIR LOCK/FIRING RANGE VESTIBULE** | | | |
| | Function/adjacencies: | Provides access to firing range minimizing disturbance to range air flow | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’ | | |
| | Acoustics: | Acoustically separated from firing range. | | |
| | Access: | Single door off main corridor, single door to firing range, both with vision panels. The doors shall have a switchable interlock mechanism such that during normal use only one door can be opened at a time. | | |
| | Number of Occupants: | 2 | | |
| | Other/Special Requirements: | Design room ventilation to minimize disturbance to range air flow during entry and exit. | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Linoleum or VCT |
| | Wall Base: | AR | AR | Resilient |
| | Ceiling Finishes: | AR | AR | Acoustical Tile |
| | Mechanical: HVAC | AR | AR | Provide heating, ventilation, and air conditioning. |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | | | | |
| **ROOM:** | **MECHANICAL/ELECTRICAL** | | | |
| | Function/adjacencies: | Houses required building mechanical/electrical components | | |
| | Special Dimensions: | Size as required to house/maintain/replace equipment. | | |
| | Acoustics: | N/A | | |
| | Access: | Access via double doors to exterior. | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Sealed concrete |
| | Ceiling Finishes: | AR | AR | Paint Structure |
| | Mechanical: HVAC | AR | AR | Provide heating and ventilation. |
| | Telecommunications | AR | AR | Outlet types and density per I3A |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | | | | |

| ROOM: | RANGE | | | |
|---|---|---|---|---|
| | Function/adjacencies: | • 25 meter indoor firing range. 10 lanes<br>• Provide granular rubber type bullet trap to provide continuous impact area for full width of range with trap maintenance area behind trap.<br>• Provide baffles to protect all range components.<br>• Control room window should be configured to observe entire firing range, including full width of firing line. | | |
| | Special Dimensions: | Provide a minimum of 15 feet between rear wall and firing line. | | |
| | Acoustics: | Room shall be acoustically separated from the rest of the building. | | |
| | Access: | Access/egress from Corridor via air-lock vestibule. Exterior exits to meet code requirements. | | |
| | Number of Occupants: | 12 during live fire activities only. | | |
| | Other/Special Requirements: | Provide surfaces downrange of firing positions sufficiently hard and smooth to contain bullets and smoothly deflect down-range with minimum bullet damage or damage to structure.<br>Provide airtight construction assemblies for all components comprising the boundaries of the range spaces to prevent air leakage/infiltration, including air spaces, gaps, penetrations, doors & windows, and connections (between walls & ceilings, wall to wall, and wall floor), including those in wall between control room, corridor, vestibule and Ranges. Sealing methods shall withstand negative pressure produced by range ventilation equipment. | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Sealed concrete (epoxy type sealer hardener) |
| | Ceiling Finishes: | AR | AR | Concrete, acoustic behind firing line |
| | Mechanical: HVAC | AR | AR | Provide heating and ventilation |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01. Additional lighting requirements are identified in paragraph 3.7.6, below. |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | | | | |
| **ROOM:** | **RANGE STORAGE** | | | |
| | Function/adjacencies: | For storage of targets and accessories. Locate adjacent to range firing line area. | | |
| | Special Dimensions: | Minimum Ceiling Height: 8’ | | |
| | Acoustics: | n/a | | |
| | Access: | Access from firing line area | | |
| | Number of Occupants: | 0 | | |
| | Other/Special Requirements: | | | |
| | | | | |
| | **DESCRIPTION** | **QTY** | **SIZE** | **SPECIFIC REQUIREMENTS** |
| | Wall Finishes: | AR | AR | Paint |
| | Floor Finishes: | AR | AR | Sealed concrete |
| | Ceiling Finishes: | AR | AR | Painted Gypsum Board |
| | Mechanical: HVAC | AR | AR | Provide heating, and ventilation |
| | Electrical: Lighting | AR | AR | Provide lighting levels per IESNA as interpreted in UFC 3-530-01 |
| | Electrical: Receptacles | AR | AR | Provide receptacles per functional requirements and UFC 3-520-01 |
| | Shelving | 6 | 1'x3' | Provide six (6) 12"x36" minimum heavy-duty stainless steel shelves on adjustable standards |

3.2.2 SITE FUNCTIONAL REQUIREMENTS

(1) Parking. The Contractor shall design and construct the vehicle parking, within the designated constructed area. Base the location of the vehicle parking area(s) on the Installation's site constraints. The Contractor shall ensure that the location of parking complies with UFC 4-010-01. See paragraph 5.2.3, "VEHICLE PAVEMENTS", for additional information. Provide parking spaces for 30 POVs (including 2 HC) and 3 tactical vehicles (LMTVs).

(2) Service Drives: The Contractor shall provide service drives to the building. Locate the drives in accordance with UFC 4-010-01. Restrict access to the drives, where applicable, as required by UFC 4-010-01. Design the pavements as required by paragraph 5.2.3, "VEHICLE PAVEMENTS". The minimum drive width shall be 12 feet.

(3) Fire Access Lanes: The Contractor shall provide fire access lanes. Design fire access lanes in accordance with NFPA 1, UFC 3-600-01, and the installation's requirements.

(4) Construct pedestrian walks within the designated construction area and connect to existing sidewalks, where applicable.

(a) Sidewalks shall be a minimum of 6 feet wide. Sidewalks designed to support service vehicle traffic shall be a minimum of 10 feet wide. Construct walks paralleling buildings beyond the eave drip line and at least 5 feet from the foundation. Restrict vehicular access to sidewalks, as required by UFC 4-010-01.

(b) Construct non-vehicular pedestrian sidewalks of Portland Cement Concrete having a minimum normal thickness of 4 inches. Design joint patterns uniformly, symmetrical, and in accordance with AASHTO standards. Do not exceed the length to width ratio of 1.25 for non-reinforced pavements.

(c) Sidewalks designed to support emergency and service vehicle traffic will be considered roadway pavements and shall be designed to meet the AASHTO standards. Construct vehicular supported walks of Portland Cement Concrete having a minimum normal thickness of 7 inches. Design joints uniformly, symmetrical, and in accordance with AASHTO standards. Do not exceed the length to width ratio or 1.25 for non-reinforced pavements.

(5) Dumpster Area: The Contractor shall locate, design, and construct the dumpster enclosure area and screening. Locate the dumpster areas in accordance with UFC 4-010-01. Position the GFGI dumpsters outside of restricted areas to allow for servicing activities. Size dumpster pads to accommodate trash dumpsters only. No recycling dumpsters are required. Dumpster screening shall be aesthetically and architecturally compatible with the building it serves and shall be designed in accordance with the Installation's guidelines. There shall be a minimum of one (1) dumpster.

(6) Accessibility: Provide ADA compliant access from the parking lot to the building. Provide two (2) ADA compliant vehicle parking stall for POV parking. Provide handicapped vehicle parking signage and pavement markings.

3.2.3 FUNCTIONAL SPACES:

The areas identified on the floorplan in Appendix J represent the minimum net area requirements for the functional spaces. The gross area space shall be sized to accommodate the required function, comply with code requirements and other requirements of the Facility, and in no case can exceed the maximum gross area identified in Paragraph 2.0, SCOPE.

**3.3 GENERAL TECHNICAL REQUIREMENTS**

3.3.1 SITE:

Provide all site design and construction within the 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 fencing and gates, water, sewer, storm drainage and site improvements. Accessibility for individuals with disabilities will be provided. Antiterrorism/Force Protection measures shall also be included in the facility design in accordance with applicable criteria.

The Contractor shall be responsible for maintaining the construction site and haul route. Damages 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 activities shall be repaired/replaced by the Contractor at no additional cost to the Government.

3.3.1.1 Antiterrorism and Force Protection. The contractor shall evaluate this project for security requirements in accordance with UFC 4-010-01.

3.3.1.2 Storm Water Management. Site storm water management may require controls on the peak flow that can be discharged. A storm water pollution prevention plan is required. Implement the applicable portions of this plan using best management practices. Segregate drainage form areas likely to be contaminated. Provide treatment for contaminated water prior to its discharge.

3.3.1.3 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 entrance drives and other surfaces subject to vehicular traffic shall be reinforced concrete pipe with watertight joints. See paragraph 6 for additional storm drainage requirements.

**3.4 ARCHITECTURE AND INTERIOR DESIGN**

3.4.1 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.

3.4.2 BUILDING EXTERIOR:

Design buildings to enhance or complement 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.

3.4.2.1 BUILDING NUMBERS: Each building shall have exterior signage permanently attached on two faces of the building indicating the assigned building number or address.

3.4.3 BUILDING INTERIOR:

3.4.3.1 SPACE CONFIGURATION:

Arrange spaces in an efficient and functional manner in accordance with functional and area requirements.

3.4.3.2 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.

3.4.3.3 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. Coordination of the building colors and finishes is necessary for a cohesive design. Color selections shall be appropriate for the building type. The use of color, texture and pattern shall be used 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. Finishes should be selected with regards to aesthetics, maintenance, durability, life safety and image. Limit the number of similar colors for each material. Color of Ceramic and porcelain tile grout shall be medium range color to help hide soiling. Plastic laminate and solid surface materials shall have patterns that are mottled, flecked or speckled. Finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items shall be coordinated with the building interior. Color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) shall match the ceiling color.

3.4.3.4 CIRCULATION:

Circulation schemes must support easy way finding within the building.

3.4.3.5 SIGNAGE:

Provide interior signage for overall way finding and life safety requirements. A comprehensive interior plans set shall be from one manufacturer and shall include the flowing 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. Use of emblems or logos may also be incorporated into the signage plan.

3.4.3.6 WINDOW TREATMENT:

Treatment shall be provided in all exterior windows or locations where control of day light coming in windows or privacy at night is required. Uniformity of window covering color and material shall be maintained to the maximum extent possible within a building.

3.4.4 MATERIAL AND FINISHES:

3.4.4.1 DOORS / FRAMES: (fire rated where required, interior doors minimum STC 25)

(a) Exterior Doors other than Main Entrance: Provide galvanized insulated hollow metal exterior doors for entry to all spaces other than corridors, or lobbies. Doors and frames shall comply with ANSI A250.8/SDI 100. Doors shall be heavy duty (grade 2) insulated with 18-gage steel cladding; top edge closed flush; A60 galvannealed. Frames shall be 12-gauge, with continuously welded mitered corners and seamless face joints. Doors and frames shall be constructed of hot dipped zinc coated steel sheet, complying with ASTM A653, Commercial Steel, Type B, minimum A40 coating weight; factory primed. Fire-rated openings shall comply with applicable codes, and the requirements of the labeling authority. Door and frame installation shall comply with applicable codes and criteria including UFC 4-010-01, and shall meet the requirements for the ‘Ballistic Envelope’ where applicable.

(b) Main Entrance Doors: Provide aluminum storefront doors and frames with Architectural Class 1 anodized finish, fully glazed, with medium or wide stile for entry into lobbies or corridors. Framing systems shall have thermal-break design. Storefront systems shall comply with wind-load requirements of applicable codes and criteria including UFC 4-010-01.

(c) Provide vision glazing in doors where it is required. Glazing for doors passing through walls designated as part of the ‘Ballistic Envelope’ shall meet U.L. Classification Rating 5. (Range Area).

(d) Hollow core metal, insulated metal, or solid core wood doors (Administrative spaces).

3.4.4.2 WINDOWS / GLAZING: (Fire rated where required)

(a) Range Area: No widows directly to the exterior are permitted.

(b) Offices, exterior and Vestibule interior: Aluminum, insulated windows, fixed, color PVF finish.

(c) Interior Windows: Hollow core metal with fire or safety glazing as required, bullet resistant where required to maintain the ballistic envelop of the range area.

(d) Exterior Windows: Provide insulated, high efficiency window systems, with thermally broken frames complying with applicable codes and criteria including UFC 4-010-01. Window sills shall be designed to discourage bird nesting.

3.4.4.3 SPECIALTIES:

(a) Marker boards: Liquid writing marker boards, magnetic.

(b) Bulletin boards: Bulletin boards shall consist of a natural cork tack board, and aluminum tubular frame.

(c) Signage: Comply with requirements of ABA and UFAS. Interior signage shall be fully integrated as a design element with the architecture and interior design.

(d) Fire Extinguishers, Cabinets.

(e) Millwork: Built-in accessories / worktops / counters.

(f) RANGE SAFETY CEILING: Provide a safety ceiling above the firing line area. The ceiling (shield) shall extend 18 feet in front of the firing line and a minimum of 3 feet behind. This ceiling shall safely contain rounds from direct fire. Apply acoustical material and airspace to the safety ceiling panels after installation. Coordinate ceiling with the radial plenum for efficient airflow. The ceiling shall be 10 mm (0.375 in) steel plate with a nominal 500 BHN, covered with one sheet of 19 mm (0.75 in) and one sheet of 11 mm (0.4375 in) plywood. Do not use mild steel, carbon steel or low alloy steel. For general safety ceiling configuration criteria refer to Engineering Technical Letter (ER) 08-11 2008. Provide mill certificates for steel safety ceilings indicating physical properties. On steel plate, install plywood facing to mitigate the risk of “splash-back” ricochets. Attach the 19-millimeter (0.75-inch) sheathing to the steel using flathead countersunk screws. Attach the 11-millimeter (0.4375-inch) plywood to the 19-millimeter (0.75-inch) sheathing using #8 flathead screws at 300-millimeter (11.8-inch) spacing. Nominal AR500 ballistic plate manufactured to BHN 500 may have BHN values ranging from 480 to 530. Commercial baffle systems/safety ceiling products such as *Savage Range Systems* shoot-house walls may be used if shown to provide equal or better protection.

3.4.4.4 Finish Hardware: All requirements for hardware keying shall be coordinated with the Contracting Officer. Extension of the existing Installation keying system shall be provided, the Installation keying system is Best Locks. Cores shall have not less than seven pins; cylinders shall have key-removable type cores. Disassembly of knob or lockset shall not be required to remove core from lockset. Locksets for mechanical, electrical and communications rooms shall only be keyed to the existing Installation Master Keying System. Provide closers for all exterior doors, all doors opening to corridors and as required by codes. Exit devices shall be installed on all building egress doors.

3.4.4.5 Auxiliary Hardware: 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.

3.4.4.6 Hardware for fire doors: Hardware for fire doors shall be installed in accordance with the requirements of applicable codes. Exit devices installed on fire doors shall have a visible label bearing the marking “Fire Exit Hardware”. Other hardware installed on fire doors, such as locksets, closers, and hinges shall have a visible label or stamp indicating that the hardware items have been approved by an approved testing agency for installation on

fire-rated doors. Hardware for smoke-control door assemblies shall be installed in accordance with applicable codes.

3.4.4.7 Non-Destructive Emergency Access System: Fire Department Secure Lock-Box: Furnish and install a Knox-Vault 4400 Series (Single Lock Model) or government approved equal, mounted at the building exterior adjacent to the Main Entry.

3.4.5 COMPREHENSIVE INTERIOR DESIGN:

3.4.5.1 COMPREHENSIVE INTERIOR DESIGN (CID):

Refer to paragraph 5.3.6.

3.4.5.2 COLOR, SURFACE AND SIGNAGE:

Provide a signage package for all reception desks if not provided for in the buildings' overall signage package.

3.4.6 ACOUSTICAL CONSIDERATIONS

3.4.6.1 ACOUSTIC PERFORMANCE

The following paragraphs address general requirements for acoustic performance in all facility types. See specific facility paragraphs in this Section for sound control requirements specific to individual rooms. If conflicts are present between this paragraph and other portions of the RFP, select the criteria that maximize sound isolation.

3.4.6.2 Background Noise: Provide interiors that maintain ambient sound levels in primary spaces within the following Noise Criteria (NC) ranges, as defined in ASHRAE HVAC Applications Handbook, when adjacent spaces are occupied and are being used normally:

Classroom: 25-30.

Range Officer Room: 30-35.

3.4.6.3 Airborne Sound Isolation: Design and construct interior construction to achieve the following minimum noise isolation class (NIC) values between adjacent spaces, when tested in accordance with ASTM E 336 and classified in accordance with ASTM E 413, based on NC values specified.

a. Spaces of Like Function and Similar NC Value: NIC 36.

b. Quiet Space (NC Values of 20-30) and Very Noisy Space (NC Values of 50-60): NIC 48.

c. Exception: adjacent offices, or adjacent offices and conference rooms, requiring High Speech Confidentiality: NIC 50.

3.4.6.4 Range Noise Control: The range design and construction must address noise control. Noise from the ventilation system shall not exceed 85 decibels (dBA) behind the firing line. Noise reduction in the range and noise transmission out of the range are different design considerations. Mass and limpness are two desirable attributes for sound absorption. Unpainted heavy masonry walls provide mass. Absorptive acoustical surfacing will reduce the noise level in the range but have little effect on transmission outside the range. Ambient noise levels at the firing line shall not exceed 85 dBA, and should be considerably less to improve communication between shooters and the range official. Short duration noise such as gunfire will exceed the 85 dBA level and may be as high as 160 dBA. The range design must prevent the reflection of these higher noise levels by using sound-absorbing materials.

Effective noise control measures are required to reduce noise-induced hearing loss among firing range operators, employees, and users. Noise control measures shall be compatible with ventilation requirements and meet fire and building codes. Noise controls shall address the primary two components of noise transmission—airborne and structural-borne sounds:

To reduce transmission of airborne sounds, no leaks can exist between the firing range and adjacent spaces. Small openings such as electrical outlets, spaces around doors, and joints at the walls, ceiling, and floor shall be sealed with insulation and/or weather stripping as needed. Ventilation ducts that provide a direct acoustic path into adjacent spaces shall be fitted with acoustic absorptive materials, both to remediate vibrations in the walls of the duct and to absorb noise transmitted along the duct. Special care must be paid to the maintenance and handling of acoustic absorptive materials to prevent lead dust accumulation. The design of walls shall minimize transmission of airborne sounds through combinations of gaps, absorptive materials, and different wall thicknesses.

To reduce the transmission of structural-borne sounds and vibration, acoustical absorptive materials shall be applied to walls, windows, doors, ventilation ducts, and ceilings. Use special care when applying acoustical absorptive materials to prevent them from damage or becoming dust-laden. The interior surface of firing range walls shall be treated to minimize absorption of airborne particulates, to make cleaning easier, and to resist lead and nitrate penetration. Observation room windows shall be designed to withstand bullet impacts and to maximize sound reduction. The glass shall be laminated and certified as bullet-impact resistant. If double panes of glass are used, then the glass that is in the firing range should be bullet-impact resistant and of a different thickness than the interior pane to increase noise reduction.

The Contractor shall provide testing of the installed system as verification that the system meets the performance requirements. The Contractor shall submit a testing plan to be approved by the Government prior to system testing. The testing plan shall include the experience and qualifications of personnel performing the test and analyzing the results. The Government will provide all weaponry support required for testing of the system. The test agency shall provide documentation with recommended firing operations restrictions for each weapon type under slow, rapid, and automatic firing conditions, to include recommended firing operations for suppressed weapons. The test results shall be submitted to the Government prior to acceptance of the installed system. O&M manuals shall be provided for the range sound attenuation system.

3.4.6.4.1 Use acoustical treatment on surfaces behind the firing line. Floor areas behind the firing line may be covered with acoustic material (rubber mats) if it will not impede heavy metal dust removal.

3.4.6.4.2 Acoustic panels shall be installed on walls and ceilings in the firing line area. Blown-on acoustic material and carpeting are not permitted due to the difficulty of cleaning accumulated heavy metal dust. All surfaces within the range area shall be selected to ensure ease of cleaning and to minimize the accumulation of lead dust. The installed system shall be waterproof, mold resistant, and durable to allow for maintenance without damaging or hindering the acoustical performance. The materials shall be listed by Underwriters Laboratories as Non-Combustible. Provide surface applied acoustical panels within the limits of the firing range. Panels shall be applied to walls, ceilings and or baffles to provide acoustical absorption within the range envelope. The minimal acoustical properties are as follows:

Flame Spread: 10 max in accordance with ASTM E 84

Smoke Density: 10 in accordance with ASTM E 84

Noise Reduction Coefficient (NRC): 0.85 or better throughout the range area

Reverb Time (IAW ASTM RT60): 1.3 seconds or less at all firing positions in the range, in all octave bands from 125 to 8000 Hz

The minimum amount of materials shall be based on providing the equivalent area equal to the projected ceiling area of the range. The material shall be applied to the walls, ceiling and baffles of the range as determined by the designer of record. In no case shall the wall panels be applied within 15' of the front edge of the bullet trap. The installed system shall maintain the required acoustical performance without degradation of the acoustical integrity due to bullet splash back.

The installed system shall be uniform without dimensional deviations, include no projections from bolt, and rivet heads, exposed edges, or other uneven surfaces to reduce potential ricochets.

**3.5 STRUCTURAL DESIGN**

3.5.1 STANDARDS AND CODES:

The structural design shall be in conformance with the current versions of the Unified Facilities Criteria UFC 1-200-01 Design: General Building Requirements and other relevant codes and criteria listed in APPLICABLE CRITERIA.

3.5.2 GENERAL:

The structural system needs to be compatible with the intended functions and components that allows for future flexibility and reconfigurations of the interior space. Select an economical structural system based on facility size, projected load requirements and local availability of materials and labor. The structural design shall be based on accurate site specific geotechnical information and anticipated loads for the building type and geographic location.

3.5.3 STRUCTURAL LOADS:

Structural loads (including, dead, live, hydrodynamic, earth, vehicular, snow, wind, seismic loads, and ATFP) and design shall be in accordance with UFC 1-200-01 Design: General Building Requirements and all codes referenced in APPLICABLE CRITERIA.

3.5.4 STRUCTURAL CEILING:

Provide a flush surfaced structural ceiling over the entire range area (from front of range control). This ceiling shall be constructed of pre-cast or cast-in-place concrete and designed to contain rounds fired within the Range. Ballistic requirements mandate a 7-inch minimum total concrete thickness with a 5000 psi compressive strength.

**3.6 PLUMBING**

3.6.1 EXTERIOR WALL HYDRANTS:

Wall hydrants shall be provided around perimeter of building per UFC 3-600-01 and NFPA requirements.

3.6.2 DOMESTIC HOT WATER SYSTEM:

The main water heating equipment shall be located within a mechanical room, and also located on the ground floor level only. Instantaneous water heaters are permissible. System storage and recovery shall be sized for delivery of hot water at every shower head over a continuous operation of all heads for a duration of 60 minutes. Usage diversity factor for the showers shall be one. Size water heater(s) based upon usage anticipated and accounting for this diversity factor. The energy source for the domestic water heating system shall be determined by Life Cycle Cost Analysis.

3.6.3 FLOOR DRAINS:

Provide in mechanical rooms, restrooms, janitor closet, and to receive condensate from air handling equipment. Design drains for easy cleaning. Provide basket strainers to facilitate trash removal where drains discharge to piping systems.

3.6.4 EMERGENCY SHOWERS AND EYEWASHES:

Provide eye wash, hand wash and emergency shower where required by referenced codes and locate emergency wash stations in accordance with OSHA standard 1910.151(c) and ANSI Z358.1.

**3.7 ELECTRICAL AND TELECOMMUNICATIONS**

3.7.1 ELECTRICAL SERVICE AND DISTRIBUTION:

Facility power shall be designed in accordance with NFPA 70, UFC 3-501-01 Electrical Engineering, and UFC 3-520-01 Interior Electrical Systems.

Service entrance switchgear shall be located in a dedicated Electrical Room with entrance door directly to the exterior. The switchgear shall be floor-mounted and consist of a main bolted pressure switch, check metering equipment, and a distribution section. The switchgear shall be 208Y/120 volts rated and have the capacity for the total building connected load and sufficient spare capacity to meet future anticipated growth of 20%. Provide ANSI/IEEE Category C transient voltage surge suppressor at the switchgear.

Provide separate lighting, receptacle and mechanical equipment normal power panelboards. Provide ANSI/IEEE Category B transient voltage surge suppressor at the receptacle panel.

Provide an emergency power panelboard connected through a manual transfer switch to normal power from the switchgear and to emergency power from a portable generator receptacle mounted on the building exterior. Exit lights, emergency lighting battery fixtures, selected outlets, communications systems, the security system, the fire alarm system, and mechanical equipment motor necessary to provide minimal building heat shall be connected to the emergency power panel for building operation during an extended power outage. Exit and emergency lighting, communications, the security systems, and the fire alarm system shall contain batteries for instantaneous back-up power.

3.7.2 STANDBY POWER SYSTEMS:

Standby Generator and UPS Back-Up Power Systems generally will not be required for these facilities. Government Furnished – Government Installed (GFGI), UPS systems may be considered for communications and data systems but will generally not be large in nature and will not be provided by the design.

3.7.4 LIGHTNING PROTECTION:

Lightning Protection generally will be required for all facilities and shall be designed in accordance with NFPA 780.

3.7.5 POWER DISTRIBUTION:

Power receptacles will be provided per UFC 3-520-01, NFPA 70 and in conjunction with proposed equipment and furniture layouts. 110VAC Power will be required at each work station.

3.7.6 LIGHTING:

Interior lighting controls shall be provided in accordance with ASHRAE 90.1. Local manual controls shall supplement automatic controls in offices and specialized areas such as conference rooms. Occupancy sensor

controls shall be provided in restrooms, electrical rooms, telecommunication rooms and similar spaces. Interior ambient illumination shall provide a generally glare free, high quality lighting environment.

Interior and exterior lighting and controls shall be designed in accordance with UFC 3-530-01.

Range lighting: A variety of light fixtures are required in the Firing Range Area. All fixtures shall be controlled from the Range Control Room. The fixtures illuminating the target lines shall be controlled from a panelboard in the Range Control Room to contain circuit over-current protection and a circuit full-range (100% to 0%) dimmer. Provide lighting controls in the Range Control Room to switch between four modes: normal-on, normal-off, Night Vision (NV), and manual. Normal-on shall produce the minimum levels described below. Normal-off turns off all lights except exit and emergency lights. NV eliminates power to all lights, including a switch on the load side of the battery for the exit and emergency light fixtures. Manual mode defaults to normal-on, but permits dimming of target line fixtures. Provide range lighting to produce minimum maintained light levels as listed below:

Range Area, General: 300 to 500 lux,

Range Area, Firing Line: 400 to 600 lux,

Range Area, Target (10M, 25M): 1,000 lux (vertical)

3.7.7 TELECOMMUNICATIONS:

3.7.7.1 GENERAL:

The facility shall be connected to the Installation wide area network system (WAN) and telephone system. Communications system resources will be allocated IAW the I3A Technical Criteria regarding outlet amounts based on the functionality of the facility's various component floor spaces. Design will be in accordance with the I3A Technical Criteria.

An acceptable building telecommunications cabling system encompasses, but is not limited to, copper and fiber optic (FO) entrance cable, termination equipment, copper and fiber backbone cable, copper and/or fiber horizontal distribution cable, workstation outlets, racks, cable management, patch panels, cable tray, cable ladder, grounding, and labeling. Telecommunications outlets will be provided per the I3A Technical Criteria based on functional purpose of the various spaces within the facility as modified by user special operational requirements. Telecommunications infrastructure will meet the Installation Information Infrastructure Architecture (I3A) Criteria and ANSI/TIA/EIA requirements.

VOICE/DATA OUTLETS:

Voice/data outlets shall be two 8-pin modular (RJ45 type) outlet/connector in a double gang outlet faceplate, one connector labeled voice use and one labeled data use. Copper outlet/connector must be TIA/EIA Category 6 for all projects. All connectors must be 8-pin/8-position insulation displacement terminations wired per T568B. One Cat 6 UTP cable must be installed to each standard 8-pin modular connector provisioned at the faceplate. Copper distribution cable must be terminated at the TR on Cat 6 cabinet or rack mounted patch panels with 110-type compliant connectors on the back and 8-pin modular connecters on the front.

OUTSIDE PLANT TELECOMMUNICATIONS SYSTEMS:

The project's facilities must connect to the Installation telecommunications (voice and data) system through the outside plant (OSP) underground infrastructure per I3A criteria. Connections to the OSP cabling system shall be from each facility main cross connect located in the main telecommunications room or telecommunications equipment room to the closest OSP access point. Components include the physical cable plant and the supporting structures. Items included under OSP infrastructure encompass, but are not limited to, maintenance hole and duct infrastructure, copper cable, fiber optic cable, cross connects, terminations, splices, cable vaults,

and copper and FO entrance facilities. Fiber optic cable must be installed in innerduct. If no spare innerduct is available the Contractor must install a 3-inch, 3 cell fabric mesh innerduct and pull string.

TELECOMMUNICATIONS ROOMS (TR):

Telecommunications rooms and telecommunications entrance facilities must be provided for unclassified network and voice equipment and cabling infrastructure throughout the facilities. There shall be a minimum of one telecommunications room on each floor, located near the center of the building, and stacked between floors. The telecommunications rooms will be designed and provisioned in accordance with the I3A Technical Criteria and ANSI/EIA/TIA-569-B. One telecommunications entrance capability shall be provided for the facility. The telecommunications entrance may be collocated with the main TR for the facility. TR's shall be sized for the area supported.

CATV:

Provide a completely operational CATV cabling system including, but not limited to, all necessary raceways, cabling, terminations, jacks and faceplates will be provided. The horizontal cable for the CATV system will be RG-6 with "F" type connectors on the terminal end. The CATV cabling will be terminated on splitters in the telecommunications room, or in a location indicated by the installation NEC. CATV riser cable will be RG-11 type. Splitters will be located on the CATV backboard in the telecommunications room, or in a location indicated by the NEC. All CATV horizontal cabling will be homerun between CATV jacks and the CATV backboard. Service requirements to the building will be coordinated with the local CATV service provider. At a minimum provide one 4' empty conduit stubbed out of the building to facilitate the CATV service entrance.

Each utility space, such as mechanical, electrical and telecommunications rooms will be provided with at least one wall mounted telecommunications outlet, with a wall mounting lug face plate near the entrance door.

3.7.8 MISCELLANEOUS SYSTEMS:

Secure Access Systems, Intrusion Detection Systems (IDS), Closed Circuit Television (CCTV) shall typically be designed to only provide raceways and back boxes for installation of these systems. Project specific requirements must be coordinated.

3.7.8.1 Coordinate anticipated locations of devices and provide raceways and back boxes for installation of a secure access system per Army Installation Design Standards paragraph 3.5.11, "Locks and Locking Devices".

3.7.8.2 Coordinate anticipated locations of devices required for a complete IDS and CCTV system. The design shall provide raceways and back boxes for installation of a complete system.

3.7.9 FIRE ALARM DETECTION AND NOTIFICATION:

Provide a complete detection and notification system that is able to interface with all facility fire protection systems, including, but not limited to sprinkler, Mass Notification System and Installation Fire Station. Design will be in accordance with NFPA 72, UFC-3-600-01, ETL 1110-3-485 and the local authority having jurisdiction.

3.7.10 MASS NOTIFICATION AND PAGING SYSTEMS:

Provide a Mass Notification System in accordance with UFC- 4-021-01. Provide the speakers, raceways and back boxes for a complete Paging System, typically, amplifiers and pre-amplifiers are provided separately. In some instances, it may be more efficient to the specific project to design an integrated Fire Alarm, Mass Notification and Paging System. Specific project requirements will determine.

**3.8 HEATING, VENTILATING AND AIR CONDITIONING**

3.8.1 STANDARDS AND CODES:

The HVAC system shall conform to APPLICABLE CRITERIA, as well as the following criteria. In all cases the designer shall interpret all recommendations contained in the criteria as requirements unless specifically noted in this Section, e.g. the word “should” is to replaced with “shall”.

US Navy Environmental Health Center Technical Manual NEHC-TM6290.99 Rev. 1 (May 2002) "Indoor Firing Ranges Industrial Hygiene Technical Guide"

US Navy Military Handbook MIL-HDBK-1027/3B (30 Nov 1992) "Range Facilities and Miscellaneous Training Facilities Other Than Buildings"

MIL-HDBK-1027/3B will be replaced by Unified Facilities Criteria UFC 4-160-01 "Design and Maintenance of Small Arms Ranges." UFC 4-160-01 is listed for reference only.

NIOSH National Institute of Occupational Safety and Health "Lead Exposure and Design Considerations for Indoor Firing Ranges"

29 Code of Federal Regulations (CFR) 1910.1025 "Lead"

Reference only - US Air Force Engineering Technical Letter ETL 08-11 "Small Arms Range Design and Construction"

National Guard Regulation NGR 385-15, Policy and Responsibilities for Inspection, Evaluation and Operation of Army National Guard Indoor Firing Ranges

3.8.2 ADMINISTRATIVE AREAS:

See Table 3.8 for heating and cooling of administrative areas. HVAC system design should consider including flexibility in zoning to where it can address future changes in occupant densities. Administrative areas shall be temperature-controlled by the DDC system. Temperature setpoint adjustment shall be accomplished via DDC System by authorized personnel.

3.8.3 FIRING RANGE AREA:

The area from the end of the range (control room wall) to 10 feet past the firing line, minimally, as well as along the full length perimeter walls, shall be heated by using a floor radiant heat system in accordance with UFC 3-410-01. The radiant heat system shall be sized to maintain a minimum temperature of 55 degrees F with the range ventilation system turned off during the winter design conditions. The in-floor radiant system shall be hydronic type.

RANGE VENTILATION SYSTEM OVERVIEW

The range ventilation system serves the firing range portion of the building to include the bullet trap area. The system is a 100% purge type system using all outside air. Provide a heating system for the range.

The primary supply air equipment shall be located in mechanical equipment rooms at the support area end of the building. Design/build a supply air distribution system that provides an even air flow (75 fpm +/- 5 percent with no single reading less than 50 fpm or more than 110 fpm) in each firing lane and at each firing position (standing, kneeling, and prone) across the width of the range that meets the acceptance criteria provided herein. Design/build for laminar airflow to “go smartly down range.” Provide a radial diffuser for the supply air and a continuous slot to capture the exhaust air. The Contractor’s specialized Range Ventilation Contractor may provide an intermediate exhaust if determined to be beneficial to achieve the required air flow. Make all ductwork absolutely symmetrical. Provide variable frequency drives on both supply and exhaust systems.

Maintain a negative air pressure in the firing range and bullet trap area of -0.04 +/- 0.02 inches of water gage relative to the support area. The negative pressurization requires tight seals on all doors, wall and roof joints at the perimeter of the firing range and bullet trap area.

All of the range HVAC components shall be located in the mechanical space at the bullet trap end of the range. The exhaust air equipment includes a two stage filter bank. System shall meet the most stringent recommendations of National Institute for Occupational Safety and Health (NIOSH Document 76-130), National Guard Regulation NGR 385-15, and the Navy Environmental Health Center (NEHC TM6290.99-100). Provide easy access to filter bank for filter removal and replacement. Provide High-Efficiency Particulate Arrestor (HEPA) filter for final filter. The HEPA filter shall be a minimum of 12” deep, having an efficiency of not less than 99.97% when tested in accordance with IEST Recommended Practice for HEPA filter evaluation. Isolate the supply intake from the exhaust outlet to avoid short circuiting. Provide sufficient range in the exhaust system airflow to allow sufficient time between HEPA filter changes.

Provide energy recovery for range heating. Energy recovery system shall be selected to ensure that exhaust air does not mix with outside air. The designer shall consider the outside air design temperature and shall provide components to ensure continuous operation with minimal maintenance requirements. The use of pre-heat and filtering shall be included in full compliance with component manufacturer’s recommendations.

The Range Ventilation Contractor shall provide a minimum of 1 year's maintenance and warranty along with performance monitoring for the range ventilation system as part of this contract.

3.8.5 DESIGN CONDITIONS:

3.8.5.1 Design shall be based on weather data from recognized and authoritative sources weather data. Indoor design conditions shall conform to Table 3.8. Indoor air quality shall conform to the current ASHRAE Standard 62.1 and OSHA requirements.

**TABLE 3.8 – INDOOR DESIGN DATA**

**HEATING:**

Indoor Design Temperature 70°F

Unoccupied Space Design Temperature 55°F

Firing Range Area 65°F

**COOLING:**

Indoor Design Temperature 75°F

Unoccupied Space Design Temperature 85°F

3.8.6.2 In geographical areas of high humidity, take appropriate measures to control moisture. In areas of high humidity, provisions will be made for cure rooms/spaces to have dehumidification procedures to bring ambient relative humidity in the cure rooms/spaces down to 40 percent relative humidity to allow for acceptable cure times.

3.8.6.3 To prevent mold formation in buildings, air conditioning systems must be designed to maintain space humidity at reasonable levels. Include the following considerations in the design of the air conditioning systems. Avoid over sizing of cooling equipment. Design single zone systems and multi-zone systems to maintain an indoor design condition of 50% relative humidity. Size cooling coils for the greater of the cooling load calculated at the design dry bulb temperature condition or the design humidity condition. Where fan coil units are used, provide a non-permeable wall covering behind the unit. Provide ventilation air from a separate dedicated air handling unit.

Do not condition outside air through fan coil units. Avoid the use of direct expansion cooling coils in air handling units with constant running fans that handle outside air.

**3.9 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), Testing Adjusting, and Balancing Bureau (TABB). 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.

**3.10 COMMISSIONING**

Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for LEED Fundamental commissioning, in accordance with ASHRAE Guideline for the Commissioning Process and LEED. The Contractor shall hire the Commissioning Authority, certified as a Commissioning Authority by AABC, NEBB, or TABB, as described in the ASHRAE Guideline for the Commissioning Process. The Contracting Officer’s Representative will act as the Owner’s representative in performance of duties spelled out under OWNER in Annex A2 of the ASHRAE Guideline for the Commissioning Process.

**3.11 ENERGY CONSERVATION**

3.11.1 DESIGN:

Design the buildings, including the building envelope, HVAC systems, service water heating, power, and lighting systems to achieve an energy consumption that is below the consumption of a baseline building by the percentage stated in paragraph 5.9.2 or 30%, whichever is greater, 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. Base the selection of solutions and technologies to achieve the above energy performance requirements on life cycle cost analysis. Life Cycle Cost Analyses shall follow the requirements set forth in NIST Handbook 135 Life-Cycle Costing Manual using an automated calculation tool such as BLCC. Cyclical and annual maintenance costs used shall come from ASHRAE recommendations or other similar Industry Standard sources.

3.11.2 ENERGY STAR:

The contractor shall purchase Energy Star or FEMP designated products. 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. In the case of an electric motor of 1 to 500 horsepower the Contractor shall select only a premium efficient motor.

**3.12 FIRE PROTECTION**

3.12.1 STANDARDS AND CODES:

The facility shall be protected with a fire sprinkler system in accordance with UFC 3-600-01. The classroom and lobby areas shall use a wet pipe system designed for Light Hazard occupancy. The mechanical rooms shall use a wet pipe system designed for Ordinary Hazard Group 1 occupancy. The firing line area in the range shall use a dry pipe system designed for Ordinary Hazard Group 1 occupancy. Sprinklers are not required downrange of the firing line in the indoor range area.

3.12.2 QUALIFICATIONS OF FIRE PROTECTION ENGINEER:

The design of the fire protection features shall be by a qualified fire protection engineer meeting one of the conditions indicated in UFC 3-600-01.

3.12.3 FIRE PROTECTION AND LIFE SAFETY ANALYSIS:

A fire protection and life safety design analysis shall be provided for all buildings in the project. The analysis shall be submitted with the preliminary 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.

3.12.4 SPRINKLER SYSTEM:

3.12.4.1 Backflow Preventer: A double check RPZ backflow preventer shall be provided on the fire water main and 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.

3.12.4.2 Fire Department Connection: A fire department connection shall be provided. These shall be located to be directly accessible to the fire department.

3.12.5 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.

3.12.6 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.

3.12.7 FIRE WATER SUPPLY:

Fire flow test data is provided in the appendix. The Contractor shall be responsible for coordinating with the geographic district in acquiring fire flow test data for preliminary fire protection system design. The Contractor

shall verify the fire flow data by conducting necessary fire flow tests at the project site during project design and shall base the design of fire protection system on the results of this test.

3.12.8 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.

3.12.9 FIRE DETECTION AND ALARM:

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 fully compatible with and integrated with the local base wide central monitoring system.

3.12.10 BUILDING CONSTRUCTION:

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

3.12.10.1 Fire Extinguishers: Portable fire extinguishers shall be provided where required by NFPA 101. Portable fire extinguishers shall be located and installed in accordance with NFPA 10, Portable Fire Extinguishers.

3.12.10.2 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.

3.12.11: INSPECTION AND TESTING:

Inspect and test all fire suppression equipment and systems, fire pumps, and fire alarm and detection 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.

3.12.12: FIRE EXTINGUISHER CABINETS:

Provide fire extinguisher cabinets and locations for hanging portable fire extinguishers in accordance with NFPA 10 Standard for Portable Fire Extinguishers.

3.12.13: FIRE ALARM AND DETECTION SYSTEM:

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.

## 4.0 APPLICABLE CRITERIA

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

### 4.1. INDUSTRY CRITERIA

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

**Table 1: Industry Criteria**

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

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

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

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| **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)** | |
| Version 1.2 | AWI Quality Standards 7th Edition |
| **Associated Air Balance Council (AABC)** | |
| AABC MN-1 | National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems |
| | AABC Associated Air Balance Council Testing and Balance Procedures |
| **ASTM International** | |
| ASTM C1060-90(1997) | Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings |
| ASTM E 779 (2003) | Standard Test Method for Determining Air Leakage Rate by Fan Pressurization |
| ASTM E1827-96(2002) | Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door |
| **Builders Hardware Manufacturers Association (BHMA)** | |
| ANSI/BHMA | American National Standards for Builders Hardware |

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| **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 |

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| IESNA RP-8 | Roadway Lighting |
| IESNA Lighting Handbook | Reference and Application |
| **Institute of Electrical and Electronics Engineers Inc. (IEEE)** | |
| | Standard for Use of the International System of Units (SI): the Modern Metric System |
| Standard 1100 | Recommended Practice for Powering and Grounding Sensitive Electronic Equipment |
| **International Code Council (ICC)** | |
| IBC | International Building Code<br><br>Note: All references in the International Building Code to the International Electrical Code shall be considered to be references to NFPA 70.<br><br>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.<br><br>All references in the International Building Code to the International Fire Code and Chapter 9 shall be considered to be references to Unified Facilities Criteria (UFC) 3-600-01. |
| IMC | International Mechanical Code –<br><br>Note: For all references to “HEATING AND COOLING LOAD CALCULATIONS”, follow ASHRAE 90.1<br><br>Note: For all references to “VENTILATION”, follow ASHRAE 62.1 |
| IRC | International Residential Code |
| IPC | International Plumbing Code |
| IEC | Energy Conservation Code (IEC) –Applicable only to the extent specifically referenced herein. Refer to Paragraph 5, ENERGY CONSERVATION requirements. |
| IGC | International Gas Code - not applicable. Follow NFPA 54, National Fuel Gas Code and NFPA 58, Liquified Petroleum Gas Code. |
| **International Organization for Standardization (ISO)** | |
| ISO 6781:1983 | Qualitative detection of thermal irregularities in building envelopes – |

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| | 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 |

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| NFPA 14 | Standard for the Installation of Standpipes and Hose Systems |
| NFPA 20 | Installation of Centrifugal Fire Pumps |
| NFPA 24<br><br>NFPA 25 | Standard for the Installation of Private Fire Service Mains and Their Appurtenances [underground fire protection system design]<br><br>Inspection, Testing And Maintenance Of Water-Based Fire Protection Systems |
| NFPA 30 | Flammable and Combustible Liquids Code |
| NFPA 30A | Motor Fuel Dispensing Facilities and Repair Garages |
| NFPA 31 | Installation of Oil Burning Equipment |
| NFPA 54 | National Fuel Gas Code |
| NFPA 58 | Liquefied Petroleum Gas Code |
| NFPA 70 | National Electrical Code |
| NFPA 72 | National Fire Alarm Code |
| NFPA 76 | Fire Protection of Telecommunications Facilities |
| NFPA 80 | Standard for Fire Doors and Fire Windows |
| NFPA 90a | Installation of Air Conditioning and Ventilating Systems |
| NFPA 96 | Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations |
| NFPA 101 | Life Safety Code |
| NFPA 780 | Standard for the Installation of Lightning Protection Systems |
| **National Roofing Contractor's Association (NRCA)** | |
| | Roofing and Waterproofing Manual |
| **National Sanitation Foundation, International** | |
| NSF/ANSI Std. 2, 3, 4, 5, 6, 7, 8, 12, 13, 18, 20, 21, 25, 29, 35, 36, 37, 51, 52, 59, | Food Equipment Standards |

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| 169 | |
| 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)** | |

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

4.2. MILITARY CRITERIA

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

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

4.2.2. Executive Order 12770: Metric Usage In Federal Government

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

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

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

4.2.5. Deleted.

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

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

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

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

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

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

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

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

## 5.0 GENERAL TECHNICAL REQUIREMENTS

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

5.1. SITE PLANNING AND DESIGN

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

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

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

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

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

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

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

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

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

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

5.2. SITE ENGINEERING

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

5.2.2. SOILS:

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

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

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

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

5.2.3.2. Parking Requirements.

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

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

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

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: Each building shall have exterior signage permanently attached on two faces of the 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. Coordination of the building colors and finishes is necessary for a cohesive design. Color selections shall be appropriate for the building type. The use of color, texture and pattern shall be used 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. Finishes should be selected with regards to aesthetics, maintenance, durability, life safety and image. Limit the number of similar colors for each material. Color of Ceramic and porcelain tile grout shall be medium range color to help hide soiling. Plastic laminate and solid surface materials shall have patterns that are mottled, flecked or speckled. Finish colors of fire extinguisher cabinets, receptacle bodies and plates, fire alarms / warning lights, emergency lighting, and other miscellaneous items shall be coordinated with the building interior. Color of equipment items on ceilings (speakers, smoke detectors, grills, etc.) shall match 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: Interior window treatments with adjustable control shall be provided in all exterior window locations for control of day light coming in windows or privacy at night. Uniformity of treatment color and material shall be maintained to the maximum extent possible within a building.

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.

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 needs to be compatible with the intended functions and components that allows for future flexibility and reconfigurations of the interior space. 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”. In addition to gravity, seismic and lateral loads, design the ancillary building items, e.g. doors, window jambs and connections, overhead architectural features, equipment bracing, 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.

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 such as at elevator shafts.

5.5.2.9. Damper and control to close all ventilation or make-up air intakes and exhausts, atrium smoke exhausts and intakes, etc when leakage can occur during inactive periods.

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

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

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

(a) 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 either pressurization or depressurization or both. 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.

(b) 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.

(c) 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, the design for underslab piping systems and underground piping serving chillers, cooling towers, etc, shall include features 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, piping should be suspended 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 vitreous china, wall-mounted, wall outlet, non-water using, with integral drain line connection, and with sealed replaceable cartridge or integral liquid seal trap. Either type shall use a biodegradable liquid to provide the seal and maintain a sanitary and odor-free environment. Install, test and maintain in accordance with manufacturer's recommendations. Slope the sanitary sewer branch line for non-water use urinals a minimum of 1/4 inch per foot. Do not use copper tube or pipe for drain lines that connect to the urinal. Manufacturer shall provide an operating manual and on-site training to installation operations personnel for the proper care and maintenance of the urinal. For complexes, non-water using urinals are not required for barracks type spaces.

5.6.8. BUILDING WATER USE REDUCTION. Reduce building potable water use in each building 30 percent using IPC fixture performance requirements 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.

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

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

5.7.5.1. Interior Lighting:

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

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

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

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

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

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

5.7.6. TELECOMMUNICATION SYSTEM: All building telecommunications cabling systems (BCS) and OSP telecommunications cabling system shall conform to APPLICABLE CRITERIA to include 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. 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.

5.8.2.2. Design systems in geographical areas that meet the definition for high humidity in UFC 3-410-01FA in accordance with the special criteria for humid areas therein.

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

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

5.8.2.5. Environmental Requirements for Telecommunications Rooms,(including SIPRNET ROOMS, where applicable for specific facility type). Comply with ANSI/EIA/TIA 569 and the I3A.

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. The Building Automation System (BAS) shall be a single complete non-proprietary Direct Digital Control (DDC) system for control of the heating, ventilating and air conditioning (HVAC) and other building systems. The BAS shall be based on an Open implementation of BACnet using ASHRAE 135-2004 exclusively as the communications protocol for communication between DDC Hardware devices to allow multi-vendor interoperability. The building BAS shall include integration to a basewide supervisory monitoring and control (M&C) system.

5.8.3.1. The 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 hardware vendor or their agents. This includes, but is not limited to the following:

- Hardware shall be installed such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.
- Necessary documentation (including rights to documentation and data), configuration information, configuration tools, application programs (with comments explaining program logic), application source code for programmable controllers, drivers, and other software shall be licensed to and 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:

- Be connected to a ASHRAE 135 MS/TP control network.
- Implement all required functionality of the application network interface via BACnet objects, properties, and services
- Shall conform to basewide addressing schemes, particularly with regard to Device ID.
- Minimize the use of proprietary BACnet objects and properties
- Not use any of the following BACnet services for application control functionality or communication:
  - AtomicFile or AtomicFileWrite
  - ConfirmedTextMessage or UnconfirmedTextMessage
  - ConfirmedPrivateTransfer or UnconfirmedPrivateTransfer
- Communicate over the control network via ASHRAE 135 exclusively.
- Conform to the BACnet Testing Lab's Device Implementation Guidelines.
- Be capable of responding to Who-Is/I-Am and Who-Has/I-Have service requests.
- All settings and parameters used by the application shall be fully configurable:
  - to the greatest extent possible, via properties of BACnet objects that can be written to via BACnet services.
  - via properties of BACnet objects that can be written to via BACnet services for the following

- Setpoint
- Alarm limit
- Schedule modification
- Trend modification
  - All other settings and parameters that can not be written to via BACnet services shall be fully configurable via either:
- Properties of BACnet objects that can be written to with a configuration tool, or
- Hardware settings on the controller itself to support the application.
- Provide BACnet objects, properties, and services required to support the application and supervisory monitoring and control functionality including:
  - System start/stop and overrides.
  - Scheduling
  - Alarming
  - Trending
- To the greatest extent practical, not rely on the control network to perform the application
- Be BTL Listed

5.8.3.3. Include any device capable of communicating over IEEE 802.3 (Ethernet) in a DIACAP and Certificate of Networthiness (CoN) for this installation, regardless of whether the Ethernet connection is active at time of installation. Do not use devices with Ethernet connection capability not included in a DIACAP or without a DIACAP or without a CoN shall not be used.

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

5.8.3.5. Not Used

5.8.3.6. Perform all necessary actions needed to fully integrate the ASHRAE 135-based building control system to the UMCS. These actions include but are not limited to:

- Install BACnet MS/TP-to-IP routers and/or BACnet/IP Broadcast Management Devices (BBMD) in accordance with ASHRAE 135 Annex J as needed to connect the building control network to the UMCS IP network. Devices shall be capable of configuration via DHCP and Write-Broadcast-Distribution-Table messages but shall not rely on these services for configuration. All communication between the UMCS and building networks shall be via BACnet/IP and in accordance with ASHRAE 135. Any IP network work including access to existing networks shall be coordinated with the installation Network Enterprise Center (NEC).
- 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.
- Configure M&C software to provide hierarchically arranged screens to allow operator to configure (via BACnet services to the appropriate objects) all devices on the installation BACnet internetwork. The following adjustments shall be supported:
  - Setpoints
  - Alarm limits
  - Schedules
  - Trends

This requirement is separate from and in addition to the requirement to provide all necessary programming and configuration software.

5.8.3.7. Perform all necessary actions needed to integrate legacy systems to the UMCS. 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. Integration may be via drivers in the M&C Software or hardware gateways may be provided. Where hardware gateways are provided, include all hardware, software, software licenses, and configuration tools required for gateway operation, modification, and maintenance. Configure software driver or a hardware gateway to support M&C software functionality as listed above.

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

- The latest version of all software including source code for application software (for programmable controllers), software licenses, 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 for each device:
  - Device ID and network address (MS/TP network and MAC address, or IP address).
  - Input and Output Objects including Name, Type, Description, and relevant supported or required Properties.
  - Hardware I/O, including Type (AI, AO, BI, BO) and Description.
  - Alarm information including alarm limits and BACnet device IDs, object IDs, and property information.
  - Supervisory control information including BACnet device IDs, object IDs, and properties for trending and overrides.
  - Objects and Properties needed for device configuration.
  - Device IDs and objects (where applicable) of remote devices and objects that communicate with the given Device (e.g. clients and servers for BACnet services used by the given device).
  - 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 BACnet Device IDs, BACnet network addresses, network names, and locations.
- A consolidated list of all Device IDs.
- Control System Schematic diagram and Sequence of Operation for each controlled 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.
- 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 MS/TP or IP local control bus IAW ASHRAE135 section 9 or Annex J. | |
| 2 | Communication between DDC Hardware is only via ASHRAE 135. PrivateTransfer, TextMessage, or AtomicFile services have not been used. | |
| 3 | All sequences are performed using DDC Hardware. | |
| 4 | All software has been licensed to the Government | |
| 5 | Final As-built Drawings accurately represent the final installed system. | |
| 6 | O&M Instructions have been completed and submitted. | |
| 7 | All DDC hardware connected or intended to be connected to the IP network is covered under a DIACAP and has a certificate of Networthiness | |
| | | |
| 8 | M&C software monitoring displays have been created for all building systems, including all override and display points indicated on Points Schedule drawings | |
| 9 | Connections between the UMCS IP network and ASHRAE 135 building networks is in accordance with ASHRAE 135 Annex J, including BACnet Broadcast Management Devices (BBMDs) as needed. | |
| | | |
| By signing below I verify that all requirements of the contract, including but not limited to the above, been met.<br><br>Signature:_____ Date:_____ | | |

5.8.3.9. 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.

5.8.3.10. 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.

5.8.3.11. 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.

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 (CA), certified as a CA by AABC, NEBB, or TABB, as described in Guideline 1.1. The CA 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 CA will communicate and report directly to the Government in execution of commissioning activities. The Contracting Officer’s Representative will act as the Owner’s representative in performance of duties spelled out under OWNER in Annex F of ASHRAE Guideline 0. 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 three 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.

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. Fire Protection Engineer Qualifications: In accordance with UFC 3-600-01, FIRE PROTECTION ENGINEERING FOR FACILITIES**,** the fire protection engineer of record shall be a registered professional engineer (P.E.) who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveys (NCEES), or a registered P.E. in a related engineering discipline with a minimum of 5 years experience, dedicated to fire protection engineering that can be verified with documentation.

5.11. SUSTAINABLE DESIGN

5.11.1. STANDARDS AND CODES: Sustainable design shall conform to APPLICABLE CRITERIA. See paragraph 6, PROJECT-SPECIFIC REQUIREMENTS for which version of LEED applies to this project. The LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) applies to all projects. Averaging may be used for LEED compliance as permitted by the AGMBC but is restricted to only those buildings included in this project. Each building must individually comply with the requirements of paragraphs ENERGY CONSERVATION and BUILDING WATER USE REDUCTION.

5.11.2. LEED RATING, REGISTRATION, VALIDATION AND CERTIFICATION: See Paragraph PROJECT-SPECIFIC REQUIREMENTS for project minimum LEED rating/achievement level, for facilities that are exempt from the minimum LEED rating, for LEED registration and LEED certification requirements and for other project-specific information and requirements.

5.11.2.1. Innovation and Design Credits. LEED Innovation and Design (ID) credits are acceptable only if they are supported by formal written approval by GBCI (either published in USGBC Innovation and Design Credit Catalog or accompanied by a formal ruling from GBCI). LEED ID credits that require any Owner actions or commitments are acceptable only when Owner commitment is indicated in paragraph PROJECT-SPECIFIC REQUIREMENTS or Appendix LEED Project Credit Guidance

5.11.3. OPTIMIZE ENERGY PERFORMANCE. : Project must earn, as a minimum, the points associated with compliance with paragraph ENERGY CONSERVATION. LEED documentation differs from documentation requirements for paragraph ENERGY CONSERVATION and both must be provided. For LEED-NC v2.2 projects you may substitute ASHRAE 90.1 2007 Appendix G in its entirety for ASHRAE 90.1 2004 in accordance with USGBC Credit Interpretation Ruling dated 4/23/2008.

5.11.4. COMMISSIONING. See paragraph 5.8.5 COMMISSIONING for commissioning requirements. USACE templates for the required Basis of Design document and Commissioning Plan documents are available at http://en.sas.usace.army.mil (click on Engineering Criteria) and may be used at Contractor's option.

5.11.5. DAYLIGHTING. Except where precluded by other project requirements, do the following in at least 75 percent of all spaces occupied for critical visual tasks: achieve a 2 percent glazing factor (calculated in accordance with LEED credit EQ8.1) OR earn LEED Daylighting credit, provide appropriate glare control and provide either automatic dimming controls or occupant-accessible manual lighting controls.

5.11.6. LOW-EMITTING MATERIALS. Except where precluded by other project requirements, use materials with low pollutant emissions, including but not limited to composite wood products, adhesives, sealants, interior paints and finishes, carpet systems and furnishings,

5.11.7. CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT. Except where precluded by other project requirements, earn LEED credit EQ 3.1 Construction IAQ Management Plan, During Construction and credit EQ 3.2 Construction IAQ Management Plan, Before Occupancy.

5.11.8. RECYCLED CONTENT. In addition to complying with section RECYCLED/RECOVERED MATERIALS, earn LEED credit MR4.1, Recycled Content, 10 percent except where precluded by other project requirements.

5.11.9. BIOBASED AND ENVIRONMENTALLY PREFERABLE PRODUCTS. Except where precluded by other project requirements, use materials with biobased content, materials with rapidly renewable content, FSC certified wood products and products that have a lesser or reduced effect on human health and the environment over their lifecycle to the maximum extent practicable.

5.11.10. FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM (FB4P). The Farm Security and Rural Investment Act (FSRIA) of 2002 required the U.S. Department of Agriculture (USDA) to create procurement preferences for biobased products that are applicable to all federal procurement (to designate products for biobased content). For all designated products that are used in this project, meet USDA biobased content rules for them except use of a designated product with USDA biobased content is not required if the biobased product (a) is not available within a reasonable time, (b) fails to meet performance standard or (c) is available only at an unreasonable price. For biobased content product designations, see http://www.biopreferred.gov/ProposedAndFinalItemDesignations.aspx.

5.12. CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT: Achievement of 50% diversion, by weight, of all non-hazardous C&D waste debris is required. Reuse of excess soils, recycling of vegetation, alternative daily cover, and wood to energy are not considered diversion in this context, however the Contractor must tracked and report it. A waste management plan and waste diversion reports are required, as detailed in Section 01 57 20.00 10, ENVIRONMENTAL PROTECTION.

5.13. SECURITY (ANTI-TERRORISM STANDARDS): Unless otherwise specified in Project Specific Requirements, only the minimum protective measures as specified by the current Department of Defense Minimum Antiterrorism Standards for Buildings, UFC 4-010-01, are required for this project. The element of those standards that has the most significant impact on project planning is providing protection against explosives effects. That protection can either be achieved using conventional construction (including specific window requirements) in conjunction with establishing relatively large standoff distances to parking, roadways, and installation perimeters or through building hardening, which will allow lesser standoff distances. Even with the latter, the minimum standoff

distances cannot be encroached upon. These setbacks will establish the maximum buildable area. All standards in Appendix B of UFC 4-010-01 must be followed and as many of the recommendations in Appendix C that can reasonably be accommodated should be included. The facility requirements listed in these specifications assume that the minimum standoff distances can be met, permitting conventional construction. Lesser standoff distances (with specific minimums) are not desired, however can be provided, but will require structural hardening for the building. See Project Specific Requirements for project specific siting constraints. The following list highlights the major points but the detailed requirements as presented in Appendix B of UFC 4-010-01 must be followed.

(a) Standoff distance from roads, parking and installation perimeter; and/or structural blast mitigation

(b) Blast resistant windows and skylights, including glazing, frames, anchors, and supports

(c) Progressive collapse resistance for all facilities 3 stories or higher

(d) Mass notification system (shall also conform to UFC 4-021-01, Mass Notification Systems)

(e) For facilities with mailrooms (see paragraph 3 for applicability) – mailrooms have separate HVAC systems and are sealed from rest of building

## 6.0 PROJECT SPECIFIC REQUIREMENTS

### 6.1. GENERAL

The requirements of this paragraph augment the requirements indicated in Paragraphs 3 through 5.

### 6.2. APPROVED DEVIATIONS

The following are approved deviations from the requirements stated in Paragraphs 3 through 5 that only apply to this project.

6.2.1 In addition to Paragraph 4, the following references shall be considered "Applicable Criteria". All design shall be in accordance with Applicable Criteria.

US Navy Environmental Health Center Technical Manual NEHC-TM6290.99 Rev. 1 (May 2002) "Indoor Firing Ranges Industrial Hygiene Technical Guide"

US Navy Military Handbook MIL-HDBK-1027/3B (30 Nov 1992) "Range Facilities and Miscellaneous Training Facilities Other Than Buildings"

MIL-HDBK-1027/3B will be replaced by Unified Facilities Criteria UFC 4-160-01 "Design and Maintenance of Small Arms Ranges." UFC 4-160-01 is listed for reference only.

NIOSH National Institute of Occupational Safety and Health "Lead Exposure and Design Considerations for Indoor Firing Ranges"

29 Code of Federal Regulations (CFR) 1910.1025 "Lead"

National Guard Regulation NGR 385-15, Policy and Responsibilities for Inspection, Evaluation and Operation of Army National Guard Indoor Firing Ranges

Reference only - US Air Force Engineering Technical Letter ETL 08-11 "Small Arms Range Design and Construction"

6.2.2 Use the table included in Appendix BB in lieu of Section 01 33 16, Attachment G, "Design Submittal Directory and Subdirectory File Arrangement".

6.2.3 There is no need to perform a life cycle cost analysis for or to install 30% solar domestic hot water heating, as required in paragraph 5.9.4. The Government has determined it not to be life cycle cost effective for Fort Drum, NY.

### 6.3. SITE PLANNING AND DESIGN

#### 6.3.1. General:

The proposed project is located on the northeast corner of the intersection of 4th Armored Division Drive and Tigris River Valley Road, in the 10300 area of Fort Drum, NY.

**The project is to consist of one (1) Indoor Firing Range.**
**The project includes appurtenant parking areas and access drives.**

Site preparation and tree cutting shall be performed per the following: Due to the Migratory Bird Treaty act and the Endangered Species Act no cutting may occur between 15 April and October 1 of any given year.

6.3.1.1 Snow / Ice: Walkways and mechanical area shall be designed to maintain a safe distance from the roof lines to minimize the impact of sliding snow and ice using the (CRREL) sliding snow calculator shown in Appendix EE and available for download at HYPERLINK "http://www.crrel.usace.army.mil/products/sliding_snow_calculator/"www.crrel.usace.army.mil/products/sliding_snow_calculator/. Exterior mechanical and electrical units must have a safe distance from sliding snow and ice from the roof. Parking areas shall be designed with consideration for plowing and managing snow.

6.3.1.2 Drainage: Slope grade away from the exterior of all buildings at minimum of 2% for 20 feet to maintain positive site drainage. Grades in turfed areas shall be a minimum of 1% in the direction of drainage and a maximum of 33%. Slopes on ditches and swales shall have an absolute minimum of 0.3% and a desirable minimum of 0.5%. Storm water design shall comply with NYS DOT design manual.

6.3.1.3 Pavement Grade: Finished pavement shall be graded to assure positive drainage across the paved areas as shown on the drawings. Paved surfaces to have a minimum grade of 1.0% and a maximum grade of 2.5%.

6.3.1.4 The building finished floor shall be 6” above the surrounding grade elevation.

6.3.1.5 All exterior concrete surfaces shall receive a broom finish. Broom finish in direction perpendicular to traffic. All sidewalks shall be constructed with mesh reinforcement and of minimum strength concrete of 4500 psi and 4 inches thick unless to be used by service vehicles, those shall be 7 inches thick and reinforced. Sidewalks to be used by service vehicles shall be at least 10' wide.

6.3.2. Site Structures and Amenities

6.3.2.1 Dumpster Pad: Provide a dumpster pad constructed with reinforced concrete designed for HS-20 DOT loading. Provide standard bollards at 4-feet O.C. and a minimum clearance of 2 inches between Dumpster Pad and Bollard Foundations. Screening shall be as required by the Installation and consistent with adjacent facilities. Provide space at dumpster areas for recycling receptacles and coordinate with the Installation on recycling receptacle types, sizes and access requirements.

6.3.2.2 Mechanical and Electrical Concrete Pads: Provide appropriately sized concrete pads for the exterior mechanical and electrical equipment. Pads shall be minimum 8" thick reinforced concrete slabs with areas extending a minimum of 6" beyond the exterior limits of the equipment and constructed on minimum 4" gravel base. In order to minimize settlement, wrap the 4" gravel in geotextile fabric.

6.3.2.3 Bollards: Standard bollards shall be constructed with minimum 7-foot long 8" dia. steel sch. 40 pipes filled with concrete & placed in reinforced mesh concrete foundation cylinders 24" dia. by 42" long. The bollard concrete foundations shall be located below finished grade. The bollard 8" dia. steel pipe may protrude through the concrete foundations by up to 6-inches. Removable bollards shall be constructed with standard 5-foot long 4" X Strong or Sch. 80 steel pipe (OD4" = 4.50") with welded cap and lifting bar. The permanent in ground pipe shall be 5" Sch. 80 steel pipe (ID5" = 4.813") constructed in reinforced mesh concrete foundation cylinders 24" dia. by 36" long. The top of the steel pipe shall require standard internal threads for standard screw in plug and the top of 5-inch pipe placed at the crown of the concrete foundation. All bollards shall be galvanized steel and painted.

6.3.2.4 Foundation Drip Strip: Contractor to provide a minimum 4-feet wide by 4-inches thick drip strip at finished grade around each building. The drip strip is to include geo-synthetic fabric and #2 stone with color matching the proposed building façade materials along with black aluminum edging.

6.3.2.5 Provide for ease of snow removal and storage in adjacent areas. No curbs, gutters, or islands are allowed unless specifically shown on drawings.

6.3.2.6 Gates: All gates shall be overhead cantilever, aluminum.

6.3.2.7 Exterior Door Stoppers. Provide one door stopper for each exterior door consisting of 3" dia. galvanized and painted steel Sch. 40 pipes filled with concrete & constructed in below finish grade 12" dia. concrete foundation cylinders by 36" long. These stoppers are intended to minimize damage in the event of wind gusts when opening the door.

6.3.2.8 Provide for exterior doors and corners of buildings with adjacent vehicle access: minimum 12" sch. 40 pipe galvanized steel and painted, concrete filled bollards; constructed in below finish grade foundations at minimum 36" diameter wire mesh reinforced concrete by 48" deep.

6.3.3. Site Functional Requirements:

6.3.3.1. Stormwater Management (SWM) Systems.

The Contractor(s) shall comply with Article 17 of New York State Environmental Conservation Law; Title 6, Part 750 of New York Codes, Rules, and Regulations; and the current New York State Pollutant Discharge Elimination System permit. Inclusive of this permit is the requirement for the contractor to comply with the “Stormwater Pollution Prevention Plan” (SWPPP) and prepare a site specific Erosion and Sedimentation Control Plan. The contractor shall prepare the NOI for submission. Under GP-0-10-001 the contractor is required to submit amendment to the SWPPP if design is changed after NOI is accepted by the state.

6.3.3.2. Erosion and Sediment Control

See 6.3.3.1 Stormwater Management (SWM) Systems.

6.3.3.3. Vehicular Circulation.

6.3.3.3.1 See Appendix J for site plans for site vehicular circulation.

6.3.3.3.2 Contractor’s Storage Yard: The Contractor’s storage yard shall be located within the project site as approved by the Contracting Officer.

6.3.3.3.3 Provisions for snow removal shall be considered in all site designs.

6.3.3.3.4 Parking spaces for tactical vehicles (LMTVs) shall be a minimum of 11' x 25'.

6.4. SITE ENGINEERING

6.4.1. Existing Topographical Conditions

Existing Conditions: Topographic and utility information of the project site is included (accuracy +/- two feet). Contractor is responsible for verifying all existing conditions, including but not limited to existing condition features, topographic line and grade and all existing utility information including horizontal location and vertical depth and slope.

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

Geotechnical Investigation Data is included 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 requirements.

Flow test data is included in Appendix D.

6.4.4. Pavement Engineering and Traffic Estimates:

Pavement Design: Asphalt pavement design shall be in accordance with the New York State Department of Transportation Comprehensive Design Manual.

Required at connection of new pavement to existing pavement: A straight line saw cut of the wearing top course of existing pavement a minimum of 6-inches beyond the vertical cut of the binder asphalt course and granular base course. The new wearing top course is used to bridge the vertical cut to minimize differential settlement and minimize breakdown of the asphalt surface along the joint.

6.4.5. Traffic Signage and Pavement Markings

Shall be per New York State MUTCD. All exterior signage shall be designed and installed to accomodate the loads stated in paragraph 6.6.2.

6.4.6. Base Utility Information

Utilities: Contractor to provide live/hot power, communication, gas, and water connections. If not physically possible, utility connections shall be provided as required below. Any utility outages, road closures, etc. shall be coordinated with Fort Drum agencies and may be required to be accomplished at off hours/weekends and holidays. A 14 day timeline notification shall be submitted to the Fort Drum Public Works prior to any work. All piping whose sizes are indicated in the RFP (shown on plans or in the specifications) are indicated as minimum inside diameter regardless of type of pipe. Piping provided shall not be less than this minimum diameter. The design of the water and sewer systems shall be stamped by a NYS Registered Professional Engineer and shall conform to all the requirements of the 10 State Standards & DOH Standards. Outages are not acceptable during the heating season and require 30 day advance notice. Contractor shall receive New Your State DEC approval of the water and sewer design prior to starting any physical construction.

6.4.6.1 Marker Tape and Tracer: Provide marker tape and tracer wire for all underground pipe, conduits and duct systems, with the exception of storm sewer piping. Tracer wire test stations and termination to be contained in a test station that shall be a ”TWABADJ18” - adjustable 18” tracer wire access box, by C.P. Test Services or equal. Test stations to be located at 500 feet intervals, by each valve box and the termination of the utility. Tracer wire is to be placed 6 to 12 inches above pipe, and dig tape is to be located 18 inches below grade. (Dig tape for communication duct banks is 12” and 12 inches below grade.)

6.4.6.2 Existing Utilities: Existing utilities are shown on the Site Utility Plans, as could be located by surface survey and plotted from record drawings. The Contractor shall be responsible for verifying the existence, location, size, depth and condition of the utilities.

6.4.6.3 Water:

6.4.6.3.1 Fire Hydrants: A minimum of two 6-inch bollards shall be provided around all hydrants. Four bollards are required where hydrant is exposed to 360-degrees traffic. Bollards shall be 6" galvanized and painted steel sch. 40 concrete filled pipes, constructed in below finish grade concrete foundation cylinders 24" dia. by 42" long.

All hydrants will require a 5 foot long by ½ inch diameter fiber glass pole (alternating red and white reflective bands, 4-each) mounted on a spring to the top of the fire hydrant for locating the fire hydrant in the snow. Fire Hydrants to have a 5” ‘Storz ‘ Connection.

6.4.6.3.2 Valve and Valve Boxes: Sufficient sectional control valves shall be provided so that no more than two fire hydrants will be out of service in the event of a single break in a water main.

6.4.6.3.3 Post Indicator Valves: Post indicator valves shall be provided on water services. Tamper switches must be included on all post indicator valves on the fire lines to building. PIVs are to be a minimum of 50 feet from the building.

6.4.6.3.4 Testing and Chlorination Requirements: Water main and service lines to be tested requires 48 hour notice and approval from the COR and the Fort Drum Public Works Plumbing Shop and Environmental Division must be obtained.

6.4.6.4 Gas: Interruption of gas service to adjacent facilities, during construction, shall be minimized and restricted to the hours as permitted by the Contracting Officer. The gas service line shall be designed in accordance with the applicable codes and local gas company, National Grid, standards.

6.4.6.4.1 Burial Depth: The minimum cover depth for gas mains and service lines shall be 30 inches. Gas piping trench shall include Marker Tape and Tracer Wire and comply with installation per paragraph 6.4.6.1.

6.4.6.4.2 Gas Line Materials: Materials for gas lines shall be Type II high density polyethylene with the PE 3408 designation SDR11 (100 PSI). Transition from underground to above ground piping shall be by anode less riser.

6.4.6.4.3 Gas Line Testing: Gas line to be pressure tested at a minimum 70 psi. Contractor shall provide a written work plan and drawing to Fort Drum Public Works for approval, a minimum 14 days prior to commencing any work. All gas piping shall be purged using nitrogen only; full nitrogen purge required, slug method is not acceptable.

Not Used.

Not Used.

Not Used.

Not Used.

Not Used.

6.4.7. Cut and Fill

6.4.7.1 If unclassified materials (glacial boulders, impenetrable bedrock) are encountered, the Contractor is to achieve desired elevation by suitable methods. If blasting is required, Contractor is to obtain a blasting permit from Fort Drum prior to proceeding.

6.4.7.2 Excavated Materials: Excavated materials shall be separated to satisfactory and unsatisfactory soil materials. Surplus satisfactory material shall be disposed of at the on base clean soil disposal area, approximately 6 miles from project site, as directed by Fort Drum Public Works. Unsatisfactory material (all rock, concrete, asphalt, metal, refuse and organics shall be disposed of off of Fort Drum property).

6.4.8. Borrow Material

Training Area 6A is the location for acceptable borrow material which is available upon request.

a) Borrow request will be in writing and will provide an accurate estimate for borrow materials to include grade/side slopes, dates of usage, contractor name, hauler name and intended usage. Actual haul quantities will be provided to PW Environmental Solid Waste Manager for tracking as recycled materials.

b) The user shall stake out the corners of the designated area.

c) Provide contractor identification signs approximate size 24 inches X 24 inches at each corner of the borrow area assigned.

d) To open the pit: trees, stumps and grubbing materials will be removed.

Top soil will be removed and stored on site for reuse.

e) The borrow material calculations will be based on providing positive slope (min 1%) from the established road and when excavation is complete will provide a relatively flat surface.

f) If during excavation water is encountered the user will cease excavating and start recovery operation to restore native sand to a level that provides a 24 inch protective layer over the water.

g) If the size of the pit becomes insufficient notify PW Master Planning.

h) Edge slopes will be maintained at a maximum of 20%.

i) No spoils will be left on site.

k) All haul trucks will cover all loads.

l) All haul trucks will be clean of excess material (anything outside the box) before leaving the borrow area.

m) The contractor will provide points of convenience (rest room facilities).

n) The site is monitored and access is off post via public road ways.

For Closure:

a) Closure request shall be in writing.

b) Top soil stored from the opening operations will be graded smooth to include the slope areas.

c) Seeding will be provided for the closed borrow area and shall be the Fort Drum Standard for Sandy Soils.

d) Seeding will follow contract specifications and time frames.

6.4.9. Haul Routes and Staging Areas

Haul Route: The Contractor's haul route shall be from the project site location to NYS Route 26 - (Contractor entry gate). Contractor will be responsible for repairing any damage caused by the Contractor along the haul routes during construction.

6.4.10. Clearing and Grubbing:

Contractor shall stack saleable timber from the project site as directed by Contracting Officers Representative (COR) to a location adjacent to site. Saleable timber shall remain property of the Government.

6.4.11. Landscaping:

(1) Disturbed area north of infiltration trench shall be planted 30 foot on center with the following species (3" caliper) in equal ratios: Acer rubrum, Acer saccharinum, Fraxinus pennsylvanica.

6.4.12. Turf:

Loam & Seed: All disturbed areas shall be covered with stockpiled or imported loam a minimum of 4" and shall be seeded such that a dense grass growth becomes established.

6.5. ARCHITECTURE

6.5.1. General: To the maximum extent possible within the contract cost limitation, the buildings shall conform to the look and feel of the architectural style and shall use the same colors as adjacent facilities as expressed herein . The Government will evaluate the extent to which the proposal is compatible with the architectural theme expressed in the RFP during the contract or task order competition. The first priority in order of importance is that the design provides comparable building mass, size, height, and configuration compared to the architectural theme expressed herein. The second priority is that design is providing compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching nearby and installation material/color pallets, as described herein.

6.5.2. **Design**

6.5.2.1. Appendix F is provided "For Information Only", to establish the desired site and architectural themes for the area. Appendix F identifies the desired project look and feel based on Fort Drum**'s** Installation Architectural Theme from existing and proposed adjacent building forms; i.e. building exterior skin, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, exterior color schemes, and organizational layout.

6.5.2.2. The design should address Fort Drum's identified preferences. Implement these preferences considering the following:

(a) Achievable within the Construction Contract Cost Limitation (CCL)

(b) Meets Milestones within Maximum Performance Duration.

(c) Achieves Full Scope indentified in this Solicitation

(d) Best Life-Cycle Cost Design

(e) Meets the Specified Sustainable Design and LEED requirements

(f) Complies with Energy Conservation Requirements Specified in this RFP.

6.5.2.3. Priority #1. Visual Compatibility: Facility Massing (Size, Height, Spacing, Architectural Theme, etc.) Exterior Aesthetic Considerations: The buildings massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are sympathetic to the style and context of the Installation. The Installation's intent for this area is:

To enhance and complement the visual environment of the installation. Exterior elements of these facilities shall be in accordance with the architectural character of the adjacent facilities unless required otherwise by applicable codes. Use durable, low-maintenance materials. Configure building massing and use exterior elements and material detailing to provide human scale. To the greatest extent possible, match the exterior materials and colors, roof slopes, accents, and architectural theme of adjacent existing buildings.

6.5.2.4. Priority #2. Architectural Compatibility: Exterior Design Elements (Materials, Style, Construction Details, etc.) Roofs, Exterior Skin, and Windows & Door Fenestrations should promote a visually appealing compatibility with the desired character while not sacrificing the integrity and technical competency of building systems.

6.5.2.5. See Appendix F for exterior colors that apply to Architectural character at Fort Drum. 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

except where effects of snow are of concern.

(b) Color Schedules: Exterior and interior colors shall comply with the current Fort Drum Color Matrix (refer to Appendices). The successful Contractor must provide two color boards for each interior and exterior materials to the Contracting Officer and Fort Drum. Color boards must show samples of materials to be incorporated into the project, in the proposed color.

(c) Concrete: Exposed concrete is not permitted for major exterior architectural elements, except as noted for concrete floors, precast sills and accent blocks. Building foundations and other structural elements of concrete shall be concealed through the use of stepped brick ledges, grading, etc.

(d) Exterior Soffits and Fascias: Provide continuous ventilation. Soffit vents shall be fully perforated metal panels, screened and sealed to resist insect intrusion. Soffits and fascias shall be pre-finished metal or steel to match the standing seam metal roof. Eaves shall be at a minimum 3'6" and no gutters or downspouts will be allowed.

(e) Exterior Canopies: Exterior walkways accessing building entrances are required to be covered with canopies. Mechanical room exterior doors require canopies sized to protect the door from snow and ice build-up. Canopies are required to cover an area two times the door width by 5'-0" deep minimum or a depth as calculated by the Contractor's designer. The designer shall use the sliding snow calculator developed by the USACE Cold Regions Research and Engineering Laboratory (CRREL) for sloped roofs. Utility connections to buildings shall be protected from sliding snow and ice. Contractor shall submit all sliding snow calculations as part of the design submittals.

(f) Snow Guards: Avoid where possible per above paragraphs. If snow guards are necessary, design and install per MP-05-6443 - Snow Guards on Metal Roofs as published by CRREL.

(g) Roof Venting: Provide adequate ventilation and insulation of the roof at all buildings in accordance with guidelines so as to avoid problematic icing at the eaves. Use Hunter Cool Vent panels or government approved equal from the eave to the roof peak.

(h) Foundation Thermal Insulation: Provide at all foundation walls of heated spaces. Extend from top of footing to underside of slab and a minimum of 36" under slab perimeter.

(i) Building Identification: Each building shall have a minimum of 2 sets of aluminum Helvetica numbers. Coordinate with Fort Drum personnel. Signage shall be vandal resistant.

(j) Sloped Standing Seam Metal Roof: Provide facility with Sloped Standing Seam Metal Roof in accordance with the requirements herein. Standing seam metal roofs shall be constructed with a 3/12 to 6/12 pitch to match the surrounding facilities. The standing seam metal roofing system shall be of a cold roof design which creates a cold roof environment to minimize ice build up during inclement weather. All penetrations shall be made as close to the roof peak as possible (minimum of 5'-0") and also shall be anchored at two points to the structure on the inside to prevent them from being sheared off by snow and ice. The length from the peak to the eave shall not exceed 40 foot for any standing seam metal roof. Roof shall be designed so as to prevent valleys from being over doors or windows. Design shall not permit snow falling from one roof to another. All roof penetrations shall be within 5' from peak of roof. Minimum R48 insulation shall be provided between the heated space and the attic area airway (higher value may be required to meet energy performance requirements for EPAct and LEED). Provide adequate ventilation and insulation of the roof at all buildings in accordance with guidelines so as to avoid problematic icings at their eaves. Attic trusses or equivalent framing shall be incorporated as required to maintain roof-ventilation airway from the eaves and out through the ridge vent. Ridge vents shall be provided on hip ridges and gable ridges. No loose or granular fill insulation is permitted.

(k) Use FRP Exterior Doors to match recently constructed adjacent buildings.

(l) The designer shall determine the minimum insulation values required to meet the energy and other criteria specified herein, but in no case shall the values be less than R30 for exterior walls, and R48 between the heated space and attic airway.

6.5.3. Programmable Electronic Key Card Access Systems:

Not used.

6.5.4. INTERIOR DESIGN

(a) Floors: Comply with requirements of applicable codes. Provide durable flooring materials.

(b) Metal Support Systems: Metal framing and furring system shall be capable of carrying a transverse load of 5 psf without exceeding either allowable stress or a deflection of L/240. Design studs and connections for cabinets, equipment, and furnishings where they occur. Design shall be based on the steel stud properties only. Provide G60 minimum galvanized coating for interior application.

(c) Gypsum Wallboard and Ceiling Board: Shall be durable impact and mold resistant as specified under ASTM E 695 for single drop soft body impact test. Glass-mat gypsum panels shall be used as substrate for ceramic tile wall applications except at showers where cementitious backer board shall be used.

(d) Acoustic Ceilings: Comply with requirements of applicable codes. Ceiling tiles shall be 2'x2' omni-directional, mildew/moisture resistant units.

(f) Interior Doors and Frames: Unless otherwise required for sound resistance, fire protection, or ballistic containment, provide honeycomb core reinforced hollow metal doors or flush solid core wood doors with laminate clad stile edges and faces. All door frames shall be hollow metal.

(g) Hollow metal doors for all other unspecified locations: Comply with ANSI A250.8/SDI 100. Doors shall be minimum Level 2, physical performance Level "B", Model 2; factory primed.

(h) 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.

(i) STC ratings shall be of the sound classification required and shall include the entire door and frame assembly.

(j) Wall construction in firing range area: minimum requirement for walls in the firing range area shall be based on the requirements described in this document or 8" block, core filled, with layers of block filler on the interior to make for a smooth surface, whichever is more stringent.

6.5.4.1 Entryway Grille System: Provide a slab recess to accept a walk-off mat. Provide a floor drain under mat at building entrances. Floor drain in entry vestibule shall include a sediment bucket to facilitate easy cleaning and minimize clogging.

6.5.4.2 Concrete Sealer: Place sealer on exposed concrete floors. Sealer shall comply with ASTM C 309.

6.5.4.3 Wood and Casework: The use of wood shall be limited to fire rated shelves and cabinetry, millwork, plastic laminate mounting panels and unexposed fire retardant treated nailers, roof curb blocking shims, or backing for flashing.

6.5.4.4 Furnishings: The Contractor shall coordinate electrical and utility connections for all appliances, vending machines and furniture. Items which are built-in shall be provided and installed by the Contractor unless stated otherwise.

6.5.4.5 Clear Access Space: Provide clear access space around each piece of equipment for operation, maintenance, and repair as recommended by the equipment manufacturer. No piping, ducts, or equipment shall infringe on access space. Where manufacturer does not provide clearance recommendation, provide 18-inch minimum clearance or as required by code, whichever is larger. In Mechanical Rooms and other mechanical spaces, locate all pipes and ducts so that walkways and equipment access areas are not obstructed and a minimum of 78-inch clearance is provided above walkways and work spaces. Locate and route all piping and ducts so piping and ducts do not have to be stepped over or stepped on to access equipment or walk-through spaces.

6.5.4.6 Exterior Windows: shall be double hung.

6.5.4.7 Locksets and Latchsets: The locks shall be supplied with Best Mortise Cylinders or equal (Arrow and Falcon) to continue the Base Master Key System for all doors. The existing Fort Drum system is equal to Schlage Heavy Duty Commercial Lever Type with removable, 7 pin, Type L keyway, interchangeable core locks to be compatible with existing Fort Drum “Best” manufactured locks. Building entrance doors shall be keyed alike. The Contractor shall provide 3 sets of keys for each door to Public Works Fort Drum. Coordinate keying requirements with Fort Drum and the Contracting Office.

Interior building signage requirements:

As required under chapters 3 & 5.

6.6. STRUCTURAL DESIGN

6.6.1 General

Consider mission effectiveness, the most economical system in the locality, life-cycle economics, and space adaptability in choosing the structural systems. Space adaptability includes future reorganization or reallocation of space.

Analyze, design, and detail each building as a complete structural system. Design structural elements to preclude damage to finishes, partitions, and other frangible, nonstructural elements; to prevent impaired operability of

moveable components; and to prevent cladding leakage and roof ponding. Limit deflections of structural members to the allowable limits of the applicable material standard, e.g. ACI, AISC, Brick Industry Association (BIA).

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. All concrete shall be a minimum of 4,500 psi and shall be reinforced. Higher strengths may be required for ballastic envelop as indicated elsewhere in the RFP. Place floor mounted mechanical and electrical equipment on a 4" minimum concrete pad.

In addition to gravity, seismic, and lateral loads, design ancillary building items (e.g. doors, window jambs and connections, overhead architectural features, equipment bracing, etc.) 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).

6.6.2 Applicable Standards, Codes, and Criteria

6.6.2.1 Minimum Design Wind Load Requirements: All wind loads shall be computed and applied using a wind speed of 100 mph.

6.6.2.2 Minimum Design Seismic Load Requirements: Seismic design loads shall be computed and applied using earthquake loading data as shown in latest IBC. The mapped maximum considered earthquake (MCE) spectral response accelerations for site class B are:

Ss (at short periods) = 30% g

S1 (at 1-second period) = 8% g

The acceleration values identified are for the general location of the facility. Verify and use site specific criteria based on the final site location of the facility. Adjust site class per IBC to match specific site informtion in geotechnical report.

6.6.2.3 Minimum Design Snow Load Requirements: (Design per ASCE 7-05): Ground Snow Load = 70 psf.

6.6.3 Antiterrorism/Force Protection loads and minimum requirements are per UFC 4-010-01. For design of structural components subjected to dynamic loads, the U.S. Army Corps of Engineers Protective Design Center (PDC) developed SBEDS, Single-Degree-of-Freedom Blast Effects Design Spreadsheets (SBEDS). SBEDS is available at the software tab of the PDC website, HYPERLINK "https://pdc.usace.army.mil/"https://pdc.usace.army.mil/.

6.6.4 Foundation: The foundation is site specific and must be designed upon known geotechnical considerations by an engineer knowledgeable of the local conditions (e.g. highly expansive soils, groundwater levels). Coordinate the need for a vapor barrier with the architectural floor finishes and requirements of the geotechnical report. All slab-on-grade to receive a coating (e.g. epoxy) or to receive and overlaying finish (e.g. carpet or tile), shall be underlain by a vapor barrier system with a minimum 10-mil polyethylene membrane. The minimum thickness for all vapor barriers shall be 10 mil. Minimum depth from finish grade to bottom of footings shall be 5'-6".

6.6.5 Site Features - Retaining Walls/Bridges/Etc.: Design site features (e.g. retaining walls, culverts, bridges, etc.) in accordance with the appropriate American Association of State Highway and Transportation Officials (AASHTO)

criteria including AASHTO LRFD Bridge Design Specifications, AASHTO Standard Specifications for Highway Bridges, and AASHTO Guide Specifications for Design of Pedestrian Bridges. Consider operation and maintenance requirements (e.g. painting, mowing, inspecting and routine maintenance). Design site features to drain properly in order to meet loading assumptions.

6.6.6 Design Analysis: 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. Results must include an output listing for maximum/minimum stresses/forces and deflections for each element and the reactions for each loading case and combination.

6.7. THERMAL PERFORMANCE

6.7.1 Moisture protection shall be considered by the Contractor. Protection from damage to flooring and wall finishes shall be taken into consideration when designing floor slabs and walls. This could be as simple as placing a vapor barrier under the floor slab, building wrap, or vapor barrier on the walls.

6.8. PLUMBING

6.8.1 Piping Systems

6.8.1.1 Domestic water piping: No piping shall be located inside exterior wall cavities, unheated attics, or other areas subject to freezing.

6.8.1.2 Sanitary sewer piping: Plumbing vents through roof shall have a minimum height of 24 inches and shall be located as close to the roof ridge as possible and provided with adequate supports as necessary to resist forces from sliding snow and ice during winter.

6.8.2 Miscellaneous Items:

6.8.2.1 Cleanout(s) shall be provided at building service exit.

6.8.2.2 Exterior wall hydrants shall be non-freeze, exposed, anti-siphon self-draining type.

6.8.2.3 Interior hose bibs shall be equipped with anti-siphon device (integral or as attachment). Hose bibs shall be installed in each Mechanical room.

6.8.2.4 Cold-water makeup for HVAC equipment shall be by use of a hose bib equipped with an anti-siphon device to manually refill the water system. (Note: No direct water connection shall be made to the glycol system).

6.8.2.5 Floor drains with sediment buckets shall be installed in Mechanical Rooms and vestibules. Vestibules shall have floor drain(s) with depressed floor mat. All floor drains shall be provided with automatic trap primers.

6.8.2.6 All floor-mounted equipment shall be provided with a concrete housekeeping pad. Housekeeping pad shall be sized to extend at least 6 inches beyond the equipment and shall be a minimum of 4 inches thick.

6.8.2.7 Electric water coolers shall be wall mounted, stainless steel, lead free, with front and side push bars.

6.8.2.8 Water hammer arrestors shall be provided as part of the plumbing system and be a complete engineered system. Water hammer arrestors shall be specified and scheduled for use with fixtures as required by engineering calculations.

6.8.3 Note that the subject site is served by a domestic water system, with intermitent water pressures in excess of 80PSI. Hydrant flow test data is provided at Appendix D.

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.9.1 Exterior Electric Power:

6.9.1.1 Primary Power: Obtain primary 13.2/7.62 kV 3-phase power from the solidly grounded 3-phase, 4-wire electrical distribution system.

6.9.1.1.1 The layout and location of ducts, manholes, handholes, etc. shown on the Civil site utility plans are approximate.

6.9.1.1.2 Provide an underground reinforced concrete encased duct bank with within 20 feet of the limits of the road. All manholes within this limit shall be designed for HS-25 vehicle loading.

6.9.1.1.3 Minimum cover for the primary power duct bank shall be 36” for 15 kV conduits with 15 kV cables.

6.9.1.1.4 Medium-voltage cable joints shall comply with IEEE Std 404 and IEEE Std 592. Medium voltage cable terminations shall comply with IEEE Std 48. Splice kits shall be of the pre-molded splice and connector type. Joints used in underground facilities shall be certified by the manufacturer for waterproof, submersible applications. Tape type splices are not acceptable. Medium-voltage cable joints shall be made by qualified cable splicers only. The Government reserves the right to require the cable splicer to make a demonstration or sample splice for approval. Underground splicing kits shall be 15 kV class RTE type BOL-T connectors or equal and terminations at the medium-voltage sectionalizing switch 600 ampere terminations shall be 15 kV class, separable insulated connectors, type BOL-T connectors, or approved equal. All 200A terminations shall be by load break elbows.

6.9.1.1.5 Fault and Overcurrent Protection: Line-side and load-side overcurrent and fault protection devices shall be coordinated to isolate any electrical fault from the rest of the system and for all overload conditions. After contract award, the Contractor shall contact the Contracting Officer to obtain the information (i.e., site one lines, etc.) necessary to provide this coordination.

6.9.1.1.6 Use 600 amp deadbreak junctions with 600 amp tee body connections in manholes. Fire wrap all exposed cable in manholes and crimp neutral connections.

6.9.1.2 Primary Conductors: The phase conductors on the line side of the fuse terminals shall be single copper conductor 15kV, 133% insulated, type MV90, with a semi-conducting shield, and EPR insulation, 500 kcmil with a #4/0 neutral with USE/XHHW insulation. All neutral connections shall be made with irreversible permanent connector. The phase conductors (primary cables) downstream of the sectionalizing switch shall be single copper conductor 15kV, 133% insulated, type MV90, with a semiconductor shield, and EPR insulation sized per NEC for the loads, but shall be a minimum of #2. Provide #2 copper ground wire with USE/XHHW insulation with the phase conductors.

6.9.1.2.1 The primary side transformer compartment shall be dead front with load-break elbow terminations, load-break oil immersed switch and draw-out, dry-well mounted current-limiting fuses, with primary surge arrestors. The primary feeder shall be connected to one set of bushings, and the surge arresters shall be connected to the second set of bushings. Transformers shall be pad mounted with delta primary and wye secondary.

6.9.1.2.2 The transformer secondary compartment shall be live front with NEMA pattern spade terminations. The neutral connections shall be solidly grounded.

6.9.1.2.3 Provide 8" schedule 80 concrete filled bollards to protect transformers and fused terminals from vehicular traffic where required.

6.9.1.2.4 Provide curb and containment of transformer oil per standards in National Grid Electric Service Bulletin 750, 754 & 759. Available at HYPERLINK "http://www.nationalgridus.com/niagaramohawk/construction/3_elec_specs.asp"http://www.nationalgridus.com/niagaramohawk/construction/3_elec_specs.asp

6.9.2 Grounding

6.9.2.1 Grounding Systems: All underground bonding connections shall be made with exothermic welds. The maximum resistance to ground shall be 10 ohms.

6.9.3 Communications Utilities:

6.9.3.1 All splices, terminations, and cutovers on each end of all cables, and within the cable runs shall be performed by Design-Build Contractor. Where existing manholes or handholes do not contain fiber mesh or sufficient cable racking, they shall be added by the contractor. The installation of the system shall be turnkey.

6.9.3.2 Provide 3-4" conduits from the communications manhole at the telephone point of connection to each building. The conduits shall be used for telephone, data, cable TV (CATV). Provide a three-inch, three-cell fabric mesh innerduct including non-abrasive pull-string in the data conduit. The CATV conduit will be used by the CATV installer to access the manhole and its attached duct bank system. The CATV installer will use one of the fabric mesh innerduct envelopes. All installations shall meet I3A requirements, which may require additional racking grounding, and sealing ducts in existing structures.

6.9.3.3 Exterior CATV cables will be provided by others.

6.9.3.4 All utility meters shall be connected to the DDC system with cat 6 copper or fiber optic cables. This revises the requirement in chapter 5 for wireless connectivity.

6.9.3.5 Cable TV: The CATV installer (Time-Warner) will provide the cable from the manhole to each building in the conduit provided by the Design-Build Contractor to the point of demarcation in the main Communications Room.

6.9.3.6 Additional Requirements: In addition to any requirements specified in I3A, the following shall be provided:

(a) Galvanized racks, ground rods and sumps for all hand holes.

(b) Use fusion splice end connectors feeding all fiber to racks.

(c) Communication Outlet density shall be a minimum of two per room irregardless of the number of users per room.

(d) Provide 100% spare rack space plus 1 extra rack.

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.10.1 Interior Electrical System:

6.10.1.1 Voltage drop shall be limited to 1% on the service conductors and 5% from the building's main distribution panel to all loads (2% for feeders and 3% for branch circuits), unless otherwise noted. Voltage drop calculations shall be based on estimated demand loads plus 25% future load growth. In addition, base voltage drop calculations on a 12 amp load for vending machines (all on dedicated circuits). All loads shall be assumed to be at 90% power factor.

6.10.1.2 Provide at least 1 spare conduit, which shall be the same size as the conduits with wires, from the transformer to the electric room. Provide pull cable in spare conduits and cap each end.

6.10.1.3 Provide transient voltage surge suppression (TVSS) at the service entrance.

6.10.1.4 Transformers shall be furnished with standard accessories and at least 4 taps (2 - 2.5% above and below nominal voltage).

6.10.1.5 Transformers shall be Energy Star rated.

6.10.1.6 Transformers shall be K-rated where recommended by IEEE 1100, Recommended Practice for Powering and Grounding Electronic Equipment.

6.10.1.7 Panelboards:

6.10.1.7.1 All panelboards, including the main circuit breaker, switchboard and/or main distribution panelboard, shall be fully rated for the available fault current.

6.10.1.7.2 Except for the main service distribution panelboard and the main 208Y/120 volt panelboards connected to the 480 - 120/208 volt stepdown transformers, panelboards shall be furnished with main lugs only. Provide bolt-on circuit breakers.

6.10.1.7.3 The main distribution panel/switchboard shall have a minimum of two spaces suitable for future 400 amp, 3 pole circuit breakers. In addition, provide one spare 225 amp, 3 pole and one spare 100 amp, 3 pole circuit breaker in the main distribution panel/switchboard.

6.10.1.7.4 Panelboards that serve computer and data processing loads shall be dedicated to these loads and other loads such as HVAC, lighting, and other building loads shall be served by separate panels. This requirement does not apply to HVAC equipment with motors less than ½ horsepower.

6.10.1.7.5 All panelboards serving harmonic loads that comprise over 50% of the load shall be provided with 200% rated neutral busses and 200% rated neutral feeders. Each panelboard serving harmonic loads shall be protected by a TVSS system.

6.10.1.7.5.1 Individual personal computers on user desktops shall not be considered data processing loads for this purpose. This requirement applies to server rooms and similar spaces.

6.10.1.7.6 Provide a minimum of 20% empty space for all panelboards in accordance with UFC 3-520-02 Interior Electrical Systems.

6.10.1.8 Branch Circuits, Receptacles and Outlets: All general receptacle and lighting circuits shall be 20 ampere circuits and fed by 20 ampere circuit breakers.

6.10.2 Lighting: All luminaries shall be heavy commercial (specification) grade.

6.10.2.1 Exterior Lighting: Luminaries shall be high pressure sodium, cutoff type and include shields to minimize light trespass. Metal halide luminaries with pulse-start ballasts are permitted where necessary to match existing nearby luminaries, in locations with security cameras, and where color rendition is important. All exterior lighting circuits shall be underground and trenches shall use Tracer Wire and Marker Tape.

6.10.2.1.1 In addition to the locations specified under paragraph 3.0, lighting shall be provided for the streets (where not already existing), access roads, sidewalks, in exterior canopies if provided, pavilions (if provided), recreation facilities and formation areas (if provided), and above all exterior doors. The actual number and locations of luminaries shall be determined by the Engineer of Record. Placement of lighting fixtures shall near building penetrations such as louvers, intakes, etc. shall consider that insects are attracted to light, and shall be avoided where practical.

6.10.2.1.2 Pole assemblies shall be rated for 110 mph. Poles and fixtures shall match the style and type of existing. Furnish and construct light poles on raised concrete foundations to prevent damage from vehicles that accidentally hit lighting units.

6.10.2.1.3 Exterior luminaries shall be controlled by the DDC system via an electrically held magnetic lighting contactor with a hand-off-auto switch located in the electric or mechanical room.

6.10.2.1.4 Provide a photometric plan that does not exceed 2 lumens/SF beyond edge of pavement and sidewalks or edge of lawn areas. Specify light types to include lamps, height, shields and mounting criteria. Photometric plans shall be stamped by a Professional Engineer.

6.10.2.2 Interior Lighting: All interior luminaries shall be energy efficient fluorescent, except where otherwise required in the firing range area.

6.10.2.3 Egress and Emergency Lighting:

6.10.2.3.1 Exit lights shall be LED type with emergency battery packs, self-diagnostics, and PVC housings.

6.10.3 Additional Requirements

6.10.3.1 Range Intercommunications System: Provide minimum two loud speakers (bullhorns) in range with adjustable volume and capable of clear communications during firing (assume 130 dBs from shooting). In addition, provide two-way communications and paging system between Range Control Room and Office, plus to an additional handheld mic with 10' cord located inside the range and directly below the Range Control window to allow communications while standing at the window (speaking through the window is not possible).

6.10.3.2 Range Door Security. Provide all range doors including ballistic doors, range personnel doors and bullet trap personnel doors with extra heavy duty industrial grade magnetic contacts alarm and strobe light that are activated when any range or bullet trap door is opened.

6.10.4 Communications Utilities: Communications utilities include telephone, fiber optic, and cable TV. All installations shall meet I3A requirements.

6.10.4.1 The Design-Build Contractor shall provide equipment racks, cabinets, fiber and copper patch panels, grounding equipment, service entrance equipment (including protectors and cross-connects), "110" punch down blocks, all conductors and outlets throughout the building. All horizontal copper cabling shall be rated for the present level of Category 6 cabling as approved by EIA/TIA standards. The Contractor shall make all required connections for both telephone and data systems both inside and outside the building to make for a complete turnkey installation. The entire horizontal distribution cabling system link for data and telephone systems shall be part of the manufacturer's warranted cabling solution, including patch cords. The design documents shall include data rack layouts and elevations showing each type of patch panel and equipment space required.

In addition to the I3A requirements, two 120V, 20 amp quad receptacles each with a dedicated circuit shall be placed on the telephone backboard in each telecommunications room, and one 120V, 20 amp quad receptacle shall be placed on each rack.

Note the following are requirements of I3A:

Provide a dedicated electrical panel for each TR with the following minimal requirements: 120/208 volt (V), 3-phase, 30-space panel with a minimum 100-Ampere (A) total capacity. All loads within the TR shall be fed from the dedicated TR panel and not from other branch circuits. Loads shall include, but are not limited to, receptacles, servers, UPS, data switches, and HVAC systems (including exterior units for split systems). A minimum of 30A spare capacity shall be reserved in each TR panel with a minimum of four unused spaces for future loads. In accordance with TIA/EIA-569-B, lighting fixtures should not be powered from the TR's electrical panel.

6.10.4.2 The Contractor shall provide 12-strand single mode fiber optic cables in innerduct and telephone cables (type and number of pairs per I3A) to each building. The data (fiber optic cable) and telephone service entrances shall be located in main communications room in each building.

6.10.4.3 Provide communications rooms in the building such that no data/telephone cable will be longer than 250 feet between patch panel and work area jack, including 10 feet of slack in the TR and 3 feet of slack above the outlet. If fiber is used, long runs are allowed, see paragraph 3.1.9(f) of Part II of UFC 4-214-02.

6.10.4.4 The Contractor shall make all final connections of the building telephone system at the main telephone cross connect and between each communications rooms. Backbone cables for voice between communications rooms shall be multiple 25 pair bundle cables. Backbone cables shall be sized as follows: 2 pairs for each telephone plus 25% spare capacity.

6.10.4.5 12-strand single mode fiber optic cable shall be used as the backbone cable between the main communications room and each remote communications room. All fiber optic cables shall be installed in innerducts and in accordance with I3A.

6.10.4.6 The Contractor shall provide a complete and usable (turnkey) data networking system including but not limited to all routers and servers. The Contractor shall make all final connections for both the fiber optic and copper data system cables, including patch cords, and between each communications room. The Contractor shall furnish to the Government 5% spare patch cords for copper cables and 25% spare patch cords for fiber optic cables.

6.10.4.7 Provide 4 pair, EIA/TIA 568B, category 6, unshielded twisted pair (UTP), #24 AWG, solid copper, plenum rated cables for both telephone and data systems to all data jacks.

6.10.4.8 All horizontal cables from data and telephone jacks shall be terminated on rack mounted patch panels with 110 style IDC connectors. All components shall be CAT 6 rated.

6.10.4.9 Provide, connect, and test a dedicated fiber optic communications link for the Building Management System (BMS). Coordinate specific requirements with the equipment manufacturer. Fiber optic cables shall be used to connect the BMS to the main Ft Drum Energy Management and Control System.

6.10.4.10 Provide fiber optic connections to the fire alarm and mass notification systems as required.

6.10.4.11 Cable TV: The CATV installer (Time-Warner) will provide the cable from the manhole to each building in the conduit provided by the Design-Build Contractor to the point of demarcation in the main Communications Room.

6.10.4.12 The Design-Build Contractor shall provide a point of demarcation as required by Time Warner Cable and shall make all connections downstream from the point of demarcation. There shall be individual home runs from each outlet to the junction boxes in the communications room.

6.10.4.13 Conduit shall be provided for in areas subject to physical damage. All CATV home runs shall be concealed in finished spaces.

6.10.4.14 In addition to the requirements in the previous paragraph, the Contractor shall provide 3/4” conduits from the cable trays to the CATV outlets in all rooms.

6.10.4.15 Provide flush mount boxes.

6.10.4.16 Additional Requirements: In addition to any requirements specified in I3A, the following shall be provided:

(a) Use fusion splice end connectors feeding all fiber to racks.

(b) Communication Outlet density shall be a minimum of two per room irregardless of the number of users per room.

(c) Provide 100% spare rack space plus 1 extra rack.

6.11. HEATING, VENTILATING, AND AIR CONDITIONING

6.11.1 HVAC Design Parameters: The design shall be based on the following parameters:

Project Location: Fort Drum, New York; Latitude: 44° 02' N; Longitude: 75° 46' W; Elevation: 650’ above sea level.

Outdoor Design Conditions:

1. Use 90°F DB OA temperature for air-cooled condensers.

2. Prevailing Wind: From Northwest, at 5 knots, in the winter.

3. Use -30°F DB OA temperature for winter conditions.

4. Summer: 83°F DB and 70°F WB

6.11.2 HVAC Systems:

6.11.2.1 HVAC System for Communications Room: All Communications Rooms shall utilize an HVAC system which conforms to the requirements of I3A as a minimum. Units shall include air-conditioning, heating, and be independently thermostatically controlled. Units shall be available to provide cooling 365 days per year regardless of outdoor air temperature. Units shall be provided with micro-processor controls and any other options necessary

to meet the design conditions such as low ambient temperature controls, humidifiers, or hot-gas bypass reheat for humidity control. Rooms shall be provided with positive atmospheric pressure.

6.11.2.2 HVAC System for Mechanical rooms: To prevent freeze-ups in the mechanical rooms the Contractor shall consider one of the following options:

1. Each gas fired piece of equipment located in the mechanical room shall have a dedicated combustion air louver sized for the combustion air requirements of that unit. An independently controlled combustion air damper shall be provided at each louver and will open whenever the unit is operating. A pre-heat coil shall be installed at each louver to temper the outside air to minimum of 40 degrees F.

2. If a pre-heat coil is not provided to temper the outside air, then all items located in the mechanical room that have a potential of freezing (i.e. water piping including sprinkler piping, water heaters, etc.) shall be located in a separate room and all combustion air requirements shall be direct vented to the outside from the equipment. No outside combustion air intakes louvers shall be provided.

6.11.2.3 Equipment - The boiler room shall be provided with natural gas and carbon monoxide gas leakage monitoring, with remote alarm. System shall be connected to the DDC system and fire alarm panel. Boilers shall be mounted on anchored, reinforced 4 inch high concrete housekeeping pads, with a 6 inch clear space from boiler to the edge of pad.

6.11.2.4 Gas Piping: Natural gas will be provided from the Fort Drum 15 psig natural gas distribution system. Existing gas pressure in main line at street shall be assumed to be 10 psig for pipes sizing purposes. Provide gas meter to have volume monitored by UMCS. Gas meter assembly shall not be located near outdoor air intakes. Gas meter shall be protected by three 8” diameter bollards and 16-gauge painted galvanized steel shield located 36” above meter supported at the wall and protected by bollards to protect meter from falling snow/ice from roof. Gas valves shall be solenoid valves - "normally open," no manual reset.

6.11.2.5 Cooling System: Where chilled water is used for cooling, the chilled water system shall have an air cooled chiller(s) and all required accessories. Pumps shall be base-mounted and selected for non-overloading operation at all conditions. Pump seals shall be silicon carbide for use in systems with suspended particles. If the motors for the distribution pumps exceed 7.0 kW then a primary/secondary pumping arrangement shall be used, the distribution loop shall be designed for variable flow and the pumps shall be controlled by variable frequency drives.

Chilled water piping system shall be constructed of Type L copper or ASTM A53 SCH 40 black steel with screwed, welded or grooved end fittings.

Refrigerants shall be one of the fluorocarbon gases. Refrigerant shall meet the requirements of ARI 700 as a minimum. Refrigerant Ozone Depletion Potential (ODP) shall not exceed 0.00. Refrigerant R-22 shall not be used. Chiller shall be provided with a complete factory mounted and prewired microprocessor based control system. Controls package shall provide operating controls, monitoring capabilities, programmable setpoints, safety controls, and UMCS interfaces.

Exterior cooling system piping trench shall use Marker Tape and Tracer Wire in trenches.

6.11.2.6 Air Handling Units: Modular Type Air Handling Units shall be double wall configuration, cooling coil -sized to cool the outside air to 55 degrees F in order to dehumidify the outside air; filters; and mixing box complete with automatic air dampers. Ultraviolet light C band (UV-C) emitters shall be incorporated downstream of all cooling coils and above all drain pans to control airborne and surface microbial growth and transfer. Safety features shall be provided to prevent hazard to operating staff. Units shall not produce ozone. Freeze protection shall be accomplished by monitoring the air handling units discharge air temperature. When the discharge air temperature falls to 50 degrees F (adjustable), the DDC system shall send a signal to stop fan, close the outside air damper, and send an alarm to the control system. Filters shall have a MERV of 8 or higher when evaluated under ASHRAE

standard 52.2. All filters shall be UL class 2. Provide each filter assembly with its dedicated automatic alarm (latching) to signal the need for filter change due to loading.

6.11.2.7 Ventilation and Exhaust Openings: Outside air shall be taken through outdoor air louver with louvers to be "double rain guard type". Ducts at louvers shall be watertight for 8'-0" from louver and shall pitch to drain to louver or attached 2" diameter minimum size drain with trap piped to floor drain.

6.11.2.8 Freeze Protection: All chilled water and hot water piping shall be protected from freezing by use of a 40/60 propylene glycol mixture. Glycol mixture shall be premixed by manufacturer using deionized water. Contractor shall provide glycol fill station for each separate heating and cooling system with feed water pump, tank, all necessary water treatment equipment, required hydronic controls and accessories for all hydronic systems. Glycol fill station shall be automatically operated, manually filled, with a minimum volume of 50 gallons. Provide test kits and a test coupon assembly with balancing valve, shut-off valve and plugged tees for sampling connections, 1-inch diameter. Provide drum-mounted, manually operated bung pump for the transfer of glycol into the storage and make-up/fill tank. The glycol make-up system shall automatically operate on a reduction of system pressure. Fluid level in the glycol tank shall be monitored by the DDC system and shall send an alarm when the fluid level is low. Domestic water connection shall not be provided.

6.11.2.9 Boilers. Boilers shall provide heating for the buildings and shall be cast iron, gas-fired boilers with minimum annual fuel utilization efficiency (AFUE) of 88%. (Basis of design: Hydrotherm KN Series.) Pulse type combustion boilers are not acceptable. (Note: Fort Drum requires cast iron condensing boilers due to their smaller footprint and higher efficiency.) Provide minimum of two boilers. Each boiler's capacity shall be 65% of the calculated capacity required to heat building. Manufacturer's packaged operation controls shall be provided to handle all aspects of capacity modulation and safeguarding. Controls shall be provided to allow for staggered operation and shall interface with the building DDC system and allow changes to be made to boiler control set points from the DDC system. Boiler water supply temperature shall be reset based on outside air temperature controlled by DDC control system. Solid-state controls shall be used to monitor and control all operating and safety functions. Each boiler shall utilize a separate boiler secondary pumping system to maintain constant hot water (glycol) circulation rate through the boiler whenever the boiler is enabled. Burners shall be power burners. Boiler flue system shall be a double wall, prefabricated, positive pressure type, stainless steel and factory pre-insulated, furnished and installed in strict accordance with manufacturer's installation requirements. Boiler vents exiting through the roof shall be not more than 5'-0" from the roof ridge. Anchor at 2 points within the building.

6.11.3 Controls:

HVAC system temperature control system shall be a microprocessor based Direct Digital Control (DDC) system. The DDC system shall completely, seamlessly and directly interfaces with the existing base-wide Utility Management and Control System (UMCS) installed at Fort Drum without interpreters or third party devices. Communication with existing base-wide Utility Management and Control System (UMCS) workstations, servers and laptops shall utilize BACnet protocol and be configured for operation on VLAN#4003 only, connected by common fiber optic system serving building. The system shall include software with all the necessary means for global data exchange, scheduling, local and remote control and adjustment; load shedding for demand control; event management; monitoring; trending; logging; maintenance notification; and alarms. The Fort Drum systems are Trane, Siemens. The building control systems must have seamless communications with one of the two existing base-wide systems and be capable of sending to, receiving from, and interpreting global commands with the base-wide system and resident software.

In addition to fully control and monitor the building HVAC systems, the DDC system shall monitor the following:

1. Water meters.

2. Gas meters.

3. Building electrical power and demand meter.

4. Glycol fill tank fluid level.

5. Natural gas detector.

6. Carbon monoxide detectors.

7. Existing global system substations electrical power and demand meters.

8. Existing global system outside air temperature.

9. Existing global system duty cycling modes for demand shedding.

10. Existing global system summer/winter modes.

11. Existing global system heating/cool modes.

12. Control exterior lighting through a "Hand-Off-Auto" switch.

13. Building fire alarm system.

14. Freezestat points.

15. Low ambient temperature control.

6.11.3.1 Instruction: Upon completion of work and acceptance by Government, factory representatives under direct employ of temperature control manufacturer shall provide 8 hours of classroom and “hands-on” instruction to 20 of Government’s operating personnel responsible for mechanical systems. Instruction shall be video recorded and three copies provided on DVDs.

6.11.4 HVAC Systems (Building Specific Design Requirements):

6.11.4.1 HVAC System - General: All facilities shall be equipped with HVAC systems that are appropriate for their function and occupancy and meets all code requirements. Systems shall be designed and installed in accordance with the latest industry standards for each type of application.

6.11.4.2 Range Ventilation:

The project requires a specialized subcontractor experienced in military or similar commercial indoor firing range ventilation systems for the design and construction of the range ventilation system. The specialized subcontractor shall be designated as the Range Ventilation Contractor (RVC) for the purposes of this project.

<u>RVC Experience Clause</u>

The Range Ventilation Contractor shall have experience in design and/or construction of ventilation systems meeting NIOSH, Army, Navy and/or Air Force range criteria requirements similar to those included in this project, specifically, providing ventilation for multi-lane ranges having laminar air flow over the entire cross sectional area of the firing line and maintaining a negative pressure, with similar controls to those required for this project.

<u>RVC Qualifications</u>

The Range Ventilation Contractor must meet the following qualifications. Range Ventilation Contractor shall have successfully completed a minimum of at least three military or similar commercial firing range ventilation systems that comply with the criteria listed herein, current at the time of the specific projects.

RVC Design Responsibilities

The range ventilation system incorporates Design-Build elements as indicated in this RFP. The RVC is responsible for preparing the range ventilation system design and notifying the COE in the bid proposal if the RVC cannot accept any part of the system as described in the RFP for technical and performance related reasons. Special attention shall be given to the design of the range ventilation radial supply diffuser, mechanical room space, and controls. In the absence of such notification, the RVC accepts the RFP elements of the project and shall incorporate those elements into detailed design drawings. The RVC is fully responsible for all design elements of the range ventilation system, including:

(1) Design, setup and performance of the range ventilation radial diffuser, including:

a. Quantity, size and placement of perforations in full radial face of diffuser.

b. Quantity, size and placement of dual thickness airfoil turning vanes inside the radial plenum.

c. The overall design of the plenum including general configuration, quantity and size of air supply runout ducts.

d. The RVC is responsible for final settings of overall flow, flow through individual air supply runout ducts, adjustment of turning vane positions, and other means of providing airflow at the initial firing line and down-range meeting stated performance requirements.

(2) Selection and placement of contaminant monitoring devices (CO shall be monitored behind the firing line at a minimum). Monitoring devices shall be connected to the DDC system.

(3) Selection and incorporation of energy recovery system components.

(4) Overall control system. Controls for the range area and remainder of the building shall be by the same vendor.

(5) Computational Fluid Dynamic (CFD) modeling. CFD modeling shall be performed for the indoor range to ascertain velocities at the firing line as required by this document. CFD Modeling shall be performed by an engineer with experience in at least two projects prior involving air velocity. CFD Modeling software shall be ANSYS Fluent or alternate approved program. A report shall be generated from the CFD modeling software showing a. Velocity at the firing line for each of three firing positions – standing, crouched, and prone. The discharge point of the weapon shall be considered the viewing plane for each position. The out put for velocity at the firing line shall be depicted by velocity vectors, with arrows showing direction of flow and color indicating velocity. b. Laminar flow through the entire range. The output for laminar flow through the range shall be depicted by 3D streak lines with color indicating turbulence. The report shall contain a color scale with units of measurement. The report shall also contain a narrative discussing the general nature of the output, points of concern, and indicate what the impacts of furniture and fixture placement may have on the system.

**RANGE VENTILATION SYSTEM MAINTENANCE AND PERFORMANCE MONITORING**

The Range Ventilation Contractor shall provide a minimum of 1 year's maintenance and warranty as part of this construction contract. The ventilation systems performance shall be monitored at least quarterly, and a quarterly (every 3 months) site visit shall be made to perform routine maintenance and check controls on all ventilation equipment.

**CONTROLS AND INSTRUMENTATION (DDC/BAS/UMCS)**

Control System General

Use the Direct Digital Control (DDC) SYSTEM to control the range ventilation system. Provide range DDC control panel in the Range Control Room. Interface DDC with Range Master Control Panel and other systems including range lighting controls as required. The DDC system will also seperately serve the support areas - these services are not covered by these notes.

A complete system of controls shall be provided to operate all range ventilation systems and equipment as well as all building HVAC systems and equipment including controllers, sensors, actuators, wiring, conduit, tubing and all other types of materials, equipment and services required whether or not specifically indicated or called for.

Contractor shall be required to incorporate a Direct Digital Control system (DDC). The Contractor shall have installed the same type of control system in at least one military or similar commercial indoor firing range.

Negative Pressurization - Range Area

The control system shall maintain the air pressure in the range and bullet trap areas at a negative pressure with respect to the support area as measured in the Range Control Room. This requirement is critical as the negative pressure minimizes the possibility that contaminants created in the range area will enter the adjacent non-range spaces. Heavy metals such as leads if allowed to enter non-range spaces can cause surface contamination levels to rise above OSHA allowable limits. Differential pressure instrumentation shall include Setra Model 264 or equal Very Low Differential Pressure Transducer with -0.25 to +0.25 inches water gauge range and a permanently mounted 1% accuracy manometer with 0.5 to .25 inch water gauge range and 0.005 inches water gauge minor scale divisions (Dwyer Model 215 or equal) set up to read negative pressure. Mount the manometer in the Range Control Room. Run all tubing for pressure transducer and manometer in concealed conduit.

Conduit and Wiring

Requirements of general DDC specifications apply to this work. All DDC system and range ventilation system control wiring and tubing shall be run in conduit continuously. All low voltage conduit and wiring shall be provided. All conduit inside the building shall be EMT with steel compression fittings. All conduit outside the building shall be hot dipped galvanized rigid metallic conduit (RMC) with watertight threaded fittings. Connections to vibrating equipment shall be made with watertight flexible conduit and fittings. All power wiring and conduit shall be provided. Data and power cables must be plenum rated when used in a plenum space for heating, ventilation and air conditioning (HVAC).

Building connection to the post Utility Monitoring and Control System (UMCS)

The Building Automation System (BAS) that controls the equipment and systems in the facility shall be integrated to and become part of the existing Utility Monitoring and Control System (UMCS).

Access to the BAS shall be available locally in the building and remotely from a central site.

Range ventilation system controls

Provide on/off pushbutton switch on range master control panel (RMCP) along with "DO NOT SHOOT", "SAFE TO SHOOT" and “WARNING" lights. "SAFE TO SHOOT" light will be on only when all systems are within operating parameters. Otherwise, "DO NOT SHOOT" light will be on.

1. Conditions to turn on "DO NOT SHOOT" light:

A. If supply fan is off

a. Activate “DO NOT SHOOT ” light

b. Warning at Range Master Control Panel (RMCP)

c. Shut down range ventilation system

d. UMCS system notification – supply fan is off

B. If exhaust fan is off

a. Activate “DO NOT SHOOT ” light

b. Warning at RMCP

c. UMCS system notification – exhaust fan is off

d. Shut down range ventilation system

C. If AHU supply airflow is less than design rate

a. Activate “DO NOT SHOOT” light

b. Warning at RMCP

c. UMCS system notification – Low Supply CFM

d. Continue to operate ventilation system

D. If any range door on the bullet trap is open

a. Activate “DO NOT SHOOT ” light

b. Warning at RMCP

c. Continue to operate ventilation system.

d. UMCS system notification – bullet trap door is open.

E. If the range to booth differential pressure is outside the upper limit, and the range ventilation system is at its’ lowest supply CFM

a. Activate “DO NOT SHOOT” light

b. Warning at RMCP

c. UMCS system notification – Pressurization failure

d. Continue to operate ventilation system

F. If the differential pressure sensor indicates pressure drop greater than 115% (adjustable to manufacturer recommendations for the filter) of the design range for supply, exhaust pre-filter, or exhaust HEPA filters

a. UMCS system notification – filter clogged

b. Activate “DO NOT SHOOT” light

c. Warning at RMCP

d. Ventilation system to shut down

2. Controls to provide "WARNING" light if:

A. If the differential pressure sensor indicates pressure drop between 105% design and 115% (adjustable to manufacturer recommendations for the filter) of the design range for supply, exhaust pre-filter, or exhaust HEPA filters

a. UMCS system notification – dirty filter

b. Local control panel notification – dirty filter

c. Ventilation system to continue to operate

B. Low temperature

a. A temperature sensor within the space indicates a temperature less than 65F (adjustable) will report low temperature to the UMCS

C. High temperature

a. A temperature sensor within the space indicates a temperature greater than 85F (adjustable) will report a high temperature to the UMCS.

3. Provide DDC with all points necessary to meet all range ventilation system requirements, provide a fully functioning system, and permit all system safeties and operations; including but not limited to those shown on the chart included in **Appendix FF**.

**Acceptance Test/Commissioning**

Preliminary test/commissioning

1. Contractor conduct well in advance of final acceptance test

2. System shall be fully completed prior to preliminary test and commissioning

3. Test & balance work shall be fully completed prior to preliminary test and commissioning

4. Perform all tests required for final acceptance test

5. Balance, adjust, retest and repeat as necessary until all tests meet criteria

6. Operate system in all modes and run through all control sequences

7. Verify each safety for proper operation under all conditions of operation

8. Notify COE that the preliminary test has been successfully completed

Final acceptance test

The final acceptance tests shall be witnessed by Government personnel to include the COR. Schedule a minimum of 6 weeks in advance. The contractor is responsible for assuring the system is working properly before scheduling the final acceptance tests.

Range pressure test:

Check and verify differential air pressure between firing range area and range officer booth. Firing range area air pressure shall be between -0.02 and -0.06 inches water gauge (negative with respect to range officer booth air pressure). Read from DDC instrumentation (very low differential pressure transducer with -0.25 to +0.25 inches water gauge range) and validate using a permanently mounted 1% accuracy manometer with 0.5 to .25 inch water gauge range and 0.005 inches water gauge minor scale divisions. Mount the manometer in the Range officer booth. Run all tubing in conduit.

Smoke tests:

Provide prior to airflow tests to identify potential problem areas. Provide either a fog machine or "smoke bombs" in sufficient supply (not less than ten) to complete testing with all tests demonstrating compliance with system requirements. Release smoke in each lane along the entire height at the firing line. All smoke must move "smartly" downrange. Smoke going backwards will constitute failure of acceptance. Conduct additional smoke measurements down range to ensure adequate air velocities and patterns are maintained down range towards the bullet trap.

Airflow measurements:

1. Take measurements with the system on and running, with the get-ready area empty but with furniture in place. Note the time of day, outside air temperature, space temperature and total supply air flow.

2. Using a hot wire or vane type meter - At the firing line at each firing station, place the probe (or the meter) so that it is perpendicular to the floor at the firing line. Take three measurements at the same level in three locations from the floor: 1 foot (prone level firing); 3 feet (kneeling position); and 5 feet (standing position). This will result in 9 readings for each firing position. Average the 9 readings for the Firing Position Average.

3. Acceptable readings are as follows:

A. Individual readings: no single reading under 50 fpm or over 110 fpm

B. Firing Position Average: 75 fpm (+-10%)

C. Average across all firing positions: 75 fpm (+- 5%)

4. Repeat the tests at 15-20 foot intervals downrage, also at 1 foot, 3 feet, and 5 feet above the floor. Averages at each interval across all lanes must be at least 30 fpm.

General inspection:

Verify the installation of the on/off switch along with "do not shoot", "safe to shoot" and "warning" lights.

Verify that the following conditions turn on the "do not shoot" light, shut down the system and sounds alarm:

1. Either the supply or exhaust fan is off
2. Range door remains open longer than the preset limit.
3. Range pressure is in the upper limit (greater than negative 0.02 inches water gauge)
4. Exhaust pre-filter is past its limit.
5. HEPA filter is past its limit.
6. Supply static pressure is below its limit.

Verify that the following conditions turn on the "warning lights":

1. Exhaust pre-filter is past set point.
2. Exhaust HEPA filter is past set point.

Note: set point for static and filter alarms will be documented based on field conditions at start up.

Verify that the start-up sequence is as designed.

Verify the following control points are responding and record readings:

1. Discharge, outside air, space temperature
2. Supply static pressure
3. Supply fan status
4. Exhaust fan status
5. Exhaust fault status
6. Exhaust pre-filter differential
7. HEPA filter differential
8. Range to base building pressure differential
9. Bullet trap door status
10. Range door status

Contractor to provide:

1. Training on maintenance
2. O&M manuals
3. Smoke bombs (10 minimum) or fogging machine
4. Written tests results, including meter reading

6.11.4.3 If natural gas make-up air units are used, they shall be indirect-fired type.

6.11.4.4 Recirculating Range Ventilation System (OPTIONAL BID ITEM)

Provide all design, materials, equipment, sensors, control system, and any other requirements, and install the range ventilation system such that the percent of outside air can vary from a minimum of 25% OA to the maximum condition of 100% OA. If this option is awarded, the direction to recirculate air supersedes only the specific provisions for 100% OA contained in the applicable criteria below,

US Navy Environmental Health Center Technical Manual NEHC-TM6290.99 Rev. 1 (May 2002) "Indoor Firing Ranges Industrial Hygiene Technical Guide"

MIL-HDBK-1027/3B will be replaced by Unified Facilities Criteria UFC 4-160-01 "Design and Maintenance of Small Arms Ranges." UFC 4-160-01 is listed for reference only.

Reference only - US Air Force Engineering Technical Letter ETL 08-11 "Small Arms Range Design and Construction".

Recirculated air shall be filtered at a minimum by a pre-filter (MERV 6), secondary filter (MERV 13), and final HEPA filter. The number of filters shall be dependent upon manufacturers rating and recommendations for face velocity. The system shall have a high efficiency particulate air (HEPA) filter with reliable back-up filter. In addition, controls to monitor the concentration of lead (total particulate monitor may be used) and carbon monoxide in the return air shall be installed and programmed to modulate the amount of OA and ultimately bypass the recirculation system automatically if the filter system fails. This system shall be operating and maintained IAW 29 CFR 1910.1025(e)(4)(ii).

Sensors shall be selected for longevity, reliability, and to minimize maintenance and re-calibration requirements. Lead may be monitored through the use of a total particulate monitor. Placement and housing of the sensors shall allow for ease of maintenance while limiting false alarm conditions due to effects of firing. The sensor alarms shall be adjustable such that the thresholds and time delay can be modified. This shall be used to ensure that the alarm signals when the set threshold has been exceeded for the set period of time.

The Control System and range ventilation shall be designed such that the percent of OA is automatically adjusted based on the sensor conditions, and shall range continuously from 25% OA to 100% OA. Additionally, a control shall be included in the Range Control Room to manually switch the system between recirculation mode and 100% OA mode.

All other components of the range ventilation system shall be incorporated as described in this document, including but not limited to energy recovery and filtration of exhausted air.

6.11.4.5 Geothermal System (OPTIONAL BID ITEM)

Provide and install a complete geothermal heating/cooling system for the Administrative and Support areas and the in-floor radiant heating for the Firing Range area, to include but not limited to the heat pumps, piping/pumps/distribution systems, heating and cooling systems, controls, etc. to make a complete and usable system.

System design may incorporate water-to-refrigerant-to-air water source heat pumps and/or water-to-refrigerant-to-water central chiller/heat pump.

Heating for the applicable areas of the building will be accomplished using the geothermal heat pump system. Where annual heating and cooling loads are unmatched by more than 25% the geothermal heat pump system shall employ an auxiliary heating water system. Heating water system shall be used for ventilation air preheat, ventilation air re-heat (if required), mechanical, electrical and storage rooms heating, and perimeter and vestibule heating where required. The auxiliary heating water system shall include a minimum of two (2) heating water boilers and circulation pumps. Heating system shall use a primary/secondary pumping arrangement. There shall be not less than two primary hot water distribution pumps for each building, one of which shall be operating and the other on automatic standby. Pumps with motors that are equal or greater than 5.0 Horsepower shall utilize variable frequency drives. Pump seals shall be silicon carbide for use in systems with suspended particles. The controls shall alternate the lead/lag pumps daily to equalize their running hours (adjustable).

Integrate the control system to the installation's existing UMCS. The existing UMCS is Trane and Siemens

6.12. ENERGY CONSERVATION

6.12.1. General

6.12.1.1 Note that ASHRAE 90.1 requires the use of ASHRAE 62.1 for ventilation and exhaust rates. Coordinate system selection with the installation based on energy usage and life cycle cost, reliability and operating considerations, and the limited maintenance capabilities and resources of the user.

6.12.1.2 Coordinate with the customer on their plans to implement the Energy Policy Act of 2005 (Public Law 109-58); for estimating purposes, assume no additional requirements for adding alternative fueling stations.

6.12.1.3 Roof Penetrations shall be kept to a minimum.

6.12.2. Inclusion of Renewable Energy Features. The following renewable energy features have been determined lifecycle cost effective, are included in the project budget and shall be provided:

None.

6.13. FIRE PROTECTION

6.13.1 Fire Protection Engineer: The fire protection engineer shall be an integral part of the design team and shall be involved in all aspects of the design of the fire protection system. As a minimum, the fire protection engineer shall design the automatic sprinkler systems; the fire alarm system; and the MONACO fire alarm radio transmitter/ receiver system.

6.13.2 Incoming Fire Service Main: A minimum of an 8 inch fire service shall be brought into the buildings and the domestic water service shall be branched off of and be supplied by it. A PIV (post indicator valve) shall be provided outside at a minimum distance of 50 feet from the exterior of the building. The incoming fire protection service shall be in the mechanical room and shall be located to prevent freezing. A backflow preventer shall be provided with OS&Y valves at each end to isolate the assembly. A vertical assembly may be considered to conserve space if no fire pump is provided.

6.13.3 Fire Extinguisher Cabinets: Extinguisher shall be installed in semi-recessed cabinets. Cabinets shall be no locking type with glass window.

6.13.4 Piping: There shall be no exposed sprinkler piping in the building except in mechanical and electrical spaces and stairwells.

6.13.5 Fire Department Connection: Threads shall be 5” Storz connection compatible with the equipment at the Fort DRUM Fire Department. It shall be installed with a 45 degree downturn. At this termination the riser is to be protected with a painted, concrete filled steel bollard. FDC escutcheons shall be lettered to identify the interior building fire protection system(s) as appropriate, as either “AUTO SPKR” or “AUTO SPKR & STANDPIPE”. The location of the fire department connection shall be coordinated and approved by the Fort DRUM Fire Chief. The location of the fire department connection may not necessarily be in the vicinity of the incoming fire service but, shall be within 150 feet of a fire hydrant.

6.13.6 Fire Alarm / Mass Notification System: The system shall be a voice evacuation fire alarm system with manual voice paging features to combine both fire alarm and mass notification system features. The system installed in accordance with all applicable codes and standards. It shall utilize an addressable microprocessor based type system with manual and automatic alarm initiation. Signal transmission shall be a multiplex format and be dedicated to fire alarm service only. Fire alarm control panel shall be mounted in building main electrical room with an auxiliary annunciator panel capable of all control functions mounted in the building main entrance vestibule. The type and location of the fire alarm annunciator shall be coordinated with the Fort Drum Fire Chief.

6.13.6.1 Each Mass Notification system shall have a dedicated control panel and interfaced to a Monaco transceiver that can accept all messages, including live voice messages, from the central control station. Coordinate transceiver connection requirements with the Contracting Officer.

6.13.6.2 Audible alarm indication shall be via fire alarm speakers. Visual alarm indication shall be by synchronized strobes. Spacing and location of speakers and strobes shall be commensurate with the ADA (Americans with Disabilities Act); NFPA 72; and any other applicable codes.

6.13.7 The NAC (Notification Appliance Circuits) and the SLC (Signal Line Circuits) shall be class and style as required for the application. The AID (Alarm Indicating Device) circuits shall be Style “D” (Class “A”). All circuits shall have at least 40% spare capacity for additional devices (initiating and indicating) in each building.

6.13.8 All signals from the fire alarm panel shall be transmitted to the FORT DRUM fire department fire alarm receiving station. The transmitter shall be identical to the current base wireless manufacturer and shall be added to the existing base receiving system. The fire alarm radio transmitter shall be a MONACO BTX Series Transceiver and/or an approved equal system compatible with Fort Drum's radio transmitter system.

6.13.9 Monitor Module shall be designed to monitor system components that are not equipped for multiplex communication with the fire alarm control panel and cannot transmit a unique identification signal. Monitor Modules shall be provided in the appropriate quantity and location (no greater than 3 feet away) to individually monitor other fire alarm initiating devices or supervisory devices and provide a unique address to the fire alarm control panel. The monitor module shall contain an integral LED that flashes each time the control module is polled.

6.13.10 Control Modules shall be capable of operating as a relay (dry contact FORM C) for interfacing the control panel with other systems or other devices. The module shall be UL Listed as compatible with the control panel. The indicating device or the external load being controlled shall be configured as a STYLE Y notification appliance circuit(s). The system shall be capable of supervising audible, visual and dry contact circuits. The supervision shall detect a short on the supervised circuit and shall prevent power from being applied to the circuit. The control module shall contain an integral LED that flashes each time the control module is polled and be located within 3 feet of the controlled circuit or appliance.

6.13.11 The fire alarm system shall be provided with and connected to a Monaco BTX fire alarm transceiver and or an approved equal system compatible with Fort Drum’s radio transmitter system, which shall transmit distinct signals to the existing base wide Monaco D21 fire alarm monitoring system. The fire alarm transceiver shall be provided with all necessary equipment to interface with the existing base monitoring system. Provide an omni-directional antenna for each radio transmitter. The antenna shall be mounted on a 25 feet high wood or fiberglass pole at the exterior of the building. The antenna shall be corrosion resistant and designed to withstand wind velocities of 100 MPH. The antenna shall not be mounted to any portion of the building roof system. The antenna shall be properly grounded. Also provided shall be a lightning arrester for the antenna mast assembly appropriately grounded. The radio frequency for the existing FORT DRUM fire alarm transmitter system by MONACO is 413.325

(UHF). In addition to its signal transmission capabilities, the radio transceiver shall be capable of receiving voice signals so that live voice messages can be made throughout the building, over the fire alarm/mass notification system, from a remote location.

6.13.12 All mechanical rooms utilizing gas fired equipment shall be provided with both combustible gas detectors (calibrated to alarm at 25% of the LEL of methane) and carbon monoxide gas detectors (calibrated to alarm at 35 ppm). These detectors shall be monitored for alarm and trouble conditions by the building fire alarm system and shall transmit as separate zones to the fire alarm transceiver. When a detector activates it shall sound a horn/strobe with amber lens located in the vicinity of the detector (each detector shall have its own horn/strobe). Signage provided with the horn/strobe shall state what the hazard is and to evacuate the area immediately to fresh air. Activation of any gas detector shall initiate a building general fire alarm, however shall not sound the fire alarm audio/visual appliances in the building and only activate its respective special hazard horn/strobe device. Activation of any gas detector in a mechanical room shall shutdown all gas-fired appliances along with the gas supply to the appliances in the space via solenoid valves at the individual appliances.

6.13.13 Contractor shall be responsible for providing sufficient training materials for all present at the training session, (minimum 15 personnel). Coordinate actual requirements with the Owner at time of training.

6.13.14 The Contractor shall be responsible for providing video taped training sessions, which will be submitted to the Owner for future employee training. All of the training sessions conducted shall be video taped.

6.13.15 Include NFPA - 170 fire symbols standard as a reference document.

6.13.16 Sprinkler Requirements: The area between the firing line and the rear of the bullet trap are not required to be sprinklered.

6.14. SUSTAINABLE DESIGN

6.14.1. LEED Rating Tool Version. This project shall be executed using LEED-NC Version 3.

6.14.2. The minimum requirement for this project is to achieve LEED Silver level. Each non-exempt facility (building plus sitework) must achieve this level. In addition to any facilities indicated as exempt in paragraph 3, the following facilities are exempt from the minimum LEED achievement requirement: none..

6.14.3. Credit Validation: LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the Contractor. Administration/team management of the online project will be by the Contractor. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is required. The Contractor will obtain LEED certification prior to project closeout. Application, payment of certification of fees and all coordination with USGBC during the certification process will be by the Contractor. GBCI interim review of design phase data is not required by the Government but is recommended. Government validation during project execution does not relieve or modify in any way the Contractor's responsibility to satisfy all requirements for certification as defined by LEED and GBCI. Contractor is not responsible for design phase LEED documentation of any unaltered portion of the design that is accomplished by others. If the project includes unaltered complete design by others, during the certification process Contractor will coordinate all GBCI comments on LEED credits that fall outside Contractor's scope of responsibility with the Government for coordination with the Designer of Record, and Contractor will not be penalized if project fails to achieve certification at the minimum required level due to loss of credits that are the responsibility of others.

6.14.4. Commissioning: See Appendix M for Owner's Project Requirements document(s).

6.14.5. LEED Credits Coordination. The following information is provided relative to Sustainable Sites and other credits.

**SS Credit 1 Site Selection:**

Project site IS NOT considered prime farmland.

Delineation of 100-year flood elevation is shown on site drawings provided in this CONTRACT.

Delineation of threatened or endangered species habitat is shown on site drawings provided in this CONTRACT.

Delineation of water, wetlands and areas of special concern is shown on site drawings provided in this CONTRACT.

Project site WAS NOT previously used as public parkland.

**SS Credit 2 Development Density & Community Connectivity.**

Project site DOES NOT meets the criteria for this credit.

**SS Credit 3 Brownfield Redevelopment.**

Project site DOES NOT meets the criteria for this credit.

**SS Credit 4.1 Public Transportation Access.**

Project site DOES NOT meets the criteria for this credit.

**EA Credit 6 Green Power.**

35% of the project's electricity WILL NOT will be provided through an Installation renewable energy contract. Do not purchase Renewable Energy Credits (REC's) to earn this credit.

**MR Credit 2 Construction Waste Management.**

The Installation does not have an on-post recycling facility available for Contractor's use.

**Regional Priority Credits (Version 3 only)**

The project zip code is 13602.

6.14.6. LEED Credit Preferences, Guidance and Resources. See Appendix L LEED Project Credit Guidance for supplemental information relating to individual credits.

6.14.7. Not Used

6.14.8. Additional Information

N/A.

6.15. ENVIRONMENTAL

Note that the requirements of the base contract apply for all work included in this task order, including Section 01 57 20.00

**1) WETLANDS:**

Jurisdictional wetlands are present in the vicinity of the project site. In the event that the contractor's final site plan is such that wetland mitigation is required, the contractor shall perform the mitigation at no additional cost to the Government. Design of mitigation shall be fully coordinated with Fort Drum's Environmental Division.

**2) ENDANGERED SPECIES:**

1. The federally endangered Indiana bat is present on Fort Drum and must be considered in all actions. Actions on Fort Drum, must be in accordance with requirements negotiated with the U.S. Fish & Wildlife Service under Section 7 of the Endangered Species Act. Projects involving ANY habitat modification (e.g., vegetation removal) must be addressed by Fort Drum's Fish and Wildlife Management Program. In general, no trees greater than 4 inches (diameter breast height) may be cut from 15 April - 01 October to avoid any direct adverse effects to the Indiana bat. Clearing of natural vegetation (e.g., shrubs and trees) less than 4 inches (diameter breast height) should typically occur between August 1 - April 15 to minimize the impact to migratory birds and to maintain foraging areas for bats. The contractor (and all subcontractors) shall be responsible for coordination with Fort Drum's Fish & Wildlife Management Program to ensure compliance with the Endangered Species Act and all other applicable laws and regulations pertaining to wildlife. Overall the contractor (and all subcontractors) shall minimize interference with, disturbance to, and damage to plants, fish, wildlife, and their habitats on and adjacent to the project area.

2. Flagging or signs must be used to demarcate areas to be cleared vs. not cleared prior to any construction activities or tree clearing for a given project. Clearing must only occur within the flagged area, and flagging must be removed upon completion of the project.

3. If any bats are discovered during the demolition or repair of buildings (to include work such as complete and partial building demo, removal/replacement of roofs, siding, etc.), all work must cease and Fort Drum's Fish and Wildlife Management Program (772-9636 or 772-4999) must be immediately contacted. If the building has pre-existing known bat colonies, then Fort Drum's Fish and Wildlife Management Program must be contacted before demolition is to occur. (At this time, the only structures known to contain bat colonies are within the historic LeRay Area.).

4. All found bats must be immediately reported to Fort Drum's Fish and Wildlife Management Program (772-9636 or 772-4999). Do not attempt to handle any live bats, regardless of condition. If a live bat is found in a building please contact 772-2072 or 772-4999.

5. Light minimization measures are to be incorporated for all exterior lighting that may include but are not limited to full cutoffs, reflectors, shields, and/or downward angling of lights. The following are guidelines that have been established for light minimization within the draft Installation Design Guide and must be followed to the maximum extent possible.

a. Maximum light at the edge of parking lot/road pavement will be 2 foot candles or its equivalent.

b. Light levels for parking lots/sidewalks shall be in accordance with Illuminating Engineering Society (IES) Lighting Handbook.

c. A Professional Engineer must review the lighting plan and ensure it is sound and meets minimization requirements.

d. Use full cutoff luminaires for road, parking lot, and sidewalk illumination. These are luminaires that allow no direct light emissions above a horizontal plane through the luminaire's lowest light emitting part.

e. Use downward-angling lights and appropriate shields in all applicable locations.

6. No night lighting for construction projects is authorized without prior coordination and authorization from the project manager and Fort Drum’s Fish and Wildlife Management Program.

7. Project planning and design should attempt to minimize building footprints by combining infrastructure (i.e. roads, utility lines, etc.) for multiple buildings or by constructing multi-story versus multiple or expanded single story buildings whenever possible.

**3) OUTDOOR LIGHTING MINIMIZATION:**

The purpose of the Fort Drum Outdoor Lighting Guidelines is to regulate outdoor lighting in order to reduce or prevent light pollution. This means to the extent reasonably possible the reduction or prevention of glare and light trespass, the conservation of energy, and promotion of safety and security. These Guidelines will ensure appropriate outdoor lighting in compliance with the Endangered Species Act and in accordance with the Fort Drum's Army Strategic Plan for Sustainability.

**Definitions**

a. Fixture Height: height of the fixture shall be the vertical distance from the ground directly below the centerline of the fixture to the lowest direct light emitting part of the fixture.

b. Foot-candles: a unit of illumination of a surface that is equal to one lumen per square foot. For the purposes of these regulations, foot-candles shall be measured at a height of 3 ft. above finished grade.

c. Fully Shielded Light: light fixtures shielded or constructed so that no light rays are directly emitted by the installed fixture at angles above the horizontal plane as certified by a photometric test report. The fixture must also be properly installed to effectively down direct light in order to conform with the definition.

d. Light Trespass: the shining of light produced by a light fixture beyond the boundaries of the property on which it is located.

e. Lumen: the unit of luminous flux, the total amount of light falling uniformly on or passing through an area of 1 square foot, each of which is 1 foot from a 1-candela source, yielding an illuminance of 1 foot candle at that distance (the output of lamps and bulbs is customarily measured in lumens, a common 100 watt incandescent light bulb, for example, having an output less than 1,800 lumens).

f. Point Light Source: the exact place from which illumination is produced (i.e., a light bulb filament or discharge capsule).

g. Sag-lens or Drop-lens: A clear or prismatic refracting lens that extends below the lowest opaque portion of a light fixture.

**Applicability**

All outdoor lighting fixtures installed, retro-fitted, or replaced on Fort Drum property shall comply with these regulations. These regulations do not apply to interior lighting.

**Exemptions**

The following are exempt from the provisions of these guidelines:

a. Traffic control signals and devices.

b. Temporary emergency lighting (i.e. fire, police, repair workers).

c. Moving vehicle lights.

d. Navigation lights (i.e. airports, heliports, radio/television towers).

e. Seasonal decorations with individual lights in place no longer than 60 days.

f. Lighting for flags. Efforts should be made in these areas to minimize sky glow and light trespass whenever feasible.

g. Sports field outdoor lighting (i.e. ball fields, football, soccer, ice rink, etc.). Sports outdoor lighting is to be turned off when a sporting event is not occurring.

h. Other special situations for temporary or periodic events (i.e. fairs, festivals, carnivals, night-time construction).

i. Security lights of any wattage that are controlled by a motion-sensor switch and which do not remain on longer than 10 minutes after activation.

j. Access points, Army Supply points, or other high security areas subject to AR 190-11 or TM-8-583-2. Efforts should be made in these areas to minimize sky glow and light trespass whenever feasible.

Additional exemptions may be provided after coordination with Fort Drum's Fish and Wildlife Management Program.

**General Standards**

The following general standards shall apply to all outdoor lighting installed, retrofitted, or replaced on Fort Drum, which is not exempted above:

a. Outdoor lighting must be hooded, fully shielded (i.e. full cutoff fixtures), and/or aimed downward. Outdoor lighting used to illuminate parking spaces, driveways, maneuvering areas, or buildings shall conform to the definition for "fully shielded light fixtures" and be designed, arranged and screened so that the point light source shall not be visible from adjoining lots (i.e. woodlands) or streets.

b. The intensity of light within a site shall not exceed two (2) footcandles at any property line, edge of pavement, or road.

c. The hood or shield must mask the direct horizontal surface of the light source. The light must be aimed to insure that the illumination is only pointing downward onto the ground surface, with no escaping light permitted to contribute to sky glow by shining upward into the sky.

d. Any bright light shining onto adjacent properties (i.e. woodlands) or streets which would result in a nuisance glare or a disabling glare shall not be permitted. Light trespass beyond property boundaries or above the horizontal plane shall be considered non-compliant.

e. Existing fixtures may be adapted to comply with these guidelines by adding a properly designed hood or shield, or by pointing any upward-mounted, shielded fixture downward onto the ground surface.

f. All outdoor lighting fixtures shall be designed, installed, located and maintained such that nuisance glare onto adjacent properties (i.e. woodlands) or streets shall be minimized and all direct illumination kept within the boundaries of a building's property.

g. Accent lighting shall be directed downward onto the building or object and not toward the sky or onto adjacent properties (i.e. woodlands). Direct light emissions shall not be visible above the roof line or beyond the building edge.

h. Spotlighting on landscaping and foliage shall be limited to 150 watts (2220 lumens output) and lighting is to be angled downwards. The lamp shall be fully shielded and not create disabling or nuisance glare.

i. No sag-lens or drop-lens are to be used.

6.16. PERMITS

6.16.1 The D/B Contractor shall comply with all Federal, State, and Local environmental requirements and coordinate all necessary permitting with the installation's DPW and COR.

6.16.2 The design of the water and sewer systems shall be stamped by a NYS Registered Professional Engineer and shall conform to all requirements of the 10 State Standards & DOH Standards. No contruction can start until the SWPPP is approved by NYSDEC and NYSDOH.

6.17. DEMOLITION

Contractor to perform demolition, removal, and disposal (off Fort Drum) of any and all existing man made features that will be impacted by the proposed development to include but not limited to pavement areas, sidewalks, etc. Significant building demolition is not anticipated.

6.18. ADDITIONAL FACILITIES

6.18.1 Bullet Trap

The contractor shall install a commercial Bullet Trap in accordance with all manufacturer's recommendations, and provided with all available accessories including lead seperation equipment. The Bullet Trap shall be granular rubber type, Meggitt Reclining GranTrap or approved equal. The trap shall be covered with a self-healing rubber cover that allows penetration by projectiles while keeping out shooting debris and other contaminants. The trap shall include a supply bin or other mechanism for continuous replenishment of the granular rubber material to maintain a consistent depth. A supplemental bin shall be included behind the supply bin to maintain ballistic integrity of the trap. The trap shall be installed to contain all projectiles anticipated to be used in this range. Installation of the bullet trap does not preclude the requirement of the rear wall to be included in the ballastic envelop and to also have the capability to contain stray rounds. Installation is to be performed by the manufacturer's authorized representative.

6.18.2 Target System (OPTIONAL BID ITEM)

The Contractor shall provide a complete target control and retrieval system, Meggitt RTS-360 Target System, and RangeMaster 10K controls or approved equal.

The Control System shall have capability for simultaneous operation of target systems, range lighting, fire line and door security, range master call, signal light functions, and monitoring of ventilation system for malfunction.

The target positioning system shall be able to handle all standard bulls-eye and silhouette targets and move them from within shooter's reach to 25m target line, and have the ability to stop at any point in between.

The target system shall have the capability to be programmed to randomly turn the target holder to the left or right in increments up to 360 degrees or present a complete, unexpected turn at the direction of programmable software. Each lane of targets shall be able to be programmed to turn autonomously or simultaneously.

The target positioning system shall be able to position targets at specified intermediate target positions for timed intervals. It shall also allow targets to be turned from a concealed position to fully exposed position. Each target may be edged or exposed at any time while it is at its distance stops, while traveling to or from the firing line, and independent of all other targets.

The control system shall allow for control to be released to the individual firing line (shooter stall).

6.18.3 Shooting Stalls

Separations shall be provided at the firing line to organize and designate a space for each shooter. Separators shall be pylon type as opposed to wall type. Shooting stalls shall be rated for rifle application.

The main shelf at each seperator shall be hinged to provide a horizontal table in open position, and movable to another position to provide unobstructed opening.

Shooting stalls shall be commercially manufactured by a firm that regularly provides such products, such as Meggitt Bastion Model BP16 or equivalent.

End of Section 01 10 00.

**SECTION 01 33 00.**
**SUBMITTAL PROCEDURES**
**(DESIGN-BUILD TASK ORDERS)**

## 1.0 GENERAL

1.13. GOVERNMENT APPROVED OR CONCURRED WITH SUBMITTALS

1.14. INFORMATION ONLY SUBMITTALS

## 1.0 GENERAL

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 33 30 apply to this task order, except as otherwise specified herein.

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 one (1) copies of the submittal and return zero(0) copy(ies) of the submittal.

1.14. INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. The Government will retain one (1) copies of information only submittals.

End of Section 01 33 00.

# SECTION 01 33 16
# DESIGN AFTER AWARD

**1.0 GENERAL INFORMATION**

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1.2. DESIGNER OF RECORD

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**3.0 EXECUTION**

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3.5.8. Interim Building Design Contents

3.6. FINAL DESIGN REVIEWS AND CONFERENCES

3.7. FINAL DESIGN REQUIREMENTS

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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

3.9.2. Web based Design Submittals

3.9.3. Mailing of Design Submittals

3.10. AS-BUILT DOCUMENTS

**ATTACHMENT A STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS**

**ATTACHMENT B FURNITURE, FIXTURES AND EQUIPMENT REQUIREMENTS**

**ATTACHMENT C TRACKING COMMENTS IN DRCHECKS**

**ATTACHMENT D SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

**ATTACHMENT E LEED SUBMITTALS**

**ATTACHMENT F BUILDING INFORMATION MODELING REQUIREMENTS**

**ATTACHMENT G DESIGN SUBMITTAL DIRECTORY AND SUBDIRECTORY FILE ARRANGEMENT**

## 1.0 GENERAL INFORMATION

1.1. INTRODUCTION

1.1.1. The information contained in this section applies to the design required after award. After award, the Contractor will develop the accepted proposal into the completed design, as described herein.

1.1.2. The Contractor may elect to fast track the design and construction that is, proceed with construction of parts of the sitework and facilities prior to completion of the overall design. To facilitate fast tracking, the Contractor may elect to divide the design into no more than ten (10) 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 shall be accounted for by a listed. 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. 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.

3.5.3. 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 90.1-2004 Chapter 8 Power were met. The Electrical Section of the Design Analysis shall also include a completed form titled "Lighting Compliance Documentation".

3.5.5.2. Interim and Final Design submittals which address energy consuming systems, (heating, cooling, service hot water, lighting, power, etc.) must also include calculations in a separate Energy Conservation Section of the Design Analysis which demonstrate and document (a) the baseline energy consumption for the facility or facilities under contract, that would meet the requirements of ANSI/ASHRAE/IESNA Standard 90.1 and (b) the energy consumption of the facility or facilities under contract utilizing the materials and methods required by this construction contract. Use the USGBC Energy and Atmosphere (EA) Credit 1 compliance template / form or an equivalently detailed form for documenting compliance with the energy reduction requirements. This template / form is titled PERFORMANCE RATING METHOD and is available when the project is registered for LEED. The calculation methodology used for this documentation and analysis shall follow the guidelines set forth in Appendix G of ASHRAE 90.1, with two exceptions: a) receptacle and process loads may be omitted from the calculation; and b) the definition of the terms in the formula for Percentage Improvement found in paragraph G1.2 are modified as follows: Baseline Building Performance shall mean the annual energy consumption calculated for a building design intended for use as a baseline for rating above standard design meeting the minimum requirements of the energy standard, and Proposed Building Performance shall mean annual energy consumption calculated for the proposed building design intended for construction. This calculation shall address all energy consuming systems in a single integrated methodology. Include laboratory fume hoods and kitchen ventilation loads in the energy calculation. They are not considered process loads. Individual calculations for heating, cooling, power, lighting, power, etc. systems will not be acceptable. The following building simulation software is acceptable for use in calculating building energy consumption: Hourly Analysis Program (HAP) by Carrier Corp., TRACE 700 by Trane Corp., DOE-2 by US Department of Energy, EnergyPlus by DOD/DOE.

3.5.6. Specifications

Specifications may be any one of the major, well known master guide specification sources (use only one source) such as MASTERSPEC from the American Institute of Architects, SPECTEXT from Construction Specification Institute or Unified Facility Guide Specifications (UFGS using MASTERFORMAT 2004 numbering system), etc. (including specifications from these sources). Manufacturers' product specifications, utilizing CSI's Manu-Spec, three part format may be used in conjunction with the selected specifications. The designers of record shall edit and expand the appropriate Specifications to insure that all project design requirements, current code requirements, and regulatory requirements are met. Specifications shall clearly identify, where appropriate, specific products chosen to meet the contract requirements (i.e., manufacturers' brand names and model numbers or similar product information).

3.5.7. Building Rendering

Present and provide a draft color computer, artist, or hand drawn rendering with the conceptual design submittal of the building exterior. Perspective renderings shall include a slightly overhead view of the entire building to encompass elevations and the roof configuration of the building. After Government review and acceptance, provide a final rendering, including the following:

Three (3) 18" x 24" color prints, framed and matted behind glass with project title underneath the print.

One (1) Image file (high resolution) in JPG format on CD for those in the submittal distribution list.

3.5.8. Interim Building Design Contents

The following list represents what the Government considers should be included in the overall completed design for a facility or project. It is not intended to limit the contractor from providing different or additional information as needed to support the design presented, including the require design analyses discussed above. As the Contractor develops individual design packages and submits them for Interim review, include as much of the applicable

information for an individual design package as is developed at the Interim design level for review purposes. These pieces shall be developed as the design progresses toward the design complete stage.

3.5.8.1. Lawn and Landscaping Irrigation System

3.5.8.2. Landscape, Planting and Turfing

3.5.8.3. Architectural

(a) Design Narrative

(b) Architectural Floor Plans, Typical Wall and Roof Sections, Elevations

(c) Finish schedule

(d) All required equipment

(e) Special graphics requirements

(f) Door and Window Schedules

(g) Hardware sets using BHMA designations

(h) Composite floor plan showing all pre-wired workstations

(i) Structural Interior Design (SID) package: See ATTACHMENT A for specific requirements

(j) Furniture, Fixtures & Equipment (FF&E) design package: See ATTACHMENT B for specific requirements

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

(a) Outside Plant (OSP) Cabling - Campus or Site Plans - Exterior Pathways and Inter-Building Backbones

(a) 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.

(b) Layout of complete building per floor - Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways including Serving Zones Drawings - Drop Locations and Cable ID's

(c) 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.

### 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 CADD Standard, available at https://cadbim.usace.army.mil/CAD. Use the approved vertical Corps of Engineers title blocks and borders on all drawings with the appropriate firm name included within the title block area.

3.7.1.6. CAD System and Building Information Modeling (BIM) (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order.)

All CAD files shall be fully compatible with MicroStation V8 or higher. Save all design CAD files as MicroStation V8 or higher files. All submitted BIM Models and associated Facility Data shall be fully compatible with Bentley BIM v8 with associated USACE Bentley BIM v8 Workspace file formats.

(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. Drawing files with external references or special fonts are not acceptable. All displayed graphic elements on all levels of the drawing files shall be part of the project drawing image. The drawing files shall not contain any graphic element that is not part of the drawing image.

(d) Deliver BIM Model and associated Facility Data files in their native format. At a minimum, BIM files shall address major architecture design elements, major structural components, mechanical systems and electrical/communication distribution and elements as defined in Attachment F. See Attachment F for additional BIM requirements.

(e) Drawing Index: Provide an index of drawings sheet in CAD as part of the drawing set, and an electronic list in Microsoft Excel of all drawings on the CD. Include the electronic file name, the sheet reference number, the sheet number, and the sheet title, containing the data for each drawing.

(f) Hard Copies: Plot submitted hard copy drawings directly from the "electronic drawing files" and copy for quantities and sizes indicated in the distribution list at the end of this specification section. The Designers of Record shall stamp, sign and date original hard copy sheets as Released For Construction, and provide copies for distribution from this set.

3.7.2. Design Analyses

3.7.2.1. The designers of record shall update, finalize and present design analyses with calculations necessary to substantiate and support all design documents submitted.

3.7.2.2. The responsible DOR shall stamp, sign and date the design analysis. Identify the software used where, applicable (name, version, vendor). Generally, provide design analyses, individually, in an original (file copy) and one copy for the assigned government reviewer.

3.7.2.3. All disciplines review the LEED design analysis in conjunction with their discipline-specific design analysis; include a copy of the separable LEED design analysis in all design analysis submittals.

3.7.2.4. Do not combine multi-disciplined volumes of design-analysis, unless multiple copies are provided to facilitate multiple reviewers (one copy per each separate design analysis included in a volume).

3.7.3. Specifications

Specifications shall be 100% complete and in final form.

3.7.4. Submittal Register

Prepare and update the Submittal Register and submit it with the 100% design specifications (see Specification Section 01 33 00, SUBMITTAL PROCEDURES) with each design package. Include the required submittals for each specification section in a design package in the submittal register.

3.7.5. Preparation of DD Form 1354 (Transfer of Real Property)

This form itemizes the types, quantities and costs of various equipment and systems that comprise the project, for the purpose of transferring the new construction project from the Corps Construction Division to the Installation's inventory of real property. The Government will furnish the DB Contractor's design manager a DD Form 1354 checklist to use to produce a draft Form 1354. Submit the completed checklist and prepared draft Form DD 1354 with the 100% design in the Design Analysis. The Corps will use these documents to complete the final DD 1354 upon completion of construction.

3.7.6. Acceptance and Release for Construction

3.7.6.1. At the conclusion of the Final Design Review (after resolutions to the comments have been agreed upon between DOR and Government reviewers), the Contracting Officer or the ACO will accept the Final Design Submission for the design package in writing and allow construction to start for that design package. The Government may withhold acceptance until all major corrections have been made or if the final design submission requires so many corrections, even though minor, that it isn't considered acceptably complete.

3.7.6.2. Government review and acceptance of design submittals is for contract conformance only and shall not relieve the Contractor from responsibility to fully adhere to the requirements of the contract, including the Contractor’s accepted contract proposal, or limit the Contractor’s responsibility of design as prescribed under Special Contract Requirement: “Responsibility of the Contractor for Design” or limit the Government’s rights under the terms of the contract. The Government reserves the right to rescind inadvertent acceptance of design submittals containing contract deviations not separately and expressly identified in the submittal for Government consideration and approval.

3.8. DESIGN COMPLETE CONSTRUCTION DOCUMENT REQUIREMENTS

After the Final Design Submission and Review Conference and after Government acceptance of the Final Design submission, revise the design documents for the design package to incorporate the comments generated and resolved in the final review conference, perform and document a back-check review and submit the final, design complete documents. Label the final design complete documents “FOR CONSTRUCTION” or use similar language. In addition to the final drawings and specifications, the following deliverables are required for distribution and field use. The deliverable includes all documentation and supporting design analysis in final form, as well as the final review comments, disposition and the back-check. As part of the quality assurance process, the Government may perform a back-check of the released for construction documentation. Promptly correct any errors or omissions found during the Government back-check. The Government may withhold retainage from progress payments for work or materials associated with a final design package until this submittal has been received and the Government determines that it is complete.

3.9. SUBMITTAL DISTRIBUTION, MEDIA AND QUANTITIES

3.9.1. Submittal Distribution and Quantities

General: The documents which the Contractor shall submit to the Government for each submittal are listed and generally described in preceding paragraphs in this Section. Provide copies of each design submittal and design substantiation as follows (NOTE: If this is a Single Award or Multiple Award, Indefinite Delivery/Indefinite Quantity Contract, this information will be provided for each task order):

| Activity and Address | Drawing Size (Full Size) **ANSI D** Full Sets/ *Partial Sets | Design Analyses & Specs Full Sets/ *Partial Sets | Drawing Size (Half Size) **11x17** Full Sets/ *Partial Sets | Non-BIM Data CD-ROM or DVD as Necessary (PDF& **.dgn**) | Furniture Submittal (FFE) | Structural Interior Design Submittal | BIM Data DVD (Per Attach F) |
|---|---|---|---|---|---|---|---|
| Commander, U.S.Army Engineer District **New York District** | 1/1 | 5/2 | 5/2 | 4 | 1 | 1 | 1 |
| Commander, U.S.Army Engineer District, Center of Standardization **Huntsville** | 0/1 | 2/2 | 0/2 | 1 | 1 | 1 | 1 |
| Installation | 2/0 | 16/0 | 12/0 | 2 | 3 | 3 | 1 |
| U.S.Army Corps of Engineers Construction Area Office | 3/2 | 3/2 | 3/2 | 3 | 3 | 3 | 1 |
| Information Systems Engineering Command (ISEC) | 0/0 | 0/1 | 0/0 | 1 | 1 (Electronic only) | N/A | 1 |
| Other Offices | 0/0 | 1/0 | 1/0 | 1 | 1 | 1 | 0 |

***NOTE: For partial sets of drawings, specifications and design analyses, see paragraph 3.9.3.3, below.**

****NOTE: When specified below in 3.9.2, furnish Installation copies of Drawings as paper copies, in lieu of the option to provide secure web-based submittals.**

3.9.2. Web based Design Submittals

Except for full or half-sized drawings for Installation personnel, as designated in the Table above, Web based design submittals will be acceptable as an alternative to the paper copies listed in the Table above, provided a single hard-copy PDF based record set is provided to the Contracting Officer for record purposes. Where the contract requires the Contractor to submit documents to permitting authorities, still provide those authorities paper copies (or in an alternate format where required by the authority). Web based design submittal information shall be provided with adequate security and availability to allow unlimited access those specifically authorized to Government reviewers while preventing unauthorized access or modification. File sizes must be of manageable size for reviewers to quickly download or open on their computers. As a minimum, drawings shall be full scale on American National Standards Institute (ANSI) D sheets (34" x 22"). In addition to the optional website, provide the BIM data submission on DVD to each activity and address noted above in paragraph 3.9.1 for each BIM submission required in Attachment F.

3.9.3. Mailing of Design Submittals

3.9.3.1. Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of the contract (or individual task order if this is an indefinite delivery/indefinite quantity, task order contract). Mail the submittals to six (6) different addresses. Assemble drawing sheets, specs, design analyses, etc. into individual sets; do not combine duplicate pages from individual sets so that the government has to assemble a set.

3.9.3.2. Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

3.9.3.3. Provide partial sets of drawings, specifications, design analyses, etc., as designated in the Table in paragraph 3.9.1, to those reviewers who only need to review their applicable portions of the design, such as the various utilities. The details of which office receives what portion of the design documentation will be worked out after award.

3.10. AS-BUILT DOCUMENTS

Provide as-built drawings and specifications in accordance with Section 01 78 02.00 10, CLOSEOUT SUBMITTALS. Update LEED design phase documentation during construction as needed to reflect construction changes and advancing project completion status (example - Commissioning Plan updates during construction phase) and include updated LEED documentation in construction closeout submittal.

**ATTACHMENT A**
**STRUCTURAL INTERIOR DESIGN (SID) REQUIREMENTS**

## 1.0 GENERAL INFORMATION

Structural Interior Design includes all building related elements and components generally part of the building itself, such as wall finishes, ceilings finishes, floor coverings, marker/bulletin boards, blinds, signage and built in casework. Develop the SID in conjunction with the furniture footprint.

## 2.0 STRUCURAL INTERIOR DESIGN (SID) REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

### 2.1. FORMAT AND SCHEDULE

Prepare and submit for approval an interior and exterior building finishes scheme for an interim design submittal. The DOR shall meet with and discuss the finish schemes with the appropriate Government officials prior to preparation of the schemes to be presented. Present original sets of the schemes to reviewers at an interim design conference.

At the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers, the Contractor may proceed to final design with the interior finishes scheme presented.

The SID information and samples are to be submitted in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover. When there are numerous pages with thick samples, use more than one binder. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Structural Interior Design" package. Include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Design submittal requirements include, but are not limited to:

#### 2.1.1. Narrative of the Structural Interior Design Objectives

The SID shall include a narrative that discusses the building related finishes. Include topics that relate to base standards, life safety, sustainable design issues, aesthetics, durability and maintainability, discuss the development and features as they relate to the occupants requirements and the building design.

#### 2.1.2. Interior Color Boards

Identify and key each item item on the color boards to the contract documents to provide a clear indication of how and where each item will be used. Arrange finish samples to the maximum extent possible by room type in order to illustrate room color coordination. Label all samples on the color boards with the manufacturer's name, patterns and colors name and number. Key or code samples to match key code system used on contract drawings.

Material and finish samples shall indicate true pattern, color and texture. Provide photographs or colored photocopies of materials or fabrics to show large overall patterns in conjunction with actual samples to show the actual colors. Finish samples must be large enough to show a complete pattern or design where practical.

Color boards shall include but not be limited to original color samples of the following:

All walls finishes and ceiling finishes, including corner guards, acrylic wainscoting and wall guards/chair rail finishes

All tile information, including tile grout color and tile patterns.

- All flooring finishes, including patterns.
- All door, door frame finishes and door hardware finishes
- All signage, wall base, toilet partitions, locker finishes and operable/folding partitions and trim

- All millwork materials and finishes (cabinets, counter tops, etc.)
- All window frame finishes and window treatments (sills, blinds, etc.)

Color board samples shall reflect all actual finish textures, patterns and colors required as specified. Patterned samples shall be of sufficient size to adequately show pattern and its repeat if a repeat occurs.

2.1.3. Exterior Color Boards

Prepare exterior finishes color boards in similar format as the interior finishes color boards, for presentation to the reviewers during an interim design conference. Provide original color samples of all exterior finishes including but not limited to the following:

- All Roof Finishes
- All Brick and Cast Stone Samples
- All Exterior Insulation and Finish Samples
- All Glass Color Samples
- All Exterior Metals Finishes
- All Window & Door Frame Finishes
- All Specialty Item Finishes, including trim

Identify each item on the exterior finishes color boards and key to the building elevations to provide a clear indication of how and where each item will be used.

2.2. STRUCTURAL INTERIOR DESIGN DOCUMENTS

2.2.1. General

Structural interior design related drawings must indicate the placement of extents of SID material, finishes and colors and must be sufficiently detailed to define all interior work. The following is a list of minimum requirements:

2.2.2. Finish Color Schedule

Provide finish color schedule(s) in the contract documents. Provide a finish code, material type, manufacturer, series, and color designations. Key the finish code to the color board samples and drawings.

2.2.3. Interior Finish Plans

Indicate wall and floor patterns and color placement, material transitions and extents of interior finishes.

2.2.4. Furniture Footprint Plans

Provide furniture footprint plans showing the outline of all freestanding and systems furniture for coordination of all other disciplines.

2.2.5. Interior Signage

Include interior signage plans or schedules showing location and quantities of all interior signage. Key each interior sign to a quantitative list indicating size, quantity of each type and signage text.

2.2.6. Interior Elevations, Sections and Details

Indicate material, color and finish placement.

**ATTACHMENT B**
**FURNITURE, FIXTURES & EQUIPMENT (FF&E) REQUIREMENTS**

## 1.0 FF&E REQUIREMENTS FOR THE INTERIM AND FINAL DESIGN SUBMITTALS

### 1.1. FORMAT AND SCHEDULE

Prepare and submit for approval a comprehensive FF&E scheme for an interim design submittal. The Contractor's interior designer, not a furniture dealer, shall develop the design. FF&E is the selection, layout, specification and documentation of furniture includes but is not limited to workstations, seating, tables, storage and shelving, filing, trash receptacles, clocks, framed artwork, artificial plants, and other accessories. Contract documentation is required to facilitate pricing, procurement and installation. The FF&E package is based on the furniture footprint developed in the Structural Interior Design (SID) portion of the interior design. Develop the FF&E package concurrently with the building design to ensure that there is coordination between the electrical outlets, switches, J-boxes, communication outlets and connections, and lighting as appropriate. In addition, coordinate layout with other building features such as architectural elements, thermostats, location of TV's, GF/GI equipment (for example computers, printers, copiers, shredders, faxes), etc. Locate furniture in front of windows only if the top of the item falls below the window and unless otherwise noted, do not attach furniture including furniture systems to the building. If project has SIPRNET and/or NIPRNET, coordinate furniture layout with SIPRNET and NIPRNET separation requirements. Verify that access required by DOIM for SIPRNET box and conduit is provided. The DOR shall interview appropriate Government personnel to determine FF&E requirements for furniture and furnishings prior to preparation of the scheme to be presented. Determine FFE items and quantities by, but not limited to: (1) the number of personnel to occupy the building, (2) job functions and related furniture/office equipment to support the job function, (3) room functions, (4) rank and grade. Present original sets of the scheme to reviewers at an interim design conference upon completion of the interim architectural submittal or three months prior to the submittal of the final FF&E package (whichever comes first).

Design may proceed to final with the FF&E scheme presented at the conclusion of the interim phase, after resolutions to the comments have been agreed upon between DOR and Government reviewers.

Provide six copies of the electronic versions of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide unbound, electronic drawings in CAD and BIM. Provide all files needed to v,/iew complete drawings. Submit all text documents in Microsoft Word or Excel..

Submit three copies of the final and complete FF&E information and samples in 8 ½" x 11" format using three ring binders with pockets on the inside of the cover upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first). Use more than one binder when there are numerous pages with thick samples. Large D-ring binders are preferred to O-ring binders. Use page protectors that are strong enough to keep pages from tearing out for upholstery and finish boards. Anchor large or heavy samples with mechanical fasteners, Velcro, or double-faced foam tape rather than rubber cement or glue. Fold out items must have a maximum spread of 25 ½". Provide cover and spine inserts sheets identifying the document as "Furniture, Fixtures & Equipment" package and include the project title and location, project number, Contractor/A/E name and phone number(s), submittal stage and date.

Provide electronic copies of all documents upon completion of the final architectural submittal or ten months prior to the contract completion date (whichever comes first), to ensure adequate time for furniture acquisition. Provide six compact disks with all drawings files needed to view the complete drawings unbound and in the latest version AutoCAD. Provide six additional compact disks of all text documents in Microsoft Word or Excel.

Design submittal requirements include, but are not limited to:

#### 1.1.1. Narrative of Interior Design Objectives

Provide a narrative description of the furniture, to include functional, safety and ergonomic considerations, durability, sustainability, aesthetics, and compatibility with the building design.

#### 1.1.2. Furniture Order Form

Prepare one Furnishings Order Form for each item specified in the design. This form identifies all information required to order each individual item. In addition to the project name and location, project number, and submittal phase, the order form must include:

(a) Furniture item illustration and code

(b) Furniture item name

(c) Job name, location, and date

(d) General Services Administration (GSA) FSC Group, part, and section

(e) Manufacturer, Product name and Product model number or National Stock Number (NSN)

(f) Finish name and number (code to finish samples)

(g) Fabric name and number, minimum Wyzenbeek Abrasion Test double rubs (code to fabric samples)

(h) Dimensions

(i) Item location by room number and room name

(j) Quantity per room

(k) Total quantity

(l) Special instructions for procurement ordering and/or installation (if applicable)

(m) 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. Alternate Manufacturer List

Provide a table consisting of major furniture items that lists the manufacturers products specified on the Order Form and two alternate manufacturers. Major furniture items include, but are not limited to, casegoods, furniture systems, seating, and tables. Organize matrix by item code and item name. Supply alternates that are available on GSA Schedule and meet the requirements of the Furniture Order Form. One of the two alternates must be from UNICOR if possible. Provide manufacturer name address, telephone number, product series and product name for each alternate manufacturer.

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.

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 use in lieu of a percentage allowance when available. Include a written statement that the pricing is based on GSA schedules. An estimate developed by a furniture dealership may be provided as support information for the estimate, but must be separate from the contractor provided estimate.

1.2. INTERIOR DESIGN DOCUMENTS

1.2.1. Overall Furniture and Area Plans

Provide floor Plans showing locations and quantities of all freestanding, and workstation furniture proposed for each floor of the building. Key each room to a large scale Furniture Placement Plan showing the furniture configuration, of all furniture. Provide enlarged area plans with a key plan identifying the area in which the building is located. Key all the items on the drawings by furniture item code. Do not provide manufacturer specific information such as product names and numbers on drawings, Drawings shall be non-proprietary. This is typical for FFE on all plans, including those mentioned below.

1.2.2. Workstation Plans

Show each typical workstation configuration in plan view, elevations or 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, elevation or isometric view and identify components to clearly represent each desk configuration.

1.2.5. Reflected Ceiling Plans

Provide typical plans showing ceiling finishes and heights, lighting fixtures, heating ventilation and air conditioning supply and return, and sprinkler head placement for coordination of furniture.

1.2.6. Electrical and Telecommunication Plans

Show power provisions including type and locations of feeder components, activated outlets and other electrical componentsShow locations and quantities of outlets for workstations. Clearly identify different outlets, i.e. electrical, LAN and telecommunication receptacles indicating each type proposed. Show wiring configuration, (circuiting, switching, internal and external connections) and provide as applicable.

1.2.7. Artwork Placement Plans

Provide an Artwork Placement Plan to show location of artwork, assign an artwork item code to each piece of artwork. As an alternative, artwork can be located on the Furniture Plans. Provide a schedule that identifies each piece by room name and number. Provide installation instructions; include mounting height.

1.2.8. Window Drapery Plans

Provide Interior Window Drapery Plans. Key each drapery treatment to a schedule showing color, pattern, material, drapery size and type, draw direction, location and quantities.

1.3. FURNITURE SELECTION

1.3.1. Select furniture from the GSA Schedules. Specify furniture available open market when an item is not available on the GSA Schedules. Provide justification fort items not available on the GSA Schedules.

1.3.2. To the greatest extent possible when specifying furniture work within a manufacturer's family of furniture for selections, example: Steelcase, Turnstone, Brayton International, Metro, and Vecta are all Steelcase companies. Each alternate should also be specified from a manufacturer's family of furniture, example: first set of alternates would be specified from Knoll's family of furniture and the second from Herman Miller family of furniture. It may be necessary to make some selections from other than a manufacturer's family of furniture if costs are not reasonable for particular items, some items are not available or appropriate for the facility or the items are not on GSA Schedule. If this occurs, consider specifying product from an open line that is accessible by numerous dealerships. Select office furniture including case goods, tables, storage, seating, etc. that is compatible in style, finish and color. Select furniture that complies with ANSI/BIFMA and from manufacturer's standard product line as shown in the most recent published price list and/or amendment and not custom product.

1.4. CONSTRUCTION

1.4.1. Provide knee space at workstations and tables that is not obstructed by panels/legs that interfere with knee space of seated person and provide desks, storage and tables with leveling devices to compensate for uneven floors.

1.4.2. Provide worksurface tops constructed to prevent warpage. 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, specify lockable desks and workstations and storage of steel construction. Use tempered glass glazing when glazing is required.

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 industrial shelving, workbenches, 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 industrial shelving, workbenches, 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 (except worksurfaces) with mitered solid wood edge of same wood type. Provide worksurface plastic laminate that closely matches adjacent wood veneer. 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. Universal casters that are appropriate for both hard surface flooring and carpet are preferred. All seating shall support up to a minimum of 250 lbs.

1.11.2. Desk and Guest Seating

Select ergonomic desk chairs with casters, non-upholstered adjustable arms, 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.

1.11.6. Lounge, Waiting and Reception Furniture.

Design for end and coffee tables with plastic laminate tops that are compatible in style finish and color with the seating.

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.

Don't use plastic laminate self edge. Training tables shall be reconfigurable, moveable and storable; lighter weight folding with dollies or castered as necessary. Specify dollies if 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
Desks - 10 year minimum
Seating, unless otherwise noted - 10 year minimum
Seating Mechanisms and Pneumatic Cylinders - 10 years
Fabric - 3 years minimum
Filing and Storage - 10 year minimum
Tables, unless otherwise noted - 10 year minimum
Table Mechanisms – 5 year
Table Ganging Device - 1 year
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 reviewers enter design review comments into DrChecks. Designers of Record shall annotate comments timely and specifically to indicate exactly what action will be taken or why the action is not required. 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 agreed to by the designers and reviewers prior to the next submittal. The DrChecks comments and responses shall be printed and included in the design analysis for record.

2.1. 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.

2.2. The Designers of Record shall answer each comment in DrChecks with a formal response prior to the next submittal, clearly indicating what action will be taken and what drawing/spec will change. 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 design conference, reviewers will back-check answers to the comments against the submittal, in addition to reviewing additional design work.

2.3. Comments that, in the DB Contractor's opinion, require effort outside the scope of the contract shall be clearly indicated as such in DrChecks. The DB Contractor shall 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 designers 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**

The role of the designers of record is to evaluate and respond to the comments entered by the Government reviewers and by the DB Contractor. 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 (concur, non-concur, for information only, or check and resolve) and add the response.

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 Back-check**

At the following design conference, participants will back-check comment annotations against newly presented documents to verify that the designers' responses are acceptable and completed. The Contractor and Government reviewers shall either enter additional back-check comments, as necessary or close those that are resolved as a result of the design conferences:

6.1. Log into DrChecks.

6.2. Click on the appropriate project.

6.3. Under “My Backcheck” click on the number under “Pending”.

6.4. If you agree with the designer’s response select “Close Comment” and add a closing response if desired.

6.5. 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.

6.6. Click on the Add button. The back-check will be added to the database and a fresh screen will appear with the next comment.

6.7. Once back-checks are all entered, exit DrChecks by choosing “My Account” and then Logout. The design is completed and final when there are no pending comments to be evaluated and there are no pending or open comments under back-check.

**ATTACHMENT D**
**SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW**

Instructions: Use the information outlined in this document to provide the minimum requirement for development of Fire Protection and Life Safety Code submittals for all building projects. Additional and supplemental information may be used to further develop the code review. Insert N/A after criteria, which may be "not applicable".

## 1.0 SAMPLE FIRE PROTECTION AND LIFE SAFETY CODE REVIEW

1.1. Project Name (insert name and location)

1.2. Applicable Codes and Standards

1.2.1. Unified Facilities Criteria (UFC): 3-600-01, Design: Fire Protection Engineering For Facilities

1.2.2. International Building Code (IBC) for fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements, except as modified by UFC 3-600-01.

1.2.3. National Fire Protection Association (NFPA) 101 Life Safety Code (latest edition), for building egress and life safety and applicable criteria in UFC 3-600-01.

1.2.4. ADA and ABA Accessiblity Guidelines. For Buildings and Facilities See Section 01 10 00, Paragraph 3 for facility specific criteria.

1.3. Occupancy Classification
IBC chapters 3 and 4

1.4. Construction Type
IBC chapter 6

1.5. Area Limitations
IBC chapter 5, table 503

1.6. Allowable Floor Areas
IBC section 503, 505

1.7. Allowable area increases
IBC section 506, 507

1.8. Maximum Height of Buildings
IBC section 504

1.9. Fire-resistive substitution

1.10. Occupancy Separations
IBC table 302.3.2

1.11. Fire Resistive Requirements

1.11.1. Exterior Walls - [_____] hour rating, IBC table 601, 602

1.11.2. Interior Bearing walls - [_____] hour rating

1.11.3. Structural frame - [_____] hour rating

1.11.4. Permanent partitions - [_____] hour rating

1.11.5. Shaft enclosures - [_____] hour rating

1.11.6. Floors & Floor-Ceilings - [_____] hour rating

1.11.7. Roofs and Roof Ceilings - [_____] hour rating

1.12. Automatic Sprinklers and others used to determine the need for automatic Extinguishing Equipment, Extinguishing Systems, Foam Systems, Standpipe

1.12.1. UFC 3-600-01, chapters 4 and 6 systems, wet chemical systems, etc. State which systems are required and to what criteria they will be designed.

1.12.2. UFC 3-600-01, Appendix B Occupancy Classification. Note the classification for each room. This may be accomplished by classifying the entire building and noting exceptions for rooms that differ (E.g. The entire building is Light Hazard except boiler room and storage rooms which are [_____], etc.)

1.12.3. UFC 3-600-01, Chapter 3 Sprinkler Design Density, Sprinkler Design Area, Water Demand for Hose Streams (supply pressure and source requirements).

1.12.4. UFC 3-600-01, Chapter 4 Coverage per sprinkler head. Extended coverage sprinkler heads are not permitted.

1.12.5. Available Water Supply. Provide the results of the water flow tests showing the available water supply static pressure and residual pressure at flow. Based on this data and the estimated flow and pressure required for the sprinkler system, determine the need for a fire pump.

1.12.6. NFPA 13, Para. 8.16.4.6.1. Provide backflow preventer valves as required by the local municipality, authority, or water purveyor. Provide a test valve located downstream of the backflow preventer for flow testing the backflow preventer at full system demand flow. Route the discharge to an appropriate location outside the building.

1.13. Kitchen Cooking Exhaust Equipment

Describe when kitchen cooking exhaust equipment is provided for the project. Type of extinguishing systems for the equipment should be provided. per NFPA 96. Show all interlocks with manual release switches, fuel shutoff valves, electrical shunt trips, exhaust fans, and building alarms.

1.14. Portable Fire Extinguishers, fire classification and travel distance. per NFPA 10

1.15. Enclosure Protection and Penetration Requirements. - Opening Protectives and Through Penetrations

1.15.1. IBC Section712, 715 and Table 715.3. Mechanical rooms, exit stairways, storage rooms, janitor [_____] hour rating. IBC Table 302.1.1

1.15.2. Fire Blocks, Draft Stops, Through Penetrations and Opening Protectives

1.16. Fire Dampers. Describe where fire dampers and smoke dampers are to be used (IBC Section 716 and NFPA 90A}. State whether isolation smoke dampers are required at the air handler.

1.17. Detection Alarm and Communication. UFC 3-600-01, (Chapter 5); NFPA 101 para. 3.4 (chapters 12-42); NFPA 72

1.18. Mass Notification. Describe building/facility mass notification system (UFC 4-021-01) type and type of base-wide mass notification/communication system. State whether the visible notification appliances will be combined with the fire alarm system or kept separate. (Note: Navy has taken position to combine visible notification appliances with fire alarm).

1.19. Interior Finishes (classification). NFPA 101.10.2.3 and NFPA 101.7.1.4

1.20. Means of Egress

1.20.1. Separation of Means of Egress, NFPA 101 chapters 7 and 12-42; NFPA101.7.1.3

1.20.2. Occupant Load, NFPA101.7.3.1 and chapters 12-42.

1.20.3. Egress Capacity (stairs, corridors, ramps and doors) NFPA101.7.3.3

1.20.4. Number of Means of Egress, NFPA101.7.4 and chapters 12-42.

1.20.5. Dead end limits and Common Path of Travel, NFPA 101.7.5.1.6 and chapters 12-42.

1.20.6. Accessible Means of Egress (for accessible buildings), NFPA101.7.5.4

1.20.7. Measurement of Travel Distance to Exits, NFPA101.7.6 and chapters 12-42.

1.20.8. Discharge from Exits, NFPA101.7.7.2

1.20.9. Illumination of Means of Egress, NFPA101.7.8

1.20.10. Emergency Lighting, NFPA101.7.9

1.20.11. Marking of Means of Egress, NFPA101.7.10

1.21. Elevators, UFC 3-600-01, Chapter 6; IBC and ASME A17.1 - 2000,(Safety Code for Elevators and Escalators)

1.22. Accessibility Requirements, ADA and ABA Accessibility Guidelines for Buildings and Facilities

1.23. Certification of Fire Protection and Life Safety Code Requirements. (Note: Edit the Fire team membership if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features for this project in accordance with the attached completed form(s).

1.24. Designer of Record. Certification of Fire protection and Life Safety Code Requirements. (Note: Edit the Fire team members if necessary). Preparers of this document certify the accuracy and completeness of the Fire Protection and Life Safety features of this project.

Fire Protection Engineer of Record:

_____

Signature and Stamp

Date

OR

Architect of Record:

_____

Signature and Stamp

Date

Mechanical Engineer of Record:

_____

Signature and Stamp

Date

Electrical Engineer of Record:

_____

Signature/Date

**ATTACHMENT E**
**LEED SUBMITTALS**

| LEED Credit Paragraph | Contractor Check Here if Credit is Claimed | **LEED-NC v3 Submittals (OCT09)** | | Provide for Credit Audit Only | | Date Submitted (to be filled in by Contractor) | Government Reviewer's Use |
|---|---|---|---|---|---|---|---|
| **PAR** | | **FEATURE** | **DUE AT** | | **REQUIRED DOCUMENTATION** | **DATE** | **REV** |
| **GENERAL** | | | | | | | |
| | GENERAL - All calculations shall be in accordance with LEED 2009 Reference Guide. | | | | | | |
| | GENERAL: Obtain excel version of this spreadsheet at http://en.sas.usace.army.mil/enWeb, "Engineering Criteria". | | | | | | |
| | GENERAL - For all credits, narrative/comments may be added to describe special circumstances or considerations regarding the project's credit approach. | | | | | | |
| | GENERAL - Include all required LEED drawings indicated below in contract drawings with applicable discipline drawings, labeled For Reference Only. | | | | | | |
| | NOTE: Each submittal indicated with "**" differs from LEED certified project submittals by either having a different due date or being an added submittal not required by GBCI. | | | | | | |
| | NOTE: Projects seeking LEED certification need only submit to GBCI whatever documentation is acceptable to GBCI (for example, licensed professional certifications). This checklist identifies what must be submitted to the Government for internal review purposes. Government review of LEED documentation in no way supercedes or modifies the requirements and rulings of of GBCI for purposes of compliance with project requirement to obtain LEED certifiaction. | | | | | | |
| | GENERAL - Audit documentation may include but is not limited to what is indicated in this table. | | | | | | |
| | | | Closeout | | List of all Final Design submittals revised after final design to reflect actual closeout conditions. Revised Final Design submittals. - OR - Statement confirming that no changes have been made since final design that effect final design submittal documents. | | Proj Engr (PE) |
| **CATEGORY 1 - SUSTAINABLE SITES** | | | | | | | |
| SSPR1 | | Construction Activity Pollution Prevention (PREREQUISITE) | **Final Design | | List of drawings and specifications that address the erosion control, particulate/dust control and sedimentation control measures to be implemented. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | **Final Design | | Narrative that indicates which compliance path was used (NPDES or Local standards) and describes the measures to be implemented on the project. If a local standard was followed, provide specific information to demonstrate that the local standard is equal to or more stringent than the NPDES program. | | CIV |
| SS1 | | Site Selection | Final Design | | Statement confirming that project does not meet any of the prohibited criteria. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | Final Design | X | LEED Site plan drawing that shows all proposed development, line depicting boundary of all bodies of water and/or wetlands within 100 feet of project boundary and a line depicting 5' elevation above 100 year flood line that falls within project boundary. Not required if neither condition applies. | | CIV |
| SS2 | | Development Density & Community Connectivity | Final Design | | Option 1: LEED Site vicinity plan showing project site and surrounding development. Show density boundary or note drawing scale. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | Final Design | | Option 1: Table indicating, for project site and all surrounding sites within density radius (keyed to site vicinity plan), site area and building area. Project development density calculation. Density radius calculation. Development density calculation within density radius. | | CIV |
| | | | Final Design | | Option 2: LEED Site vicinity plan showing project site, the 1/2 mile community radius, pedestrian walkways and the locations of the residential development(s) and Basic Services surrounding the project site. | | CIV |
| | | | Final Design | | Option 2: List (including business name and type) of all Basic Services facilities within the 1/2 mile radius, keyed to site vicinity plan. | | CIV |
| SS3 | | Brownfield Redevelopment | Final Design | | Narrative describing contamination and the remediation activities included in project. Include statement indicating how site was determined to be a brownfield. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| SS4.1 | | Alternative Transportation: Public Transportation Access | Final Design | | Statement indicating which option for compliance applies. State whether public transportation is existing or proposed and, if proposed, cite source of this information. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | Final Design | | Option 1: LEED Site vicinity plan showing project site, mass transit stops and pedestrian path to them with path distance noted. | | CIV |
| | | | Final Design | | Option 2: LEED Site vicinity plan showing project site, bus stops and pedestrian path to them with path distance noted. | | CIV |
| | | | | | | | |
| SS4.2 | | Alternative Transportation: Bicycle Storage & Changing Rooms | Final Design | | FTE calculation. Bicycle storage spaces calculation. Shower/changing facilities calculation. | | CIV |
| | | | Final Design | | List of drawings that show the location(s) of bicycle storage areas. Statement indicating distance from building entrance. | | CIV |
| | | | Final Design | | List of drawings that show the location(s) of shower/changing facilities and, if located outside the buiding, statement indicating distance from building entrance. | | CIV |

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| **PAR** | | **FEATURE** | **DUE AT** | | **REQUIRED DOCUMENTATION** | **DATE** | **REV** |
| SS4.3 | | Alternative Transportation: Low Emitting & Fuel Efficient Vehicles | Final Design | | Statement indicating which option for compliance applies. FTE calculation. Statement indicating total parking capacity of site. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | Final Design | | Option 1: Low-emission & fuel-efficient vehicle calculation. | | CIV |
| | | | Final Design | | Option 1: List of drawings and specification references that show location and number of preferred parking spaces for low-emission & fuel-efficient vehicles and signage. | | CIV |
| | | | Final Design | | Option 1: Statement indicating quantity, make, model and manufacturer of low-emission & fuel-efficient vehicles to be provided. Statement confirming vehicles are zero-emission or indicating ACEEE vehicle scores. | | CIV |
| | | | Final Design | | Option 2: Low-emission & fuel-efficient vehicle parking calculation. | | CIV |
| | | | Final Design | | Option 2: List of drawings and specification references that show location and number of preferred parking spaces and signage. | | CIV |
| | | | Final Design | | Option 3: Low-emission & fuel-efficient vehicle refueling station calculation. | | CIV |
| | | | Final Design | | Option 3: List of drawings and specifications indicating location and number of refueling stations, fuel type and fueling capacity for each station for an 8-hour period. | | CIV |
| | | | Closeout | X | Option 3: Construction product submittals indicating what was provided and confirming compliance with respect to fuel type and fueling capacity for each station for an 8-hour period. | | CIV |
| SS4.4 | | Alternative Transportation: Parking Capacity | Final Design | | Statement indicating which option for compliance applies. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | Final Design | | Option 1: Preferred parking calculation including number of spaces required, total provided, preferred spaces provided and percentage. | | CIV |
| | | | Final Design | | Option 2: FTE calculation. Preferred parking calculation including number of spaces provided, preferred spaces provided and percentage. | | CIV |
| | | | Final Design | | Options 1 and 2: List of drawings and specification references that show location and number of preferred parking spaces and signage. | | CIV |
| | | | Final Design | | Option 3: Narrative indicating number of spaces required and provided and describing infrastructure and support programs with description of project features to support them. | | CIV |
| SS5.1 | | Site Development: Protect or Restore Habitat | **Final Design | | Option 1: List of drawing and specification references that convey site disturbance limits. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | **Final Design | | Option 2: LEED site plan drawing that delineates boundaries of each preserved and restored habitat area with area (sf) noted for each. | | CIV |
| | | | **Final Design | | Option 2: Percentage calculation of restored/preserved habitat to total site area. List of drawings and specification references that convey restoration planting requirements. | | CIV |
| SS5.2 | | Site Development: Maximize Open Space | Final Design | | Option 2: LEED site plan drawing delineating boundary of vegetated open space adjacent to building with areas of building footprint and designated open space noted. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| SS6.1 | | Stormwater Design: Quantity Control | Final Design | | Statement indicating which option for compliance applies. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | Final Design | | Option 1: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf) -OR - Narrative describing site conditions, measures and controls to be implemented to prevent excessive stream velocities and erosion. | | CIV |
| | | | Final Design | | Option 2: Indicate pre-development and post-development runoff rate(cfs) and runoff quantity (cf). Indicate percent reduction in each. | | CIV |
| SS6.2 | | Stormwater Design: Quality Control | Final Design | | For non-structural controls, list all BMPs used and, for each, describe the function of the BMP and indicate the percent annual rainfall treated. List all structural controls and, for each, describe the pollutant removal and indicate the percent annual rainfall treated. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| SS7.1 | | Heat Island Effect: Non-Roof | **Final Design | | LEED site plan drawing indicating locations and quantities of each paving type, including areas of shaded pavement. Percentage calculation indicating percentage of reflective/shaded/open grid area. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |

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| | | | | | | | |
| SS7.2 | | Heat Island Effect: Roof | Final Design | | Option 1: Percentage calculation indicating percentage of SRI compliant roof area. List of drawings and specification references that convey SRI requirements and roof slopes. | | ARC |
| | | | Final Design | | Option 1: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope. | | ARC |
| | | | **Closeout | | Option 1: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope. | | PE |
| | | | Closeout | X | Option 1: Manufacturer published product data or certification confirming SRI | | PE |
| | | | Final Design | | Option 2: Percentage calculation indicating percentage of vegetated roof area. | | ARC |
| | | | Final Design | | Option 3: Combined reflective and green roof calculation. | | ARC |
| | | | Final Design | | Option 3: List of specified roof materials indicating, for each, type, manufacturer, product name and identification if known, SRI value and roof slope. | | ARC |
| | | | **Closeout | | Option 3: List of installed roof materials indicating, for each, manufacturer, product name and identification, SRI value and roof slope. | | PE |
| | | | Closeout | X | Option 3: Manufacturer published product data or certification confirming SRI | | PE |
| | | | | | | | |
| SS8 | | Light Pollution Reduction | Final Design | | Interior Lighting: List of drawings and specification references that convey interior lighting requirements (location and type of all installed interior lighting, location of non-opaque exterior envelope surfaces, allowing confirmation that maximum candela value from interiorfixtures does not intersect non-opaque building envelope surfaces). - OR - List of drawings and specification references that show automatic lighting controls compliance with credit requirement. | | ELEC |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | ELEC |
| | | | Final Design | | Exterior Lighting: List of drawings and specification references that convey exterior lighting requirements (location and type of all site lighting and building façade/landscape lighting). | | ELEC |
| | | | Final Design | | Exterior Site Lighting Power Density (LPD): Tabulation for exterior site lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all site lighting. | | ELEC |
| | | | Final Design | | Exterior Building Facade/Landscape Lighting Power Density (LPD): Tabulation for exterior building facade/landscape lighting indicating, for each location identification or description, units of measure, area or distance of the location, actual LPD using units consistent with ASHRAE 90.1, and the ASHRAE allowable LPD for that type of location. Percentage calculation of actual versus allowable LPD for all building facade/landscape lighting. | | ELEC |
| | | | Final Design | | Exterior Lighting IESNA Zone: Indicate which IESNA zone is applicable to the project. | | ELEC |
| | | | Final Design | | Exterior Lighting Site Lumen table indicating, for each fixture type, quantity installed, initial lamp lumens per luminaire, initial lamp lumens above 90 degrees from Nadir, total lamp lumens and total lamp lumens above 90 degrees. Percentage of site lamp lumens above 90 degrees from nadir to total lamp lumens. | | ELEC |
| | | | Final Design | | Exterior Lighting Narrative describing analysis used for addressing requirements for light trespass at site boundary and beyond. | | ELEC |
| | | | | | | | |
| **CATEGORY 2 – WATER EFFICIENCY** | | | | | | | |
| WEPR1 | | Water Use Reduction: 20% Reduction | Final Design | | Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio. | | MEC |
| | | | Final Design | | Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users | | MEC |
| | | | Final Design | | Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation. | | MEC |

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|---|---|---|---|---|---|---|---|
| **PAR** | | **FEATURE** | **DUE AT** | | **REQUIRED DOCUMENTATION** | **DATE** | **REV** |
| | | | Final Design | | Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage. | | MEC |
| | | | Final Design | | Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage. | | MEC |
| | | | Closeout | X | Manufacturer published product data or certification confirming fixture water usage. | | PE |
| WE1.1 | | Water Efficient Landscaping: Reduce by 50% | Final Design | | Statement indicating which option for compliance applies. | | CIV |
| | | | **Final Design | | Delineation and labeling of "LEED Project site boundary" on site plan. | | CIV |
| | | | Final Design | | Calculation indicating, for baseline and design case, total water applied, total potable water applied, total non-potable water applied. Design case percent potable water reduction. If nonpotable water is used, indicate source of nonpotable water. | | CIV |
| | | | Final Design | | List of landscape plan drawings. | | CIV |
| | | | Final Design | | Narrative describing landscaping and irrigation design strategies, including water use calculation methodology used to determine savings and, if non-potable water is used, specific information about source and available quantity. | | CIV |
| WE1.2 | | Water Efficient Landscaping: No Potable Water Use or No Irrigation | Same as WE1.1 | | Same as WE1.1 | | CIV |
| WE2 | | Innovative Wastewater Technologies | Final Design | | Statement confirming which option for compliance applies. | | MEC |
| | | | Final Design | | Statement confirming which occupancy breakdown applies (default or special). For special occupancy breakdown, indicate source and explanation for ratio. | | MEC |
| | | | Final Design | | Occupancy calculation including male/female numbers for FTEs, visitors, students, customers, residential and other type occupants/users | | MEC |
| | | | Final Design | | Statement indicating percent of male restrooms with urinals. Statement indicating annual days of operation. | | MEC |
| | | | Final Design | | Baseline flush fixture calculation spreadsheet indicating, for each fixture type, gender, flush rate, daily uses per person for each occupant type identified in occupancy calculation and annual baseline flush fixture water usage. | | MEC |
| | | | Final Design | | Design case flush fixture calculation spreadsheet indicating, for each fixture type, gender, fixture manufacturer, fixture model number, flush rate, percent of occupants using this fixture type, daily uses per person for each occupant type identified in occupancy calculation and annual design case flush fixture water usage. | | MEC |
| | | | Final Design | | Option 1: If onsite non-potable water is used, identify source(s), indicate annual quantity from each source and indicate total annual quantity from all onsite non-potable water sources. | | MEC |
| | | | Final Design | | Option 1: Summary calculation indicating baseline annual water consumption, design case annual water consumption, non-potable annual water consumption and total percentage annual water savings. | | MEC |
| | | | Final Design | | Option 2: Statement confirming on-site treatment of all generated wastewater to tertiary standards and all treated wastewater is either infiltrated or used on-site. | | MEC |
| | | | Final Design | | Option 2: List of drawing and specification references that convey design of on-site wastewater treatment features. | | CIV |
| | | | Final Design | | Option 2: On-site water treatment quantity calculation indicating all on-site wastewater source(s), annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from each source and totals for annual quantity treated, annual quantity infiltrated and annual quantity re-used on site from all sources. | | CIV |
| | | | Final Design | | Option 2: Wastewater summary calculation indicating design case annual flush fixture water usage, annual on-site water treatment and percentage sewage convyance reduction. | | MEC |
| | | | Final Design | | Narrative describing project strategy for reduction of potable water use for sewage conveyance, including specific information on reclaimed water usage and treated wastewater usage. | | MEC |
| WE3 | | Water Use Reduction: 30% - 40% Reduction | Same as WEPR1 | | Same as WEPR1 | | MEC |
| **CATEGORY 3 – ENERGY AND ATMOSPHERE** | | | | | | | |

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| EAPR1 | | Fundamental Commissioning of the Building Energy Systems (PREREQUISITE) | **Final Design | | **Owner's Project Requirements document | | ALL |
| | | | **Final Design | | **Basis of Design document for commissioned systems | | MEC, ELEC |
| | | | **Final Design | | **Commissioning Plan | | MEC, ELEC |
| | | | Closeout | | Statement confirming all commissioning requirements have been incorporated into construction documents. | | PE |
| | | | Closeout | | Commissioning Report | | PE |
| EAPR2 | | Minimum Energy Performance (PREREQUISITE) | Final Design | | Statement listing the mandatory provisions of ASHRAE 90.1 that project meets relative to compliance with this prerequisite and indicating which compliance path was used. | | MEC ELEC ARC |
| | | | Final Design | | Statement indicating which compliance path option applies. | | MEC |
| | | | Final Design | | Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology. | | MEC |
| | | | Final Design | | Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score. | | MEC |
| | | | Final Design | | Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category | | MEC |
| | | | Final Design | | Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design | | MEC |
| | | | Final Design | | Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type | | MEC |
| | | | Final Design | | Option 1: Energy type summary lising, for each energy type, utility rate description, units of energy and units of demand | | MEC |
| | | | Final Design | | Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost | | MEC |
| | | | Final Design | | Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined | | MEC |
| | | | Final Design | | Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative | | MEC |
| | | | Final Design | | Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use. | | MEC |
| | | | Final Design | | Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost. | | MEC |
| | | | Final Design | | Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings. | | MEC |
| | | | Final Design | | Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost. | | MEC |
| | | | Final Design | | Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost. | | MEC |

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| | | | Final Design | | Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features | | MEC |
| | | | Final Design | | Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates) | | MEC |
| EAPR3 | | Fundamental Refrigerant Management (PREREQUISITE) | Final Design | | Statement indicating which option for compliance applies. | | MEC |
| | | | Final Design | | Option 2: Narrative describing phase out plan, including specific information on phase out dates and refrigerant quantities. | | MEC |
| EA1 | | Optimize Energy Performance | Final Design | | Statement indicating which compliance path option applies. | | MEC |
| | | | Final Design | | Option 1: Statement confirming simulation software capabilities and confirming assumptions and methodology. | | MEC |
| | | | Final Design | | Option 1: General information including simulation program, principal heating source, percent new construction and renovation, weather file, climate zone and Energy Star Target Finder score. | | MEC |
| | | | Final Design | | Option 1: Space summary listing, for each building use, the conditioned area, unconditioned area and total area and include total area for each category | | MEC |
| | | | Final Design | | Option 1: List of all simulation output advisory message data and show difference between baseline and proposed design | | MEC |
| | | | Final Design | | Option 1: Comparison summary for energy model inputs including description of baseline and design case energy model inputs, showing both by element type | | MEC |
| | | | Final Design | | Option 1: Energy type summary lising, for each energy type, utility rate description, units of energy and units of demand | | MEC |
| | | | Final Design | | Option 1: Statement indicating whether project uses on-site renewable energy. If yes, list all sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost | | MEC |
| | | | Final Design | | Option 1: If analysis includes exceptional calculation methods, statement describing how exceptional calculation measure cost savings is determined | | MEC |
| | | | Final Design | | Option 1: If analysis includes exceptional calculation methods, for each exceptional calculation method indicate energy types and, for each energy type, annual energy savings, annual cost savings, and brief descriptive narrative | | MEC |
| | | | Final Design | | Option 1: Baseline performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand for all four orientations. For each orientation indicate total annual energy use for each orientation and total annual process energy use. | | MEC |
| | | | Final Design | | Option 1: Baseline energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost. | | MEC |
| | | | Final Design | | Option 1: Proposed Design performance rating compliance report table indicating, for each energy end use, whether it is a process load, energy type, annual and peak energy demand, baseline annual and peak energy demand and percent savings. Indicate total annual energy use and total annual process energy use for both proposed design and baseline and percent savings. | | MEC |
| | | | Final Design | | Option 1: Proposed Design energy cost table indicating, for each energy type, annual cost for all four orientations and building total energy cost. | | MEC |
| | | | Final Design | | Option 1: Energy cost and consumption by energy type report indicating, for each energy type, proposed design and baseline annual use and annual cost, percent savings annual use and annual cost. Indicate for renewable energy annual energy generated and annual cost. Indicate exceptional calculations annual energy savings and annual cost savings. Indicate building total annual energy use, annual energy cost for proposed design and baseline and indicate percent savings annual energy use and annual energy cost. | | MEC |

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| | | | Final Design | | Option 1: Compliance summaries from energy simulation software. If software does not produce compliance summaries provide output summaries and example input summaries for baseline and proposed design supporting data in the tables. Output summaries must include simulated energy consumption by end use and total energy use and cost by energy type. Example input summaries should represent most common systems and must include occupancy, use pattern, assumed envelope component sizes and descriptive features and assumed mechanical equipment types and descriptive features | | MEC |
| | | | Final Design | | Option 1: Energy rate tariff from project energy providers (only if not using LEED Reference Guide default rates) | | MEC |
| EA2.1 | | On-Site Renewable Energy | Final Design | | Statement indicating which compliance path option applies. | | ELEC |
| | | | Final Design | | List all on-site renewable energy sources and indicate, for each source, backup energy type, annual energy generated, rated capacity and renewable energy cost. Indicate total annual energy use (all sources), total annual energy cost (all sources) and percent renewable energy cost. | | ELEC MEC |
| | | | Final Design | | Option 1: Indicate, for renewable energy,proposed design total annual energy generated and annual cost. | | ELEC MEC |
| | | | Final Design | | Option 2: Indicate CBECS building type and building gross area. Provide the following CBECS data: median annual electrical intensity, median annual non-electrical fuel intensity, average electric energy cost, average non-electric fuel cost, annual electric energy use and cost, annual non-electric fuel use and cost. | | ELEC MEC |
| | | | Final Design | | Option 2: Narrative describing renewable systems and explaining calculation method used to estimate annual energy generated, including factors influencing performance. | | ELEC MEC |
| EA2.2 | | On-Site Renewable Energy | Same as EA2.1 | | Same as EA2.1 | | ELEC MEC |
| EA2.3 | | On-Site Renewable Energy | Same as EA2.1 | | Same as EA2.1 | | ELEC MEC |
| EA3 | | Enhanced Commissioning | **Final Design | | **Owner's Project Requirements document (OPR) | | ALL |
| | | | **Final Design | | **Basis of Design document for commissioned systems (BOD) | | ELEC MEC |
| | | | **Final Design | | **Commissioning Plan | | ELEC MEC |
| | | | Closeout | | Statement confirming all commissioning requirements have been incorporated into construction documents. | | PE |
| | | | Closeout | | **Commissioning Report | | PE |
| | | | **Final Design | | Statement by CxA confirming Commissioning Design Review | | |
| | | | Closeout | | Statement by CxA confirming review of Contractor submittals for compliance with OPR and BOD | | PE |
| | | | Closeout | | **Systems Manual | | PE |
| | | | Closeout | | Statement by CxA confirming completion of O&M staff and occupant training | | PE |
| | | | Closeout | | **Scope of work for post-occupancy review of building operation, including plan for resolution of outstanding issues | | PE |
| | | | **Predesign | | Statement confirming CxA qualifications and contractual relationships relative to work on this project, demonstrating that CxA is an independent third party. | | MEC |
| EA4 | | Enhanced Refrigerant Management | Final Design | | Refrigerant impact calculation table with all building data and calculation values as shown in LEED 2009 Reference Guide Example Calculations | | MEC |
| | | | Final Design | | Narrative describing any special circumstances or explanatory remarks | | |
| | | | Closeout | X | Cut sheets highlighting refrigerant data for all HVAC components. | | PE |
| EA5 | | Measurement & Verification | Closeout | | Statement indicating which compliance path option applies. | | PE |
| | | | Closeout | | Measurement and Verification Plan including Corrective Action Plan | | PE |
| | | | Closeout | | **Scope of work for post-occupancy implementation of M&V plan including corrective action plan. | | PE |
| EA6 | | Green Power | Closeout | | Statement indicating which compliance path option applies. | | PE |
| | | | Closeout | | Option 1: Indicate proposed design total annual electric energy usage | | PE |
| | | | Closeout | | Option 2: Indicate actual total annual electric energy usage | | PE |
| | | | Closeout | | Option 3: Calculation indicating building type, total gross area, median electrical intensity and annual electric energy use | | PE |

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| | | | Closeout | | Green power provider summary table indicating, for each purchase type, provider name, annual quantity green power purchased and contract term. Indicate total annual green power use and indicate percent green power | | PE |
| | | | Closeout | | Narrative describing how Green Power or Green Tags are purchased | | PE |
| **CATEGORY 4 – MATERIALS AND RESOURCES** | | | | | | | |
| MRPR1 | | Storage & Collection of Recyclables (PREREQUISITE) | Final Design | | Statement confirming that recycling area will accommodate recycling of plastic, metal, paper, cardboard and glass. Narrative indicating any other materials addressed and coordination with pickup. | | ARC |
| MR1.1 | | Building Reuse: Maintain 55% of Existing Walls, Floors & Roof | **Final Design | | If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building. | | ARC |
| | | | **Final Design | | Spreadsheet listing, for each building structural/envelope element, the existing area and reused area. Total percent reused. | | ARC |
| MR1.2 | | Building Reuse: Maintain 75% of Existing Walls, Floors & Roof | Same as MR1.1 | | Same as MR1.1 | | ARC |
| MR1.3 | | Building Reuse: Maintain 95% of Existing Walls, Floors & Roof | Same as MR1.1 | | Same as MR1.1 | | ARC |
| MR1.4 | | Building Reuse: Maintain 50% of Interior Non-Structural Elements | **Final Design | | If project includes a building addition, confirm that area of building addition does not exceed 2x the area of the existing building. | | ARC |
| | | | **Final Design | | Spreadsheet listing, for each building interior non-structural element, the existing area and reused area. Total percent reused. | | ARC |
| MR2.1 | | Construction Waste Management: Divert 50% From Disposal | **Preconstruction | | Waste Management Plan | | PE |
| | | | **Construction Quarterly and Closeout | | Spreadsheet calculations indicating material description, disposal/diversion location (or recycling hauler), weight, total waste generated, total waste diverted, diversion percentage | | PE |
| | | | **Construction Quarterly and Closeout | | Receipts/tickets for all items on spreadsheet | | PE |
| MR2.2 | | Construction Waste Management: Divert 75% From Disposal | Same as MR2.1 | | Same as MR2.1 | | PE |
| MR3.1 | | Materials Reuse: 5% | Closeout | | Statement indicating total materials value and whether default or actual. | | PE |
| | | | Closeout | | Spreadsheet calculations indicating, for each reused/salvaged material, material description, source or vendor, cost. Total reused/salvaged materials percentage. | | PE |
| MR3.2 | | Materials Reuse: 10% | Same as MR3.1 | | Same as MR3.1 | | PE |
| MR4.1 | | Recycled Content: 10% (post-consumer + 1/2 pre-consumer) | Closeout | | Statement indicating total materials value and whether default or actual. | | PE |
| | | | Closeout | | Spreadsheet calculations indicating, for each recycled content material, material name/description, manufacturer, cost, post-consumer recycled content percent, pre-consumer recycled content percent, source of recycled content data. Total post-consumer content materials cost, total pre-consumer content materials cost, total combined recycled content materials cost, recycled content materials percentage. | | PE |
| | | | Final Design or NLT Preconstruction | | **Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal. | | PE |
| | | | Closeout | X | Manufacturer published product data or certification, confirming recycled content percentages in spreadsheet | | PE |
| MR4.2 | | Recycled Content: 20% (post-consumer + 1/2 pre-consumer) | Same as MR4.1 | | Same as MR4.1 | | PE |
| MR5.1 | | Regional Materials:10% Extracted, Processed & Manufactured Regionally | Closeout | | Statement indicating total materials value and whether default or actual. | | PE |
| | | | Closeout | | Spreadsheet calculations indicating, for each regional material, material name/description, manufacturer, cost, percent compliant, harvest distance, manufacture distance, source of manufacture and harvest location data. Total regional materials cost, regional materials percentage. | | PE |
| | | | Preconstruction | | **Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal. | | PE |
| | | | Closeout | X | Manufacturer published product data or certification confirming regional material percentages in spreadsheet | | PE |

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| MR5.2 | | Regional Materials:20% Extracted, Processed & Manufactured Regionally | Same as MR5.1 | | Same as MR5.1 | | PE |
| MR6 | | Rapidly Renewable Materials | Closeout | | Statement indicating total materials value and whether default or actual. | | PE |
| | | | Closeout | | Spreadsheet calculations indicating, for each rapidly renewable material, material name/description, manufacturer, cost, rapidly renewable content percent, rapidly renewable product value. Total rapidly renewable product value, rapidly renewable materials percentage. | | PE |
| | | | Final Design | | **Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal. | | ARC |
| | | | Closeout | X | Manufacturer published product data or certification confirming rapidly renewable material percentages in spreadsheet | | PE |
| MR7 | | Certified Wood | Closeout | | Statement indicating total materials value and whether default or actual. | | PE |
| | | | Closeout | | Spreadsheet calculations indicating, for each certified wood material, material name/description, vendor, cost, wood component percent, certified wood percent of wood component, FSC chain of custody certificate number. Total certified wood product value, certified wood materials percentage. | | PE |
| | | | Final Design or NLT Preconstruction | | **Purchasing Plan consisting of spreadsheet indicated above, filled in with estimated quantities to show strategy for achieving goal. | | PE |
| | | | Closeout | X | Vendor invoices, FSC chain of custody certificates and anufacturer published product data or certification confirming all certified wood materials percentages in spreadsheet. | | PE |
| **INDOOR ENVIRONMENTAL QUALITY** | | | | | | | |
| EQPR1 | | Minimum IAQ Performance (PREREQUISITE) | Final Design | | Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements. | | MEC |
| | | | Final Design | | Narrative describing the project's ventilation design, including specifics about fresh air intake volumes and special considerations. | | MEC |
| EQPR2 | | Environmental Tobacco Smoke (ETS) Control (PREREQUISITE) | Final Design | | Statement indicating which option for compliance applies, stating applicable criteria/requirement, and confirming that project has been designed to meet the applicable requirements. | | ARC |
| | | | Final Design | | List of drawing and specification references that convey conformance to applicable requirements (signage, exhaust system, room separation details, etc). | | ARC |
| EQ1 | | Outdoor Air Delivery Monitoring | Final Design | | Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements. | | MEC |
| | | | Final Design | | List of drawing and specification references that convey conformance to applicable requirements. | | MEC |
| | | | Final Design | | Narrative describing the project's ventilation design and CO2 monitoring system, including specifics about monitors, operational parameters and setpoints. | | MEC |
| | | | Closeout | X | Cut sheets for CO2 monitoring system. | | PE |
| EQ2 | | Increased Ventilation | Final Design | | Statement indicating which option for compliance applies and confirming that project has been designed to meet the applicable requirements. | | MEC |
| | | | Final Design | | Narrative describing the project's ventilation design, including specifics about zone fresh air intake volumes and demonstrating compliance. | | MEC |
| | | | Final Design | | Option 2: Narrative describing design method used for determining natural ventilation design, including calculation methodology/model results and demonstrating compliance. | | MEC |
| | | | Final Design | | List of drawing and specification references that convey conformance to applicable requirements. | | MEC |
| EQ3.1 | | Construction IAQ Management Plan: During Construction | **Preconstruction | | Construction IAQ Management Plan | | PE |
| | | | Closeout | | Statement confirming whether air handling units were operated during construction | | PE |
| | | | Closeout | | Dated jobsite photos showing examples of IAQ management plan practices being implemented. Label photos to indicate which practice they demonstrate. Minimum one photo of each practice at each building. | | PE |

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| | | | Closeout | | Spreadsheet indicating, for each filter installed during construction, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy. | | PE |
| EQ3.2 | | Construction IAQ Management Plan: Before Occupancy | **Preconstruction | | Construction IAQ Management Plan | | PE |
| | | | Closeout | | Statement indicating which option for compliance applies and confirming that required activities have occurred that meet the applicable requirements. | | PE |
| | | | Closeout | | Option 1a: Narrative describing the project's flushout process, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance. | | PE |
| | | | Closeout | | Option 1b: Narrative describing the project's pre-occupancy and post-occupancy flushout processes, including specifics about temperature, airflow and duration, special considerations (if any) and demonstrating compliance. | | PE |
| | | | Closeout | | Option 2: Narrative describing the project's IAQ testing process, including specifics about contaminants tested for, locations, remaining work at time of test, retest parameters and special considerations (if any). | | PE |
| | | | Closeout | | Option 2: IAQ testing report demonstrating compliance. | | PE |
| EQ4.1 | | Low Emitting Materials: Adhesives & Sealants | Closeout | | Spreadsheet indicating, for each applicable indoor adhesive, sealant and sealant primer used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data. | | PE |
| | | | Closeout | | Spreadsheet indicating, for each applicable indoor aerosol adhesive, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor aerosol adhesives were used for the project. | | PE |
| | | | Closeout | X | Manufacturer published product data or certification confirming material VOCs in spreadsheet | | PE |
| EQ4.2 | | Low Emitting Materials: Paints & Coatings | Closeout | | Spreadsheet indicating, for each applicable indoor paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data. | | PE |
| | | | Closeout | | Spreadsheet indicating, for each applicable indoor anti-corrosive/anti-rust paint and coating used, the manufacturer, product name/model number, VOC content, LEED VOC limit, and source of VOC data - OR - Statement confirming no indoor anti-corrosive/anti-rust paints were used for the project . | | PE |
| | | | Closeout | X | Manufacturer published product data or certification confirming material VOCs in spreadsheet | | PE |
| EQ4.3 | | Low Emitting Materials: Flooring Systems | Closeout | | Spreadsheet indicating, for each indoor flooring system used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data. | | PE |
| | | | Closeout | | Spreadsheet indicating, for each indoor carpet cushion used, the manufacturer, product name/model number, if it meets LEED requirement (yes/no) and source of LEED compliance data - OR - Statement confirming no indoor carpet cushion was used for the project. | | PE |
| | | | Closeout | X | Manufacturer published product data or certification confirming material compliance label in spreadsheet | | PE |
| EQ4.4 | | Low Emitting Materials: Composite Wood & Agrifiber Products | Closeout | | Spreadsheet indicating, for each indoor composite wood and agrifiber product used, the manufacturer, product name/model number, if it contains added urea formaldehyde (yes/no) and source of LEED compliance data. | | PE |
| | | | Closeout | X | Manufacturer published product data or certification confirming material urea formaldehyde in spreadsheet | | PE |
| EQ5 | | Indoor Chemical & Pollutant Source Control | Closeout | | Spreadsheet indicating, for each permanent entryway system used, the manufacturer, product name/model number and description of system. | | PE |
| | | | Final Design | | List of drawing and specification references that convey locations and installation methods for entryway systems. | | ARC |
| | | | Final Design | | Spreadsheet indicating, for each chemical use area, the room number, room name, description of room separation features (walls, floor/ceilings, openings) and pressure differential from surrounding spaces with doors closed - OR - Statement confirming that project includes no chemical use areas and that no hazardous cleaning materials are needed for building maintenance. | | ARC MEC |
| | | | Final Design | | If project includes chemical use areas: List of drawing and specification references that convey locations of chemical use areas, room separation features and exhaust system. | | ARC MEC |

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| | | | Final Design | | If project includes places where water and chemical concentrate mixing occurs: List of drawing and specification references that convey provisions for containment of hazardous liquid wastes OR - Statement confirming that project includes no places where water and chemical concentrate mixing occurs. | | ARC MEC |
| | | | Closeout | | If project includes chemical use areas: Spreadsheet indicating, for AHUs/mechanical ventilation equipment serving occupied areas, the manufacturer, model number, MERV rating, location installed, and if it was replaced immediately prior to occupancy (yes/no) - OR - Statement confirming that project does not use mechanical equipment for ventilation of occupied areas. | | PE |
| EQ6.1 | | Controllability of Systems: Lighting | Final Design | | Calculation indicating total number of individual workstations, number of workstations with individual lighting controls and the percentage of workstations with individual lighting controls. | | ELEC |
| | | | Final Design | | For each shared multi-occupant space, provide a brief description of lighting controls. | | ELEC |
| | | | Final Design | | Narrative describing lighting control strategy, including type and location of individual controls and type and location of controls in shared multi-occupant spaces. | | ELEC |
| EQ6.2 | | Controllability of Systems: Thermal Comfort | Final Design | | Calculation indicating total number of individual workstations, number of workstations with individual thermal comfort controls and the percentage of workstations with individual thermal comfort controls. | | MEC |
| | | | Final Design | | For each shared multi-occupant space, provide a brief description of thermal comfort controls. | | MEC |
| | | | Final Design | | Narrative describing thermal comfort control strategy, including type and location of individual and shared multi-occupant controls. | | MEC |
| EQ7.1 | | Thermal Comfort: Design | Final Design | | Design criteria spreadsheet indicating, for spring, summer, fall and winter, maximum indoor space design temperature, minimum indoor space design temperature and maximum indoor space design humidity. | | MEC |
| | | | Final Design | | Narrative describing method used to establish thermal comfort control conditions and how systems design addresses the design criteria, including compliance with the referenced standard. | | MEC |
| EQ7.2 | | Thermal Comfort: Verification | Final Design | | Narrative describing the scope of work for the thermal comfort survey, including corrective action plan development | | MEC |
| | | | Final Design | | List of drawing and specification references that convey permanent monitoring system. | | MEC |
| EQ8.1 | | Daylight & Views: Daylight 75% of Spaces | Final Design | | Option 2: Table indicating all regularly occupied spaces with space area and space area with compliant daylight zone. Sum of regularly occupied areas and regularly occupied areas withcompliant daylight zone. Percentage calculation of areas withcompliant daylight zone to total regularly occupied areas. | | ARC |
| | | | Final Design | | Option 1: Simulation model method, software and output data | | ELEC |
| | | | Final Design | | Option 1: Table indicating all regularly occupied spaces with space area, space area with minimum 25 footcandles daylighting illumination, and method of providing glare control. Sum of regularly occupied areas and regularly occupied areas with 25 fc daylighting. Percentage calculation of areas with 25 fc daylighting to total regularly occupied areas. | | ELEC |
| | | | Final Design | | For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space. | | ARC |
| | | | Final Design | | List of drawing and specification references that convey exterior glazed opening head and sill heights, glazing performance properties and glare control/sunlight redirection devices. | | ARC |
| | | | Closeout | X | Manufacturer published product data or certification confirming glazing Tvis in spreadsheet | | PE |
| EQ8.2 | | Daylight & Views: Views for 90% of Spaces | Final Design | | Table indicating all regularly occupied spaces with space area and space area with access to views. Sum of regularly occupied areas and regularly occupied areas with access to views. Percentage calculation of areas with views to total regularly occupied areas. | | ARC |
| | | | Final Design | | For all occupied spaces excluded from the calculation, provide narrative indicating reasons for excluding the space. | | ARC |
| | | | Final Design | | LEED Floor plan drawings showing line of sight diagramming of views areas in each regularly occupied space. List of drawing/specification references that convey exterior glazed opening head and sill heights. | | ARC |
| | | | | | | | |
| **INNOVATION & DESIGN PROCESS** | | | | | | | |

| LEED Credit Paragraph | Contractor Check Here if Credit is Claimed | **LEED-NC v3 Submittals (OCT09)** | | Provide for Credit Audit Only | | Date Submitted (to be filled in by Contractor) | Government Reviewer's Use |
|---|---|---|---|---|---|---|---|
| **PAR** | | **FEATURE** | **DUE AT** | | **REQUIRED DOCUMENTATION** | **DATE** | **REV** |
| IDc1.1 | | Innovation in Design | Final Design | | Narrative decribing intent, requirement for credit, project approach to the credit. List of drawings and specification references that convey implementation of credit. All other documentation that validates claimed credit. | | |
| IDc1.2 | | Innovation in Design | Final Design | | | | |
| IDc1.3 | | Innovation in Design | Final Design | | | | |
| IDc1.4 | | Innovation in Design | Final Design | | | | |
| IDc2 | | LEED Accredited Professional | Final Design | | Narrative indicating name of LEED AP, company name of LEED AP, description of LEED AP's role and responsiblilities in the project. | | ARC |
| | | | | | | | |

**ATTACHMENT F**
Version 02-03-2010

**BUILDING INFORMATION MODELING REQUIREMENTS**

## 1.0 Section 1 - Submittal Format

1.1. Design Deliverables. Develop all designs using Building Information Modeling (BIM) and Computer Aided Design (CAD) software. Design submittal drawings shall be ANSI D size, suitable for half-size scaled reproduction.

## 2.0 Section 2 – Design Requirements

2.1. BIM Model and Facility Data. Contractor shall use BIM application(s) and software(s) to develop project designs. "Facility Data" is defined as associated intelligent attribute data. The "Model" is defined as 3D graphics that includes Facility Data and output as described in the paragraph 'Output' below. Contractors will use the Model to produce accurate Construction Documents. All submitted BIM Models and associated Facility Data shall be fully compatible with XM with associated USACE Bentley BIM Workspace

2.1.1. 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.

2.2. Drawings. Deliver CAD files used for the creation of the Construction Documents Drawings per requirements in Section 01 33 16, the criteria of the USACE New York District District, and as noted herein. Specification of a CAD file format for these Drawings does not limit which BIM application(s) or software(s) may be used for project development and execution.

2.2.1. IFC Support. The Contractor's selected BIM application(s) and software(s) must support the IFC (Industry Foundation Class - see www.iai-tech.org). Submit any deviations from or additions to the IFC property sets for any new spaces, systems, and equipment for Government approval.

2.2.2. Submittal Requirements. BIM submittals shall conform to the requirements of Sections 3 and 4 below.

2.2.3. BIM Project Execution Plan.

2.2.3.1. Develop a BIM Project Execution Plan ("Plan" or "PxP") documenting the BIM and analysis technologies selected for the Project Model (integrated with the AEC CAD Standard) from concept development through As-Builts as a design, production, coordination, construction, and documentation tool and the collaborative process by which it shall be executed. See Section 7 for additional guidance on developing the Plan.

2.2.4. BIM Requirements.

2.2.4.1. Facility Data. Develop the Facility Data consisting of a set of intelligent elements for the Model (e.g., doors, air handlers, electrical panels). This Facility Data shall include all material definitions and attributes that are necessary for the Project facility design and construction. Additional data in support of Section 6 Contractor Electives is encouraged.

2.2.4.2. Model Content. The Model and Facility Data shall include, at a minimum, the requirements of Section 4 below.

2.2.4.3. Model Granularity. Models may vary in level of detail for individual elements within a 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 1/16$^{th}$, 1/8$^{th}$ and 1/4$^{th}$), or appropriately scaled civil drawings.

2.2.4.4. Output. Submitted CAD drawings (e.g., plans, elevations, sections, schedules, details, etc.) shall be derived (commonly known as extractions, views or sheets) and maintained from the submitted Model and Facility Data.

2.3. Quality Control. Implement quality control (QC) parameters for the Model, including:

2.3.1. Model Standards Checks. QC validation used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements. Report non-compliant elements and corrective action plan to correct non-compliant elements. Provide the government with detailed justification and request government approval for any non-compliant element which the contractor proposes to be allowed to remain in the Model.

2.3.2. CAD Standards Checks. QC checking performed to ensure that the fonts, dimensions, line styles, levels and other construction document formatting issues are followed per the A/E/C CADD Standard.

2.3.3. Other Parameters. Develop such other QC parameters as Contractor deems appropriate for the Project and provide to the Government for concurrence.

2.4. Design and Construction Reviews. Perform design and construction reviews at each submittal stage under Section 3 to test the Model, including:

2.4.1. Visual Checks. Check to ensure the design intent has been followed and that there are no unintended elements in the Model.

2.4.2. 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) in a written report and resolve.

2.4.3. 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.

2.4.4. Other Parameters. Develop such other Review parameters as the Contractor deems appropriate for the Project and provide to the Government for concurrence.

**3.0 Section 3 – Design Stage Submittal Requirements**

3.1. General Submittal Requirements.

3.1.1. Provide submittals in compliance with BIM Project Execution Plan deliverables at stages as described hereinafter.

3.1.2. At each Stage in Paragraphs 3.3 through 3.6, provide a Contractor-certified written report confirming that consistency checks as identified in Paragraphs 2.3 and 2.4 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 Stage in Paragraphs 3.3 through 3.6, provide the Government with:

- The Model, Facility Data, and CAD Data files.

- A 3-D interactive review format of the Model in Bentley Navigator, Autodesk Navisworks, Adobe 3D PDF 7.0 (or later), Google Earth KMZ or other format per Plan requirements. The file format for reviews can change between submittals.

- A list of all submitted files. The list should include a description, directory, and file name for each file submitted. For all CAD sheets, include the sheet title and sheet number. Identify files that have been produced from the submitted Model and Facility Data.

3.1.4. The Government shall confirm acceptability of all submittals identified in Section 3 in coordination with the USACE New York District BIM Manager

3.2. Initial Design Conference Submittal.

3.2.1. Submit a digital copy of the Plan where, in addition to Paragraph 3.1.4, the USACE New York District District BIM Manager will confirm acceptability of the Plan or advise as to additional processes or activities necessary to be incorporated.

3.2.2. Within thirty (30) days after the approval of the Plan, conduct a demonstration to review the Plan for clarification, and to verify the functionality of Model technology workflow and processes. If modifications are required, the Contractor shall complete the modifications and resubmit the Plan and perform subsequent demonstration for Government acceptance. There will be no payment for design or construction until the Plan is acceptable to the Government. The Government may also withhold payment for design and construction for unacceptable performance in executing the approved Plan.

3.3. Interim Design Submittals.

3.3.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4 as applicable to the Interim Design package(s).

3.4. Final Design Submissions and Design Complete Submittals.

3.4.1. BIM and CAD Data. The Model shall include the requirements identified in Paragraph 2.2.4. 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. 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-Builts BIM and CAD Data Submittal. Submit the final Model, Facility Data, and CAD files reflecting as-built conditions for Government Approval, 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 deliverable Model shall be developed to include the systems described below as they would be built and the processes of installing them, and to reflect final as-built 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 accurate net square footage and net volume, and holding data for the room finish schedule for including room names and numbers. Include Programmatic Information provided by the Government or validated program 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 shall be developed in the structural Model and then referenced by the architectural Model for each floor of the Project building.

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 generic 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 and Woodwork. All architectural specialties (i.e., toilet room accessories, toilet partitions, grab bars, lockers, and display cases) and woodwork (i.e., cabinetry and counters) shall be accurately depicted with the necessary intelligence to produce accurate plans, elevations and sections 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 systems Model may vary in level of detail for individual elements within a Model, 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 within a Model. Equipment shall be depicted to meet layout requirements with the necessary intelligence to produce accurate plans and minimum schedules depicting their configuration. 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, including 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 and related building/wall sections.

4.5.4. Cast-in-Place Concrete. All walls, columns, and 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. The structural Model shall include all necessary openings and 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. The structural Model shall include all necessary shafts, pits, and openings, including necessary intelligence to produce accurate plans and building/wall sections depicting these design elements.

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 in the model. Additional minimum Model requirements include:

4.6.1. HVAC. All necessary heating, ventilating, air-conditioning and specialty equipment, including air distribution ducts for supply, return, and ventilation and exhaust ducts, including control system, 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 HVAC and Plumbing equipment clearances shall be modeled for use in interference management and maintenance access requirements.

4.6.4. Elevator Equipment. The Model shall include the necessary equipment and control system, including necessary intelligence to produce accurate plans, sections and elevations depicting these design elements.

4.7. Electrical/Telecommunications. The electrical 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 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 Systems. All necessary special electrical components (i.e., security, Mass Notification, Public Address, nurse call and other special occupancies, and control systems), including necessary intelligence to produce accurate plans, details and schedules.

4.7.3. Grounding Systems. All necessary grounding components (i.e., lightning protection systems, static grounding systems, communications grounding systems, bonding), including necessary intelligence to produce accurate plans, details and schedules.

4.7.4. Communications. All existing and new communications 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 with necessary intelligence to produce accurate plans, elevations and schedules. The exterior building lighting Model shall include all necessary lighting, relevant existing and proposed support utility lines and equipment required with necessary intelligence to produce accurate plans, details and schedules.

4.7.6. Equipment Clearances. The model shall incorporate and define all electrical and communications working spaces, clearances, and required access

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, on the Project site with necessary connections to mains or other distribution points as appropriate, including necessary intelligence to produce accurate plans and profiles for the Project site.

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 and parking lots or 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 during the source selection, as described in the proposal submission requirements and evaluation criteria, the following criteria are requirements, as applicable to those elective feature(s).

6.2. COBIE Compliance. The Model and Facility Data for the Project shall fulfill Construction Operations Building Information Exchange (COBIE) requirements as defined by the Whole Building Design Guide organization, including all requirements for the indexing and submission of Portable Document Format (PDF) and other appropriate file formats 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 BIM Execution Plan and during the Preliminary BIM Execution Plan Review, 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 Submittal stages, the Contractor shall deliver the construction schedule with information 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 BIM Execution Plan and during the Preliminary BIM Execution Plan Review, provide an overview of the use of BIM in the development and support of cost estimating requirements, or other applications such as cost analysis and estimate validation.

6.4.1. Submittal Requirements. During the Submittal stages, the Contractor shall deliver cost estimating information derived from the Model.

6.4.2. Project completion. At project completion, the Contractor shall provide an MII (Micro Computer Aided Cost Estimating System Generation II) Cost Estimate which 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 BIM output to the maximum extent possible, though other "Gap" quantity information will be included as necessary for a complete and accurate cost estimate.

6.4.2.1. Sub system level extracted quantities from the BIM 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. Therefore, when developing a BIM, the designer shall be cognizant of what tasks need to be separated appropriately at the beginning stages of model development, such as tasks done 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 BIM shall be broken done by their location (proximity in the structure) as well as the complexity of its installation.

6.4.2.2. At all design stages it shall be understood that BIM output as described in this document 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. An example of this would be plumbing that is less than 1.5" diameter and therefore not expected to be modeled due to granularity; this information is commonly referred to as The Gap. Quantities from The Gap and their associated costs shall be included in the final project actual cost estimates as well.

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.

## 7.0 Section 7 – BIM Project Execution Plan Template

7.1. Contractors will utilize the latest version of the USACE BIM PROJECT EXECUTION PLAN (USACE PxP) Template to develop an acceptable Plan. The template can be downloaded from the CAD/BIM Technology Center website.

**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). | |

# 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 responsible for the overall construction activities at the site, including 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.

### 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.

3.2.3. Acceptance of Plan

Government acceptance of the Contractor's plan is required prior to the start of design and construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4. Notification of Changes

After acceptance of the CQC Plan, notify the Government in writing of any proposed change. Proposed changes are subject to Government acceptance.

3.3. COORDINATION MEETING

After the Postaward Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, the Contractor and the Government shall meet and discuss the Contractor's quality control system. Submit the CQC Plan for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. The Government will prepare minutes of the meeting for signature by both parties. . The minutes shall become a part of the contract file. There may be occasions when either party will call for subsequent conferences to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4. QUALITY CONTROL ORGANIZATION

3.4.1. Personnel Requirements

The requirements for the CQC organization are a CQC System Manager, a Design Quality Manager, and sufficient number of additional qualified personnel to ensure contract compliance. The CQC organization shall also include personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly furnish complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2. CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System

Manager shall be a graduate engineer, graduate architect, or a BA/BS graduate of an ACCE accredited construction management college program. The CQC system Manager may alternately be an engineering technician with at least 2 years of college and an ICC certification as a Commercial Building Inspector (Residential Building Inspector certification will be required for Military Family Housing projects). In addition, the CQC system manager shall have a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. Assign the CQC System Manager no other duties (except may also serve as Safety and Health Officer, if qualified and if allowed by Section 00 73 00). Identify an alternate for the CQC System Manager in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager but the alternate may have other duties in addition to serving in a temporary capacity as the acting QC manager.

3.4.3. CQC Personnel

3.4.3.1. In addition to CQC personnel specified elsewhere in the contract provide specialized CQC personnel to assist the CQC System Manager in accordance with paragraph titled Area Qualifications.

3.4.3.2. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; **are not intended to be full time, but must be physically present at the construction site during work on their areas of responsibility**; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan. **One person may cover more than one area, provided that they are qualified to perform QC activities for the designated areas below and provided that they have adequate time to perform their duties:**

3.4.4. Experience Matrix

3.4.4.1. Area Qualifications

3.4.4.1.1. Civil - Graduate Civil Engineer or (BA/BS) graduate in construction management with 4 years experience in the type of work being performed on this project or engineering technician with 5 yrs related experience.

3.4.4.1.2. Mechanical - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Mechanical Inspector with 5 yrs related experience.

3.4.4.1.3. Electrical - Graduate Electrical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or engineering technician with an ICC certification as a Commercial Electrical Inspector with 5 yrs related experience.

3.4.4.1.4. Structural - Graduate Structural Engineer or (BA/BS) graduate in construction management with 4 yrs related experience or person with an ICC certification as a Reinforced Concrete Special Inspector and Structural Steel and Bolting Special Inspector (as applicable to the type of construction involved) with 5 yrs related experience.

3.4.4.1.5. Plumbing - Graduate Mechanical Engineer or (BA/BS) graduate in construction management with 4 yrs related experience, or person with an ICC certification as a Commercial Plumbing Inspector with 5 yrs related experience.

3.4.4.1.6. Concrete, Pavements and Soils Materials Technician (present while performing tests) with 2 yrs experience for the appropriate area

3.4.4.1.7. Testing, Adjusting and Balancing Specialist must be a member (TAB) Personnel of AABC or an experienced technician of the firm certified by the NEBB (present while testing, adjusting, balancing).

3.4.4.1.8. Design Quality Control Manager Registered Architect or Professional Engineer (not required on the construction site)

3.4.4.1.9. Registered Fire Protection Engineer with 4 years related experience or engineering technician with 5 yrs related experience (but see requirements for Fire Protection Engineer of Record to witness final testing in Section 01 10 00, paragraph 5.10, Fire Protection).

3.4.4.1.10. QC personnel assigned to the installation of the telecommunication system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification. In lieu of BICSI certification, QC personnel shall have a minimum of 5 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. QC personnel shall witness and certify the testing of telecommunications cabling and equipment.

3.4.5. Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered at TBD. 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:

  Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

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- For other deliveries:

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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

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

**1.0 OVERVIEW**

1.1. GENERAL REQUIREMENTS

1.1.1. This section contains requirements specifically applicable to this task order. The requirements of Base ID/IQ contract Section 01 50 02 apply to this task order, except as otherwise specified herein.

1.3. BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1. Bulletin Board (As Specified in Base contract)

1.3.2. Project and Safety Signs (Added to Stress standardization of signs, in the event that the Base ID/IQ Section 01 50 02 does not contain this information)

Erect a project sign and a site safety sign with informational details as provided by the Government at the Post award conference, within 15 days prior to any work activity on project site. Update the safety sign data daily, with light colored metallic or non-metallic numerals. Remove the signs from the site upon completion of the project. Engineer Pamphlet EP 310-1-6a contains the standardized layout and construction details for the signs. It can be found through a GOOGLE Search or try http://www.usace.army.mil/publications/eng-pamphlets/ep310-1-6a/s-16.pdf.

End of Section 01 50 02.

SECTION 01 57 23

TEMPORARY STORM WATER POLLUTION CONTROL
**04/08**

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

| | |
|---|---|
| ASTM D 4439 | (2004) Geosynthetics |
| ASTM D 4491 | (1999a; R 2004e1) Water Permeability of Geotextiles by Permittivity |
| ASTM D 4533 | (2004) Trapezoid Tearing Strength of Geotextiles |
| ASTM D 4632 | (2008) Grab Breaking Load and Elongation of Geotextiles |
| ASTM D 4751 | (2004) Determining Apparent Opening Size of a Geotextile |
| ASTM D 4873 | (2002) Identification, Storage, and Handling of Geosynthetic Rolls and Samples |

1.2 SYSTEM DESCRIPTION

The work consists of implementing the storm water pollution prevention measures to prevent sediment from entering streams or water bodies as specified in this Section in conformance with the requirements of Section 01 57 20.00 10 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

1.3 EROSION AND SEDIMENT CONTROLS

The controls and measures required of the Contractor are described below.

1.3.1 Stabilization Practices

The stabilization practices to be implemented include temporary seeding, erosion control matts, protection of trees, preservation of mature vegetation, etc. On the daily CQC Report, record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, initiate stabilization practices as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently

ceased.

1.3.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases or is precluded by unsuitable conditions caused by the weather, initiate stabilization practices as soon as practicable after conditions become suitable.

1.3.1.2 No Activity for Less Than 21 Days

When the total time period in which construction activity is temporarily ceased on a portion of the site is 21 days minimum, stabilization practices do not have to be initiated on that portion of the site until 14 days have elapsed after construction activity temporarily ceased.

1.3.1.3 Burnoff

Burnoff of the ground cover is not permitted.

1.3.1.4 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified, and protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

1.3.2 Erosion, Sediment and Stormwater Control

d. Storm Water Notice of Intent for Construction Activities

e. Submit a Storm Water Notice of Intent for NPDES coverage under the general permit for construction activities and a Storm Water Pollution Prevention Plan (SWPPP) for the project to the Contracting Officer prior to the commencement of work. The SWPPP shall meet the requirements of the State of New York general permit for storm water discharges from construction sites. Maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, to reflect current site conditions.

f. The Contractor shall be responsible for preparing a Stormwater Pollution Prevention Plan (SWP3), Notice of Intent (NOI) and Notice of Termination (NOT) for submission to the New York State Department of Environmental Conservation (NYSDEC) for stormwater discharges associated with construction activities under General Permit #GP-02-01. The SWP3 shall be prepared in accordance with New York State Standard Specifications for Erosion and Sediment Control and stamped by a New York State registered professional engineer. The SWP3, NOI and NOT shall be submitted along with the appropriate fees to the Contracting Officer for review, approval, and submission to the NYSDEC by the Fort Drum Environmental Office.

g. The Contractor shall allow 30 days for the Fort Drum Environmental Office to review and approve the SWP3 and NOI for the permit to be effective. The Contractor shall maintain a copy of the approved SWP3 at the construction site on-site office and continually implement and update the plan as regulations require, to reflect current site conditions.

1.3.3 Structural Practices

Implement structural practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement structural practices in a timely manner, during the construction process, to minimize erosion and sediment runoff. Include the following devices;

1.3.3.1 Silt Fences

Provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Properly install silt fences to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Install silt fences in the locations indicated on the drawings. Obtain approval from the Contracting Officer prior to final removal of silt fence barriers.

1.3.3.2 Straw Bales

Provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. If bales are used, properly place the bales to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, place the bales as work progresses, remove/replace/relocate the bales as needed for work to progress in the drainage area). Show on the drawings areas where straw bales are to be used. The Contracting Officer will approve the final removal of straw bale barriers. Provide rows of bales of straw as follows:

a. Along the downhill perimeter edge of all areas disturbed.

b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.

c. Along the toe of all cut slopes and fill slopes of the construction areas.

d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas.

e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales.

f. At the entrance to culverts that receive runoff from disturbed areas.

1.3.4 Vegetation and Mulch

a. Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with

anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

b. Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish a suitable stand of grass.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Storm Water Pollution Prevention Plan
Storm Water Notice of Intent

Pollution prevention plan and Notice of intent for NPDES coverage under the general permit for construction activities

SD-06 Test Reports

Storm Water Inspection Reports for General Permit
Erosion and Sediment Controls

SD-07 Certificates

Mill Certificate or Affidavit

Certificate attesting that the Contractor has met all specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

Identify, store and handle filter fabric in accordance with ASTM D 4873.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

Provide geotextile that complies with the requirements of ASTM D 4439, and consists of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and contains stabilizers and/or inhibitors added to the base plastic to make the filaments resistent to deterioration due to ultraviolet and heat exposure. Provide synthetic filter fabric that contains ultraviolet ray inhibitors and stabilizers to assure a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

| PHYSICAL PROPERTY | TEST PROCEDURE | STRENGTH REQUIREMENT |
|---|---|---|

| | | |
|---|---|---|
| Grab Tensile | ASTM D 4632 | 100 lbs. min. |
| Elongation (percent) | | 30 percent max. |
| Trapezoid Tear | ASTM D 4533 | 55 lbs. min. |
| Permittivity | ASTM D 4491 | 0.2 sec-1 |
| AOS (U.S. Std Sieve) | ASTM D 4751 | 20-100 |

2.1.2 Silt Fence Stakes and Posts

Use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 by 2 inches when oak is used and 4 by 4 inches when pine is used, and have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 5 feet.

2.1.3 Mill Certificate or Affidavit

Provide a mill certificate or affidavit attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. Specify in the mill certificate or affidavit the actual Minimum Average Roll Values and identify the fabric supplied by roll identification numbers. Submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. Provide bales with a standard cross section of 14 by 18 inches. Wire-bound or string-tie all bales. Use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 by 2 inches in cross section and have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 3 feet.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Extend silt fences a minimum of 16 inches above the ground surface without exceeding 34 inches above the ground surface. Provide filter fabric from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, splice together filter fabric at a support post, with a minimum 6 inch overlap, and securely sealed. Excavate trench approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4 by 4 inch trench shall be backfilled and the soil compacted over the filter fabric. Remove silt fences upon approval by the Contracting Officer.

3.2 INSTALLATION OF STRAW BALES

Place the straw bales in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Install straw bales so

that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. Entrench and backfill the barrier. Excavate a trench the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), backfill the excavated soil against the barrier. Conform the backfill soil with the ground level on the downhill side and build up to 4 inches against the uphill side of the barrier. Scatter loose straw over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Securely anchor each bale by at least two stakes driven through the bale. Drive the first stake or steel post in each bale toward the previously laid bale to force the bales together. Drive stakes or steel pickets a minimum 18 inches deep into the ground to securely anchor the bales.

## 3.3 FIELD QUALITY CONTROL

Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

### 3.3.1 Silt Fence Maintenance

Inspect the silt fences in accordance with paragraph, titled "Inspections," of this section. Any required repairs shall be made promptly. Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, replace the fabric promptly. Remove sediment deposits when deposits reach one-third of the height of the barrier. Remove a silt fence when it is no longer required. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall receive erosion control .

### 3.3.2 Straw Bale Maintenance

Inspect straw bale barriers in accordance with paragraph, titled "Inspections". Pay close attention to the repair of damaged bales, end runs and undercutting beneath bales. Accomplish necessary repairs to barriers or replacement of bales in a promptly manner. Remove sediment deposits when deposits reach one-half of the height of the barrier. At the each end of each row turn bales uphill when used to retain sediment. Remove a straw bale barrier when it is no longer required. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. Seed the areas disturbed by this shaping in accordance with Section 32 92 19 SEEDING.

### 3.3.3 Diversion Dike Maintenance

Inspect diversion dikes in accordance with paragraph, titled "Inspections," of this section. Pay close attention to the repair of damaged diversion dikes and accomplish necessary repairs promptly. When diversion dikes are no longer required, shape to an acceptable grade. Seed the areas disturbed by this shaping in accordance with Section 32 92 19 SEEDING.

## 3.4 INSPECTIONS

### 3.4.1 General

Inspect disturbed areas of the construction site, areas that have not been finally stabilized used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Conduct inspections at least once every month where sites have been finally stabilized.

### 3.4.2 Inspections Details

Inspect disturbed areas and areas used for material storage that are exposed to precipitation for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan to ensure that they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

### 3.4.3 Inspection Reports

For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. Furnish the report to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

-- End of Section --

# SUBSURFACE INVESTIGATION
# AND
# GEOTECHNICAL EVALUATION

---

## PROPOSED INDOOR RANGE
## PN 71727 ALL WEATHER MARKSMANSHIP FACILITY
## (AWMF) 1BCT
## FORT DRUM MILITARY INSTALLATION
## FORT DRUM, NEW YORK

---

## 4.0 SUBSURFACE INVESTIGATION & SAMPLING METHODOLOGY

The borings were advanced utilizing 4¼-inch inside diameter hollow stem augers. Boring B-1 was advanced from 6 to 10 feet utilizing a tri-cone roller bit with air. Soil sampling and standard penetration testing was performed utilizing a 2-inch outside diameter split spoon sampler in accordance with ASTM D 1586. Soil sampling was generally performed continuously to auger refusal at depths ranging from 1.8 to 10.3 feet (elevation 577 to 592) below the surface. The bedrock encountered in borings B-2 and B-5 was cored utilizing a double tube, NX core barrel.

The soil samples were classified in the laboratory by an engineering technician in general accordance with the Burmister Soil Classification System. The split spoon sampler does not recover material larger than 1⅜-inch in nominal dimension; therefore, the soil classifications may not be representative of the entire soil matrix. The laboratory classifications and the standard penetration test results are presented on the **Subsurface Investigation Logs** included in **Appendix C**.

A temporary observation well was installed in boring B-7 utilizing 1-inch diameter machine slot PVC screen and PVC riser that extended to the surface to facilitate future water readings.

Two test pits were excavated utilizing a Komatsu PC 85 excavator. The test pits were logged in the field by an ATL Geotechnical Engineer. The Test Pit Logs are included in Appendix C, Subsurface Investigation Logs.

The boreholes and test pits were backfilled with on-site soils upon completion.

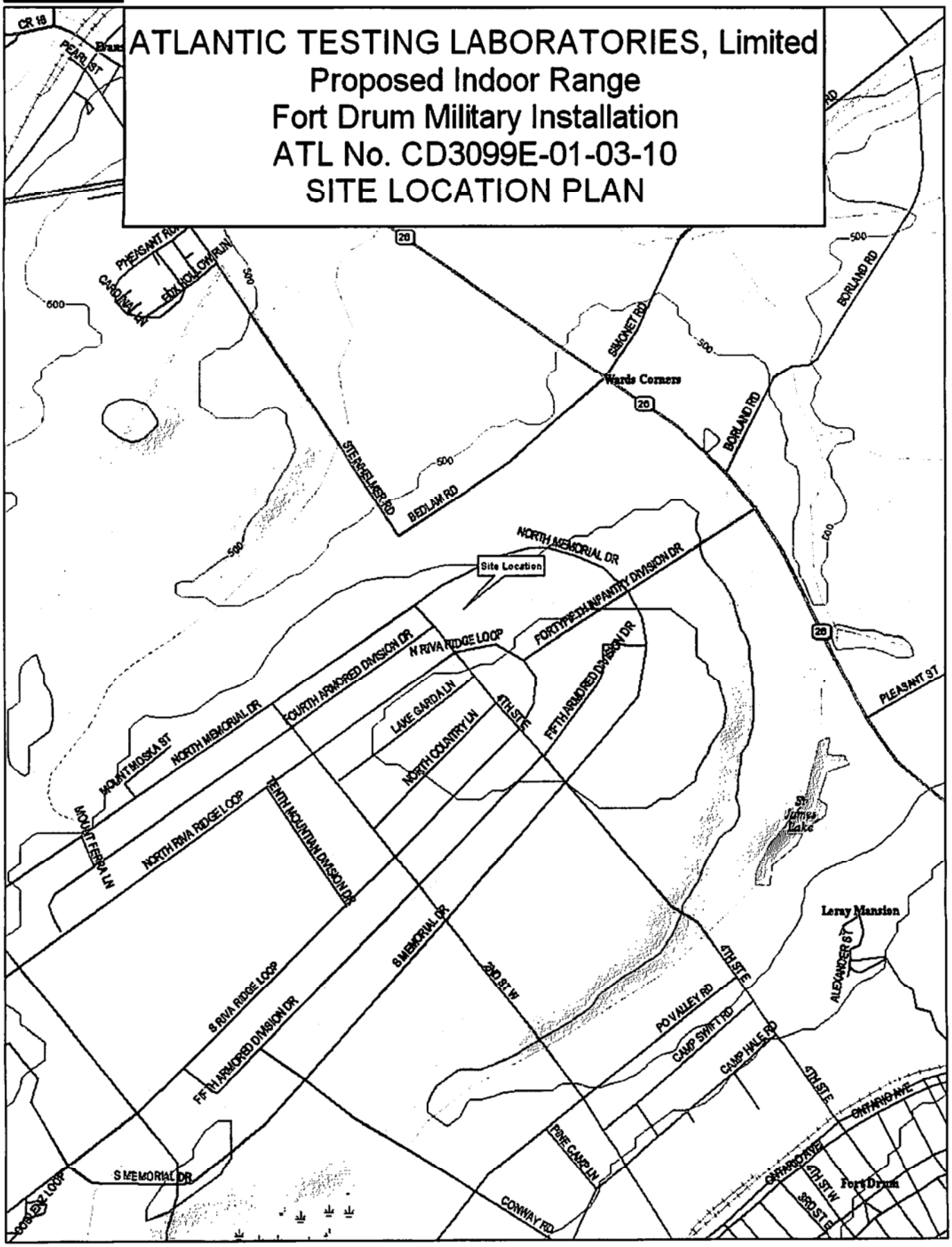
# *APPENDIX A*

## *SITE LOCATION PLAN*

DeLORME

Topo USA® 5.0

# ATLANTIC TESTING LABORATORIES, Limited
## Proposed Indoor Range
## Fort Drum Military Installation
## ATL No. CD3099E-01-03-10
## SITE LOCATION PLAN

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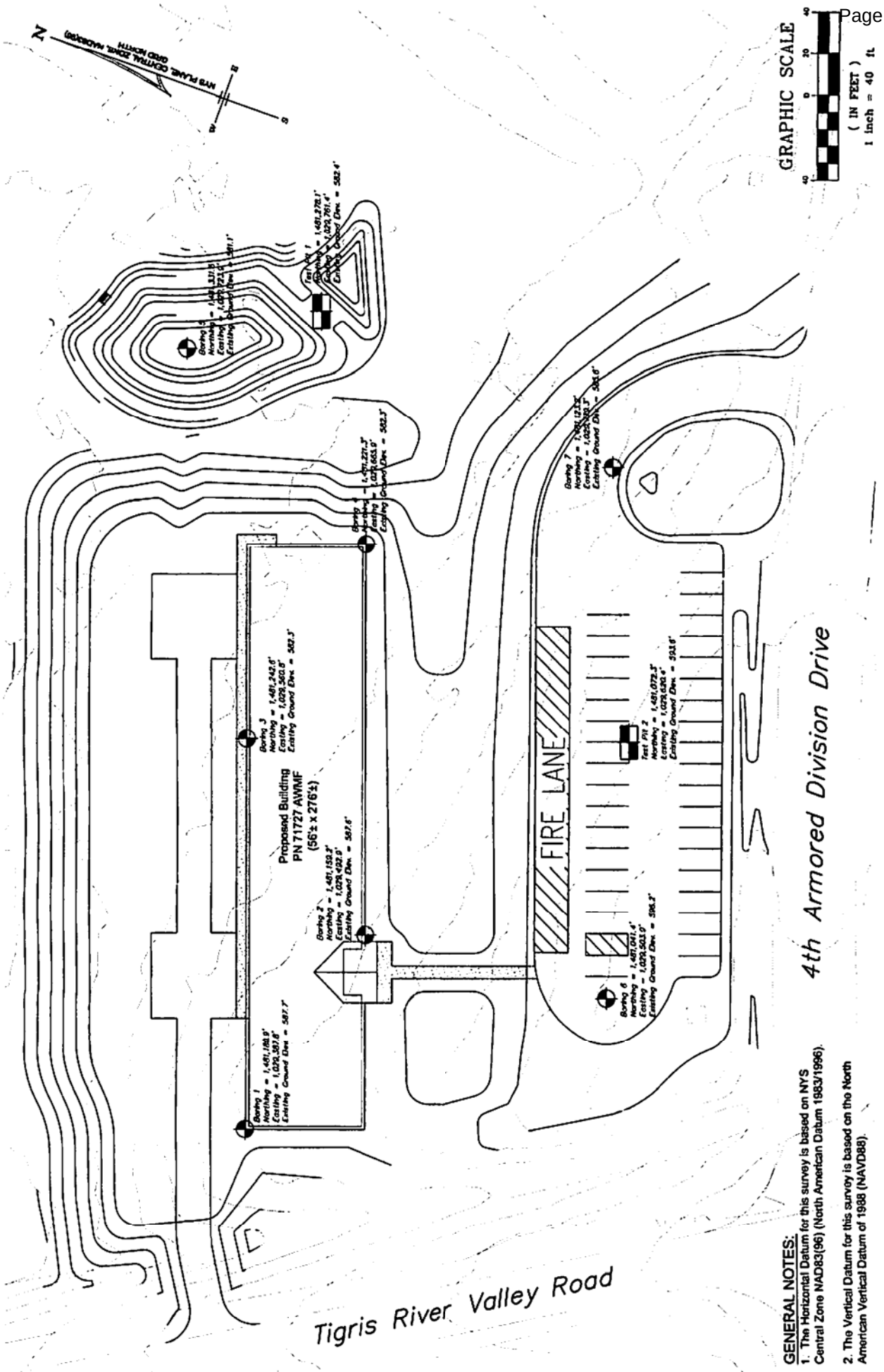
www.delorme.com

MN (0.0° W)

0 800 1600 2400 3200 4000 ft

Data Zoom 13-0

***BORING LOCATION PLAN***




GENERAL NOTES:
1. The Horizontal Datum for this survey is based on NYS Central Zone NAD83(96) (North American Datum 1983/1996).
2. The Vertical Datum for this survey is based on the North American Vertical Datum of 1988 (NAVD88).

# *SUBSURFACE INVESTIGATION LOGS*

# ATLANTIC TESTING LABORATORIES, Limited

## Subsurface Investigation

Report No.: CD3099E-01-03-10

Client: Aubertine and Currier

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Building

Proposed Indoor Range - PN 71727 AWMF 1BCT

Fort Drum, New York

Start Date: 2/24/2010 Finish Date: 2/24/2010

Boring No.: B-1 Sheet 1 of 1

Groundwater Observations

| Date | Time | Depth | Casing |
|---|---|---|---|
| 2/24/2010 | 2:00 PM | DRY | 6.0' |

Coordinates
Northing 1481180.9
Easting 1029387.8

Sampler Hammer
Weight: 140 lbs.
Fall: 30 in.
Hammer Type: Automatic

Ground Elev.: 587.7

Boring Advance By: 4 1/4" Auger/Air Rotary

Borehole caved at 6.2 feet.

| DEPTH | METHOD OF ADVANCE | SAMPLE NO. | DEPTH OF SAMPLE From | DEPTH OF SAMPLE To | SAMPLE TYPE | BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER | DEPTH OF CHANGE | CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%) | Recovery (Inches) |
|---|---|---|---|---|---|---|---|---|---|
| | AUGER | 1 | 0.0 | 2.0 | SS | 2 3 5 11 | 1.5 | Brown SILT; and c-mf+ SAND; little mf GRAVEL; trace CLAY; trace ORGANIC MATERIAL (roothairs) (wet, moderately plastic) w=17.3% | 22 |
| 1 | | | | | | | | | |
| 2 | | 2 | 2.0 | 4.0 | SS | 24 35 50 65 | 4.0 | Brown SILT; and cmf SAND; little mf GRAVEL; trace COBBLES (wet, non-plastic) w=6.5% | 19 |
| 3 | | | | | | | | | |
| 4 | | 3 | 4.0 | 5.3 | SS | 20 52 100/3" | | Brown SILT; and cmf SAND; little f GRAVEL (wet, non-plastic) w=8.4% | 12 |
| 5 | | | | | | | | | |
| 6 | AIR ROTARY | 4 | 6.0 | 6.8 | SS | 24 100/4" | | Brown SILT; some cmf SAND; some cmf GRAVEL (moist, non-plastic) w=5.0% | 8 |
| 7 | | | | | | | | | |
| 8 | | 5 | 8.0 | 8.3 | SS | 100/2" | | Grey CLAY; some SILT; little cmf SAND; trace f GRAVEL (moist, plastic) w=9.1% | 1 |
| 9 | | | | | | | 10.0 | | |
| 10 | | 6 | 10.0 | 10.3 | SS | 100/3" | 10.3 | Grey f STONE Chips w=1.4% | 2 |
| 11 | | | | | | | | Boring terminated at 10.3 feet. | |
| 12 | | | | | | | | Notes: Borehole backfilled with on-site soils. | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Neil Kenny; Mark Childs

Inspector:

ATL-LOG1 CD3099 AUBERTINE & CURRIER.GPJ LOG-WELL.GDT 3/11/10

# ATLANTIC TESTING LABORATORIES, Limited

## Subsurface Investigation

Report No.: CD3099E-01-03-10

Client: Aubertine and Currier

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Building

Proposed Indoor Range - PN 71727 AWMF 1BCT

Fort Drum, New York

Start Date: 2/24/2010 Finish Date: 2/24/2010

Boring No.: B-2 Sheet 1 of 1

Groundwater Observations

| Date | Time | Depth | Casing |
|---|---|---|---|
| 2/24/2010 | 5:30 PM | DRY | 5.0' |

Coordinates

Northing 1481159.2

Easting 1029492.9

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 587.6

Boring Advance By: 4 1/4" Auger

Borehole caved at 4.6 feet.

| DEPTH | METHOD OF ADVANCE | SAMPLE NO. | DEPTH OF SAMPLE From | DEPTH OF SAMPLE To | SAMPLE TYPE | BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER | DEPTH OF CHANGE | CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%) | Recovery (Inches) |
|---|---|---|---|---|---|---|---|---|---|
| | AUGER | 1 | 0.0 | 2.0 | SS | 2 2 2 2 | 2.0 | Brown SILT; some mf SAND; trace mf GRAVEL; trace ORGANIC MATERIAL (roots, roothairs) (wet, non-plastic) | 10 |
| | | 2 | 2.0 | 4.0 | SS | 8 24 100/5" | | Brown cmf SAND; some SILT; little mf GRAVEL (moist, non-plastic) | 13 |
| | | 3 | 4.0 | 4.4 | SS | 100/5" | 5.0 | Brown cmf SAND; little SILT; trace mf GRAVEL (wet, non-plastic) | 4 |
| | NX CORE | | 5.0 | 10.0 | NX | RUN 1 | 10.0 | Grey LIMESTONE<br>51" or 85% Recovery<br>10 Pieces (39") - 20% Chips and Fragments<br>4 Pieces longer than 4" (28") - RQD=47% | |
| | | | | | | | | Boring terminated at 10.0 feet.<br><br>Notes:<br>Borehole backfilled with on-site soils. | |

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Neil Kenny; Mark Childs

Inspector:

ATL-LOG1 CD3099 AUBERTINE & CURRIER.GPJ LOG-WELL.GDT 3/11/10

# ATLANTIC TESTING LABORATORIES, Limited

## Subsurface Investigation

Report No.: CD3099E-01-03-10

Client: Aubertine and Currier

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Building

Proposed Indoor Range - PN 71727 AWMF 1BCT

Fort Drum, New York

Start Date: 2/25/2010 Finish Date: 2/25/2010

Boring No.: B-3 Sheet 1 of 1

Groundwater Observations

| Date | Time | Depth | Casing |
|---|---|---|---|
| 2/25/2010 | 9:00 AM | DRY | 5.3' |

Coordinates

Northing 1481242.6

Easting 1029560.8

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 582.3

Boring Advance By: 4 1/4" Auger

Borehole caved at 5.1 feet.

| DEPTH | METHOD OF ADVANCE | SAMPLE NO. | DEPTH OF SAMPLE From | DEPTH OF SAMPLE To | SAMPLE TYPE | BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER | DEPTH OF CHANGE | CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%) | Recovery (Inches) |
|---|---|---|---|---|---|---|---|---|---|
| | AUGER | 1 | 0.0 | 2.0 | SS | 2 3 4 3 | 0.8 | 10" TOPSOIL & ORGANIC MATERIAL | 11 |
| 1 | | | | | | | | Brown cmf SAND; some SILT; trace f GRAVEL; trace ORGANIC MATERIAL (roots, root hairs) (wet, non-plastic) | |
| 2 | | 2 | 2.0 | 4.0 | SS | 4 8 16 25 | 3.0 | Brown cmf SAND; little SILT; little mf GRAVEL (wet, non-plastic) | 21 |
| 3 | | | | | | | | | |
| 4 | | 3 | 4.0 | 4.7 | SS | 56 100/2" | | Brown cmf GRAVEL; and cmf SAND; little SILT; trace Weathered ROCK (wet, non-plastic) | 6 |
| 5 | | | | | | | 5.3 | | |
| 6 | | | | | | | | Boring terminated at 5.3 feet due to auger refusal on possible bedrock or boulders. | |
| 7 | | | | | | | | Notes: Borehole backfilled with on-site soils. | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Neil Kenny; Mark Childs

Inspector:

ATL-LOG1 CD3099 AUBERTINE & CURRIER.GPJ LOG-WELL.GDT 3/11/10

# ATLANTIC TESTING LABORATORIES, Limited

## Subsurface Investigation

Report No.: CD3099E-01-03-10

Client: Aubertine and Currier

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Building

Proposed Indoor Range - PN 71727 AWMF 1BCT

Fort Drum, New York

Start Date: 2/25/2010 Finish Date: 2/25/2010

Boring No.: B-4 Sheet 1 of 1

Groundwater Observations

| Date | Time | Depth | Casing |
|---|---|---|---|
| 2/25/2010 | 9:40 AM | DRY | 1.8' |

Coordinates
Northing 1481221.3
Easting 1029865.9

Sampler Hammer
Weight: 140 lbs.
Fall: 30 in.
Hammer Type: Automatic

Ground Elev.: 582.3

Boring Advance By: 4 1/4" Auger

| DEPTH | METHOD OF ADVANCE | SAMPLE NO. | DEPTH OF SAMPLE From | DEPTH OF SAMPLE To | SAMPLE TYPE | BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER | DEPTH OF CHANGE | CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%) | Recovery (Inches) |
|---|---|---|---|---|---|---|---|---|---|
| | AUGER | 1 | 0.0 | 1.4 | SS | 2 41 100/5" | 1.0 | Brown cmf SAND; some SILT; little CLAY; little cmf GRAVEL; trace ORGANIC MATERIAL (roothairs) (wet, slightly plastic) | 17 |
| 1 | | | | | | | | | |
| | | 2 | 1.6 | 1.8 | | Auger Cuttings | 1.8 | Grey Fragmented ROCK | |
| 2 | | | | | | | | | |
| | | | | | | | | Boring terminated at 1.8 feet due to auger refusal on possible bedrock or boulders. | |
| 3 | | | | | | | | | |
| | | | | | | | | Notes: Borehole backfilled with on-site soils. | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Neil Kenny; Mark Childs

Inspector:

ATL-LOG1 CD3099 AUBERTINE & CURRIER.GPJ LOG-WELL.GDT 3/11/10

# ATLANTIC TESTING LABORATORIES, Limited

## Subsurface Investigation

Report No.: CD3099E-01-03-10

Client: Aubertine and Currier

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Stormwater Management Area

Proposed Indoor Range - PN 71727 AWMF 1BCT

Fort Drum, New York

Start Date: 2/25/2010 Finish Date: 2/25/2010

Boring No.: B-5 Sheet 1 of 1

Groundwater Observations

| Date | Time | Depth | Casing |
|---|---|---|---|
| 2/25/2010 | 11:00 AM | 1.6' | 8.0' |

Coordinates

Northing 1481331.6

Easting 1029723.9

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 581.1

Boring Advance By: 4 1/4" Auger

| DEPTH | METHOD OF ADVANCE | SAMPLE NO. | DEPTH OF SAMPLE From | DEPTH OF SAMPLE To | SAMPLE TYPE | BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER | DEPTH OF CHANGE | CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%) | Recovery (Inches) |
|---|---|---|---|---|---|---|---|---|---|
| | AUGER | 1 | 0.0 | 2.0 | SS | WOH 1 2 2 | | 13" TOPSOIL & ORGANIC MATERIAL | 13 |
| 1 | | | | | | | 1.1 | Brown SILT; little cmf SAND; little ORGANIC MATERIAL (roothairs, roots, fine organics); trace CLAY (wet, very slightly plastic) | |
| 2 | | 2 | 2.0 | 2.6 | SS | 32 100/1" | 2.0 | Greyish-Brown cmf GRAVEL; some cmf SAND; little SILT; trace ORGANIC MATERIAL (roothairs) (saturated, non-plastic) | 6 |
| 3 | NX CORE | | 3.0 | 8.0 | NX | RUN 1 | 3.0 | Grey LIMESTONE<br>58" or 97% Recovery<br>22 Pieces (56") - 3% Chips and Fragments<br>2 Pieces longer than 4" (13") - RQD=22% | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | 8.0 | Boring terminated at 8.0 feet. | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

Notes:
1. A temporary observation well was installed to a depth of 8 feet.

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Neil Kenny; Mark Childs

Inspector:

ATL-LOG1 CD3099 AUBERTINE & CURRIER.GPJ LOG-WELL.GDT 3/11/10

# ATLANTIC TESTING LABORATORIES, Limited

## Subsurface Investigation

Report No.: CD3099E-01-03-10

Client: Aubertine and Currier

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Parking Lot

Proposed Indoor Range - PN 71727 AWMF 1BCT

Fort Drum, New York

Start Date: 2/25/2010 Finish Date: 2/25/2010

Boring No.: B-6 Sheet 1 of 1

Groundwater Observations

| Date | Time | Depth | Casing |
|---|---|---|---|
| 2/25/2010 | 2:00 PM | DRY | 4.8' |

Coordinates

Northing 1481041.4

Easting 1029503.9

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 596.2

Boring Advance By: 4 1/4" Auger

| DEPTH | METHOD OF ADVANCE | SAMPLE NO. | DEPTH OF SAMPLE From | DEPTH OF SAMPLE To | SAMPLE TYPE | BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER | DEPTH OF CHANGE | CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%) | Recovery (Inches) |
|---|---|---|---|---|---|---|---|---|---|
| | AUGER | 1 | 0.0 | 2.0 | SS | 2 10 100/5" | 0.3 | 4" TOPSOIL & ORGANIC MATERIAL | 16 |
| 1 | | | | | | | 1.5 | Brown c-mf+ SAND; and SILT; little cmf SAND; trace CLAY; trace f GRAVEL; trace ORGANIC MATERIAL (roothairs) (wet, very slightly plastic) w=45.9% | |
| 2 | | 2 | 2.0 | 2.9 | SS | 97 100/5" | | Grey Weathered ROCK w=2.2% | 10 |
| 3 | | | | | | | | | |
| 4 | | 3 | 4.0 | 4.2 | SS | 100/2" | | Grey cmf SAND; some mf GRAVEL; little SILT (moist, non-plastic) - Weathered Bedrock w=3.4% | 2 |
| 5 | | | | | | | 4.8 | Boring terminated at 4.8 feet due to auger refusal on possible bedrock or boulders. | |
| 6 | | | | | | | | Notes: Borehole backfilled with on-site soils. | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Neil Kenny; Mark Childs

Inspector:

ATL-LOG1 CD3099 AUBERTINE & CURRIER.GPJ LOG-WELL.GDT 3/11/10

# ATLANTIC TESTING LABORATORIES, Limited

## Subsurface Investigation

Report No.: CD3099E-01-03-10

Client: Aubertine and Currier

Boring Location: See Boring Location Plan

Project: Subsurface Investigation

Parking Lot

Proposed Indoor Range - PN 71727 AWMF 1BCT

Fort Drum, New York

Start Date: 2/25/2010 Finish Date: 2/25/2010

Boring No.: B-7 Sheet 1 of 1

Groundwater Observations

| Date | Time | Depth | Casing |
|---|---|---|---|
| 2/25/2010 | 3:30 PM | 4.0' | 4.5' |

Coordinates

Northing 1481123.2

Easting 1029739.3

Sampler Hammer

Weight: 140 lbs.

Fall: 30 in.

Hammer Type: Automatic

Ground Elev.: 685.6

Boring Advance By: 4 1/4" Auger

| DEPTH | METHOD OF ADVANCE | SAMPLE NO. | DEPTH OF SAMPLE From | DEPTH OF SAMPLE To | SAMPLE TYPE | BLOWS ON SAMPLER PER 6" 2" O.D. SAMPLER | DEPTH OF CHANGE | CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%) | Recovery (inches) |
|---|---|---|---|---|---|---|---|---|---|
| | AUGER | 1 | 0.0 | 2.0 | SS | 2 2 2 2 | 1.0 | 12" TOPSOIL & ORGANIC MATERIAL | 13 |
| 1 | | | | | | | 2.5 | Brown SILT; little cmf SAND; trace f GRAVEL; trace ORGANIC MATERIAL (roots, roothairs); trace CLAY (wet, very slightly plastic) | |
| 2 | | 2 | 2.0 | 3.2 | SS | 3 21 100/2" | 4.5 | Brown cmf SAND; some SILT; some mf GRAVEL; trace CLAY; trace ORGANIC MATERIAL (roothairs) (wet, very slightly plastic) | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | Boring terminated at 4.5 feet due to auger refusal on possible bedrock or boulders. | |
| 6 | | | | | | | | Notes: 1. A temporary observation well was installed to a depth of 4.5 feet. | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

SS Split Spoon Sample
NX Rock Core
SH Undisturbed Sample (Shelby Tube)
Estimated Groundwater

Drillers: Neil Kenny; Mark Childs

Inspector:

ATL-LOG1 CD3099 AUBERTINE & CURRIER.GPJ LOG-WELL.GDT 3/11/10

# ATLANTIC TESTING LABORATORIES

## TEST PIT LOG

| | | | |
|---|---|---|---|
| Client: | Aubertine and Currier | Project No.: | CD3099 |
| Project: | Proposed Indoor Range | Test Pit No.: | TP-1 |
| Test Pit Location: | Fort Drum, New York | Date: | 2/26/10 |
| Coordinates: | N 1481278.1 E 1029761.4 | Elevation: | 582.4' |

## GROUNDWATER OBSERVATIONS

| Date | Time | Hole Depth | Water Depth | Water Elevation |
|---|---|---|---|---|
| 2-26-10 | AM | 4.5' | 4.0' | 578.4' |
| | | | | |

## SOIL STRATIGRAPHY

| Sample Number | Depth of Sample From | Depth of Sample To | Depth of Change | CLASSIFICATION OF MATERIALS ('C' COARSE, 'M' MEDIUM, 'F' FINE) ('AND' 35-50%, 'SOME' 20-35%, 'LITTLE' 10-20%, 'TRACE' 0-10%) |
|---|---|---|---|---|
| | | | 0.8 | 7" TOPSOIL and ORGANIC MATERIAL |
| S-1 | 0.8 | 2.4 | 2.4 | Brown SILT; some cmf SAND (moist, slightly plastic) |
| S-2 | 2.4 | 4.5 | 4.5 | Brown SAND; and SILT; trace GRAVEL (wet, slightly plastic) |
| | | | | BEDROCK |
| | | | | Test pit terminated at 4.5 feet due to equipment refusal. |

## NOTES

1. Type of Excavator: Komatsu PC 85
2. Cobbles encountered between 3 and 4.5 feet.
3. Groundwater seepage at 4.0 feet. Test pit caved at 4.0 feet.

ATL Representative: Aaron Woods

ATLANTIC TESTING LABORATORIES

Photographic Log

Test Pit TP-1

Test Pit TP-1

# ATLANTIC TESTING LABORATORIES

## TEST PIT LOG

| | | | |
|---|---|---|---|
| Client: | Aubertine & Currier | Project No.: | CD3099 |
| Project: | Proposed Indoor Range | Test Pit No.: | TP-2 |
| Test Pit Location: | Fort Drum, New York | Date: | 2/26/10 |
| Coordinates: | N 1481072.3 E 1029620.4 | Elevation: | 593.6' |

## GROUNDWATER OBSERVATIONS

| Date | Time | Hole Depth | Water Depth | Water Elevation |
|---|---|---|---|---|
| 2-26-10 | AM | 2.2' | DRY | -- |
| | | | | |

## SOIL STRATIGRAPHY

| Sample Number | Depth of Sample From | Depth of Sample To | Depth of Change | CLASSIFICATION OF MATERIALS ('C' COARSE, 'M' MEDIUM, 'F' FINE) ('AND' 35-50%, 'SOME' 20-35%, 'LITTLE' 10-20%, 'TRACE' 0-10%) |
|---|---|---|---|---|
| | | | 1.0 | 12" TOPSOIL and ORGANIC MATERIAL |
| S-1 | 1.0 | 2.0 | 2.2 | Brown SILT; some cmf SAND (moist, slightly plastic)<br><br>Rock Fragments and Weathered Rock encountered from 1.0 to 2.2 feet. |
| | | | | Bedrock |
| | | | | Test pit terminated at 2.2 feet due to equipment refusal. |

## NOTES

1. Type of Excavator: Komatsu PC 85
2.
3.

ATL Representative: Aaron Woods

# ATLANTIC TESTING LABORATORIES

Photographic Log

Test Pit TP-2

Test Pit TP-2

# *PARTICLE SIZE DISTRIBUTION CURVES*

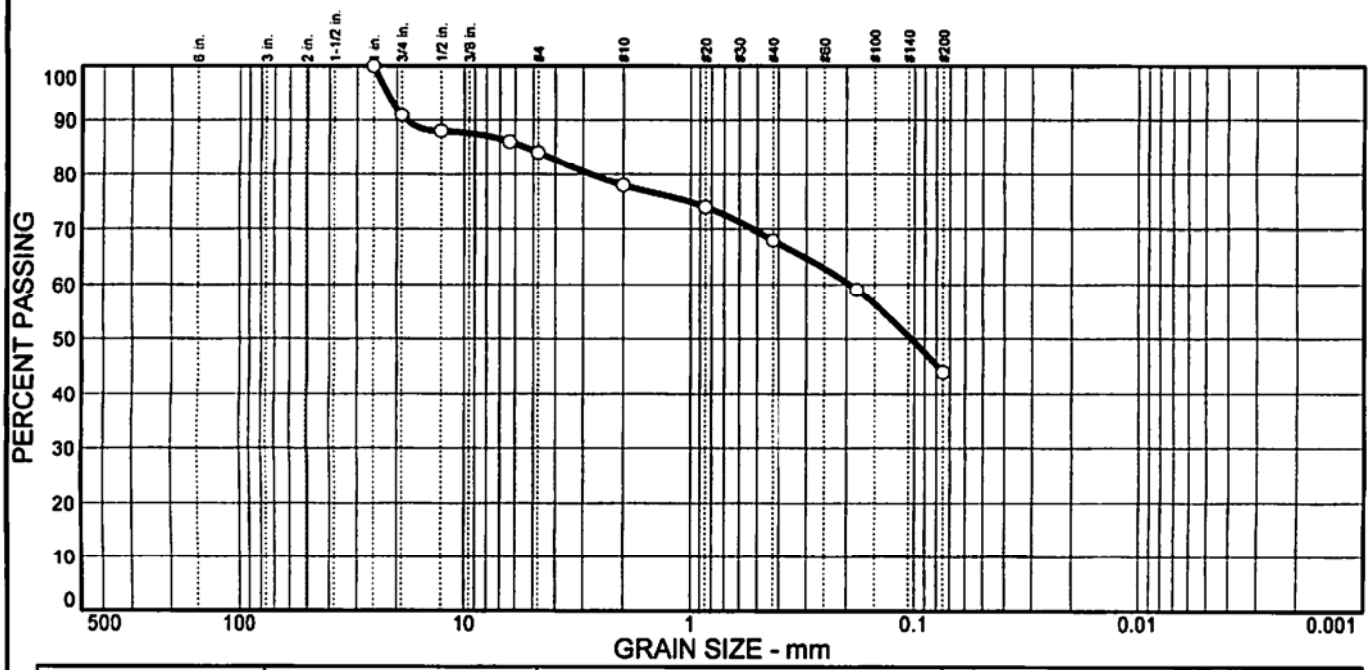
# Particle Size Distribution Report

**Project:** Proposed Indoor Range, Fort Drum, New York **Report No.:** CD3099SL-01-03-10

**Client:** Aubertine and Currier **Date:** 3/5/10

**Sample No:** B-1; S-1 **Source of Sample:** Boring Sample

**Location:** In-Situ **Elev./Depth:** 0.0 - 2.0'




| % COBBLES | % GRAVEL | | % SAND | | | % FINES | |
|---|---|---|---|---|---|---|---|
| | CRS. | FINE | CRS. | MEDIUM | FINE | SILT | CLAY |
| 0 | 9 | 7 | 6 | 10 | 24 | 44 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | OUT OF SPEC. (X) |
|---|---|---|---|
| 1 in. | 100 | | |
| 3/4 in. | 91 | | |
| 1/2 in. | 88 | | |
| 1/4 in. | 86 | | |
| #4 | 84 | | |
| #10 | 78 | | |
| #20 | 74 | | |
| #40 | 68 | | |
| #80 | 59 | | |
| #200 | 44 | | |

**Soil Description**

Brown SILT; and c-mf+ SAND; little mf GRAVEL; trace CLAY

**Atterberg Limits**

PL= -- LL= -- PI= --

**Coefficients**

$D_{85}$= 5.44 $D_{60}$= 0.194 $D_{50}$= 0.103
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Moisture content 17.3%

* (no specification provided)

ATLANTIC TESTING LABORATORIES, LIMITED

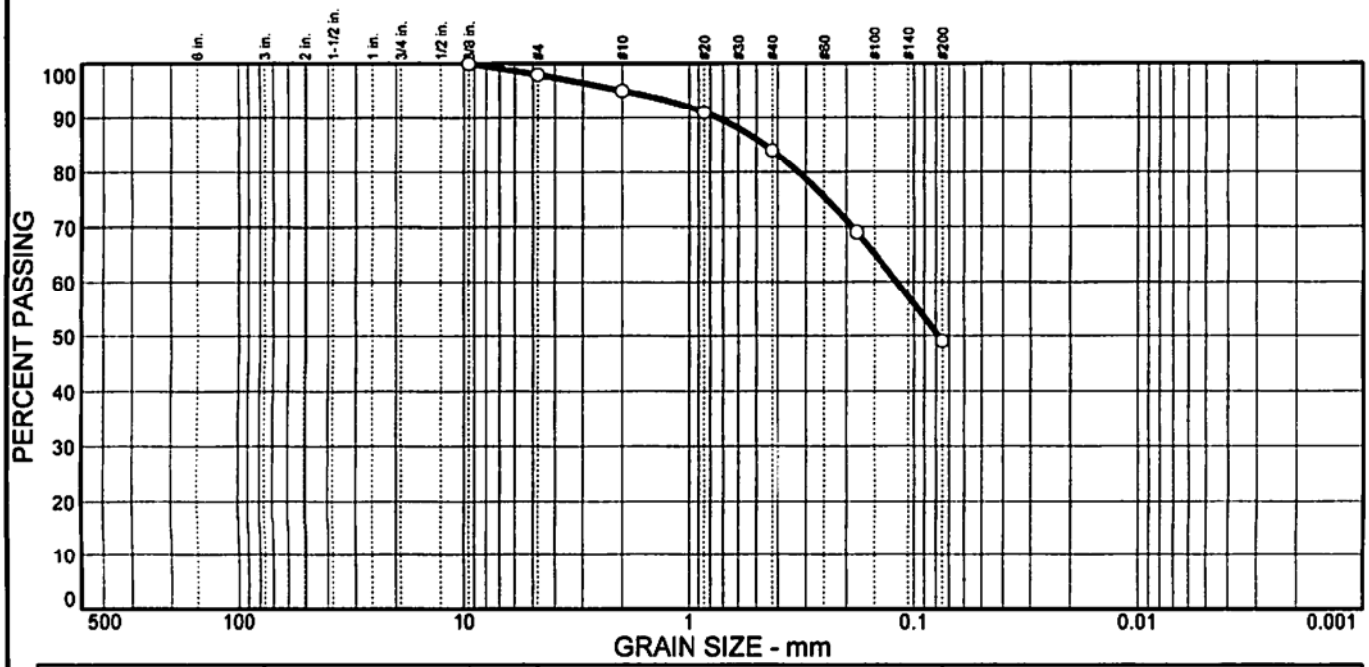
Reviewed by: _____ Date: 3/11/10

# Particle Size Distribution Report

**Project:** Proposed Indoor Range, Fort Drum, New York **Report No.:** CD3099SL-02-03-10

**Client:** Aubertine and Currier **Date:** 3/5/10

**Sample No:** B-6; S-1 **Source of Sample:** Boring Sample
**Location:** In-Situ **Elev./Depth:** 0.0 - 2.0'




| % COBBLES | % GRAVEL | | % SAND | | | % FINES | |
|---|---|---|---|---|---|---|---|
| | CRS. | FINE | CRS. | MEDIUM | FINE | SILT | CLAY |
| 0 | 0 | 2 | 3 | 11 | 35 | 49 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | OUT OF SPEC. (X) |
|---|---|---|---|
| 3/8 in. | 100 | | |
| #4 | 98 | | |
| #10 | 95 | | |
| #20 | 91 | | |
| #40 | 84 | | |
| #80 | 69 | | |
| #200 | 49 | | |

* (no specification provided)

**Soil Description**

Brown c-mf+ SAND; and SILT; trace CLAY; trace f GRAVEL; trace ORGANICS

**Atterberg Limits**

PL= -- LL= -- PI= --

**Coefficients**

$D_{85}$= 0.459 $D_{60}$= 0.120 $D_{50}$= 0.0782
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Moisture content 45.9%

**ATLANTIC TESTING LABORATORIES, LIMITED**

Reviewed by: _____ Date: 3/11/10

# List of Drawings

1. A-100 – Floor Plan
2. C-001 – Site Plan
3. C-100 – WQv Treatment Design
4. C-101 – Drainage Details

# APPENDIX C
## Utility Connections

Not Used

| | |
|---|---|
| **Project Number: 2010-018** | **Date: 03/03/2010** |
| **Project Name: Indoor Range TO #0003** | **Page: 1 of 1** |
| **Location: Fort Drum** | **Calc'd By: TFT** |

Flow Test Information for: All Weather Marksmanship Facility 1BCT (PN71727)
Conducted on March 3, 2010 at 4th Armored Division Drive and Tigris River Valley Drive.

Test No.'s; Test #1 Test #2 Test #3 Test #4

Telemetry Data for the testing period of 09:45 am to 10:45 am provided by Jesse Rice, Fort Drum, Public Works

North Post Tank #3 Bottom Elevation=604.00'
Min. Operating Elev.=725.00'
Max. Operating Elev.=745.00'

TANK #3 WATER ELEVATION

Bottom Elev=604.00'

| TIME | HEIGHT (ft) | WATER ELEVATION (ft) |
|---|---|---|
| 9:44AM | 136.7 | 740.7 |
| 9:49AM | 136.7 | 740.7 |
| 9:54AM | 136.6 | 740.6 |
| 9:59AM | 136.6 | 740.6 |
| 10:04AM | 136.7 | 740.7 |
| 10:09AM | 136.5 | 740.5 |
| 10:14AM | 136.7 | 740.7 |
| 10:19AM | 136.9 | 740.9 |
| 10:24AM | 137.0 | 741.0 |
| 10:29AM | 136.4 | 740.4 |
| 10:34AM | 136.8 | 740.8 |
| 10:39AM | 136.9 | 740.9 |
| 10:44AM | 136.7 | 740.7 |

Fire Hydrants: FH 10200-2 and FH 10300-4
Make: US Pipe with (1) 4 ½", and (2) 2 ½" with smooth radius discharge outlets, Discharge Coefficient (C=1.0)
FH 10300-1, FH 10300-2, FH 10300-3 and FH 10200-1
Make: Kennedy with (1) 4 ½", and (2) 2 ½" with smooth radius discharge outlets, Discharge Coefficient (C=1.0)

Metering Devices: P669 Pollard Hydrant Flow Gauge(s)
(Calibrated with a 0.9 friction coefficient for an inlet with a smooth radius 2.5" hose nozzle. Resulting flow gauge readings require a coefficient of 1.0 for smooth radius inlets, 0.77 for raised square lip inlets, 0.88 for sharp square lip inlets and 1.10 for open end pipe.)
P670 Pollard Fire Hydrant Gauge

# HYDRANT FLOW TEST REPORT #1

Location Tigris River Valley Road / 4th Armored Div. Dr., Fort Drum  Date 03/03/2010

Test made by Tim Titus & James Currier  Time 9:55 AM

Representative of Aubertine and Currier Architects, Engineers & Land Surveyors, PLLC

Witness Jim Sadler, Fire Department  Doug Ward & Tom Davis, PW

Purpose of Test Indoor Range Site Investigation PN 71727

Consumption rate during test 2,080 gpm

If pumps affected test, indicate pumps operating n/a

| | FH 10300-1 | FH 10300-3 | | | |
|---|---|---|---|---|---|
| Flow Hydrants | $A_1$ | $A_2$ | $A_3$ | $A_4$ | |
| Elevation | 577.0 | 581.0 | | | |
| Size Nozzle | 2 1/2" | 2 1/2" | | | |
| Pitot Reading | 920 | 1,160 | | | |
| Discharge Coefficient | 1.0 | 1.0 | | | TOTAL GPM |
| gpm | 920 | 1,160 | | | 2,080 |

FH 10300-2
Static B 65 psi  Residual B 64 psi

Elevation 578.0 ft

Projected results: @20 psi residual _____ gpm or @ _____ psi residual _____ gpm

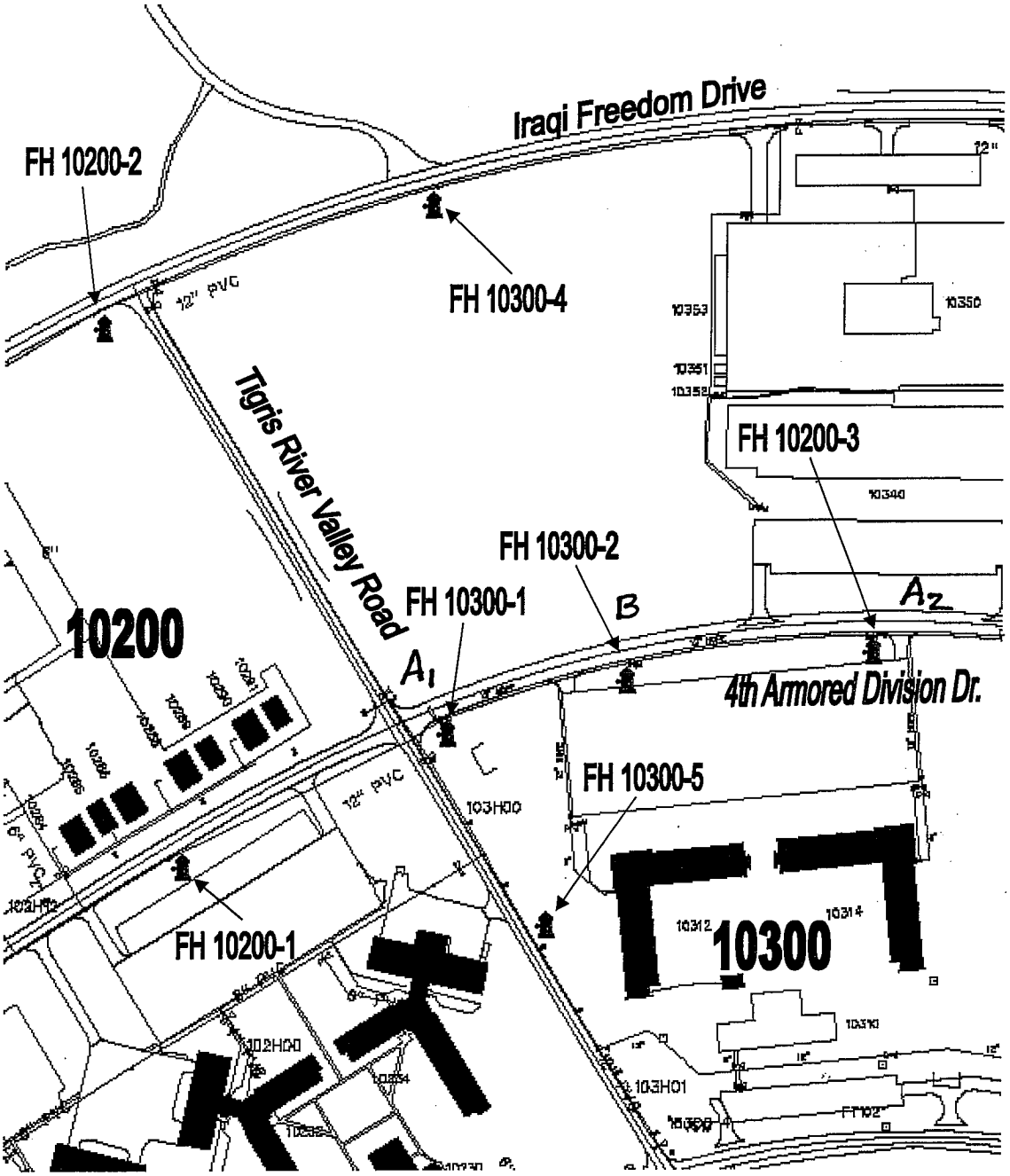
Remarks: See Sketch. Smooth radius outlets on all hydrants. All hydrants off 4th Armored Division Drive 12" main.

See alternate test location due to minimal system pressure drop during test, results inaccurate.

Location map: Show sizes and distances to next cross-connected line. Show valves and hydrant branch size. Indicate north. Show flowing hydrants and label as **$A_1$**, **$A_2$**, **$A_3$**, **$A_4$**. Show location of static and residual and label as **B**.

Indicate **B**: Hydrant ☒ _____  Sprinkler ☐ _____  Other (identify) ☐ _____

# FIRE FLOW LOCATION MAP



# HYDRANT FLOW TEST REPORT #2

Location Tigris River Valley Road / 4th Armored Div. Dr., Fort Drum

Date 03/03/2010

Test made by Tim Titus & James Currier

Time 10:05 AM

Representative of Aubertine and Currier Architects, Engineers & Land Surveyors, PLLC

Witness Jim Sadler, Fire Department  Doug Ward & Tom Davis, PW

Purpose of Test Indoor Range Site Investigation PN 71727

Consumption rate during test 3,510 gpm

If pumps affected test, indicate pumps operating n/a

| | FH 10300-5 | FH 10300-4 | FH 10300-2 | | |
|---|---|---|---|---|---|
| Flow Hydrants | $A_1$ | $A_2$ | $A_3$ | $A_4$ | |
| Elevation | 601.0 | 564.5 | 578.0 | | |
| Size Nozzle | 2 1/2" | 2 1/2" | 2 1/2" | | |
| Pitot Reading | 1,060 | 1,230 | 1,220 | | |
| Discharge Coefficient | 1.0 | 1.0 | 1.0 | | TOTAL GPM |
| gpm | 1,060 | 1,230 | 1,220 | | 3,510 |

FH 10300-1
Static B 63 psi  Residual B 60 psi

Elevation 577.0 ft

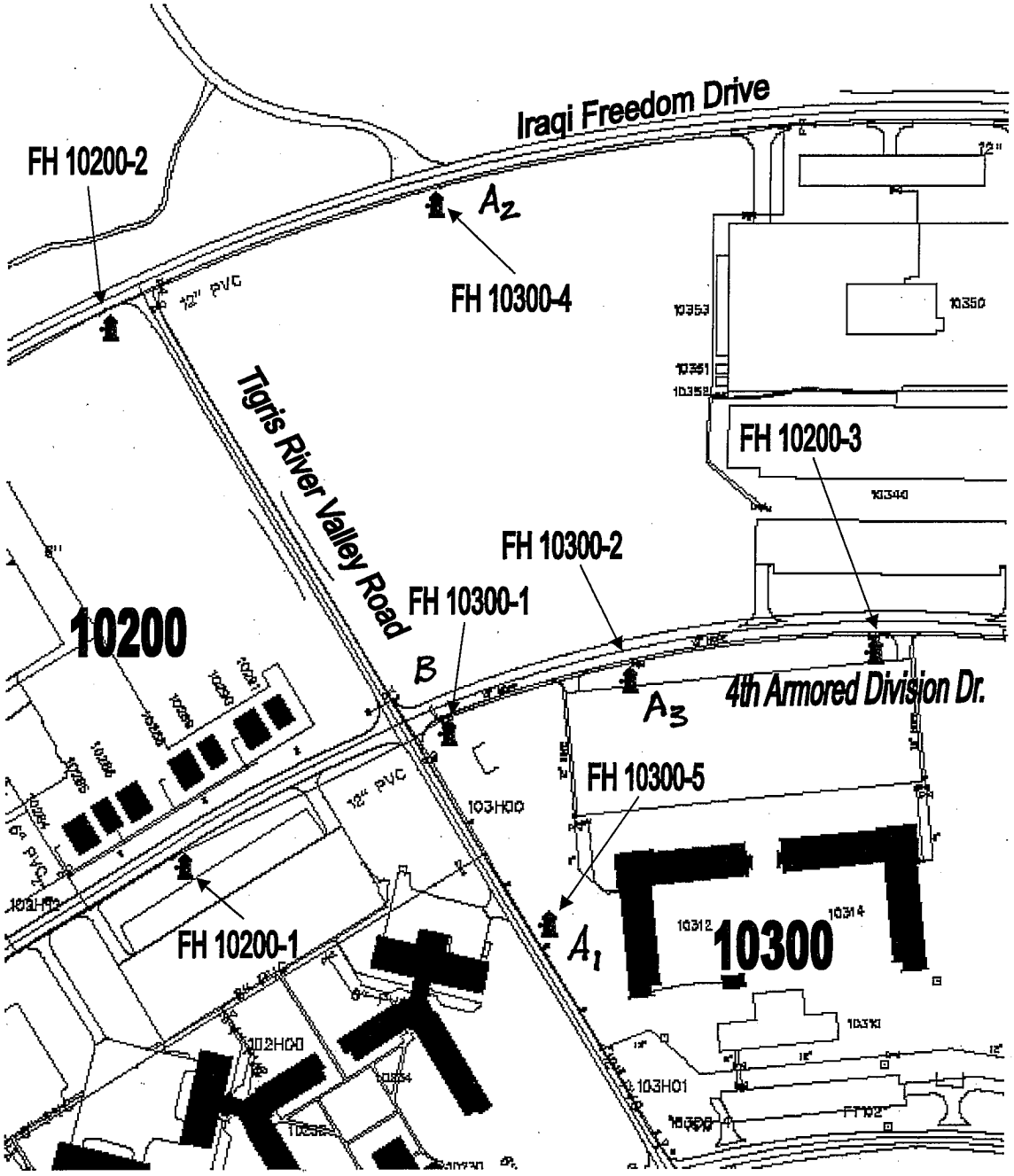
Projected results: @20 psi residual _____ gpm or @ _____ psi residual _____ gpm

Remarks: See Sketch. Smooth radius outlets on all hydrants. Only one 2.5"nozzle open on each of the three flow hydrants. Insufficient pressure drop for accurate flow projection. Flow hydrant 10300-5 would not shut down. Test location had to be revised.

Location map: Show sizes and distances to next cross-connected line. Show valves and hydrant branch size. Indicate north. Show flowing hydrants and label as **$A_1$**, **$A_2$**, **$A_3$**, **$A_4$**. Show location of static and residual and label as **B**.

Indicate **B**: Hydrant ☒ _____  Sprinkler ☐ _____  Other (identify) ☐ _____

# FIRE FLOW LOCATION MAP



# HYDRANT FLOW TEST REPORT #3

Location Tigris River Valley Road / 4th Armored Div. Dr., Fort Drum

Date 03/03/2010

Test made by Tim Titus & James Currier

Time 10:25 AM

Representative of Aubertine and Currier Architects, Engineers & Land Surveyors, PLLC

Witness Jim Sadler, Fire Department Doug Ward & Tom Davis, PW

Purpose of Test Indoor Range Site Investigation PN 71727

Consumption rate during test 3,750 gpm

If pumps affected test, indicate pumps operating n/a

| | FH 10200-1 | FH 10300-4 | FH 10300-1 | | |
|---|---|---|---|---|---|
| Flow Hydrants | $A_1$ | $A_2$ | $A_3$ | $A_4$ | |
| Elevation | 573.0 | 564.5 | 577.0 | | |
| Size Nozzle | 2 1/2" | 2 1/2" | 2 1/2" | | |
| Pitot Reading | 1,260 | 1,240 | 1,250 | | |
| Discharge Coefficient | 1.0 | 1.0 | 1.0 | | TOTAL GPM |
| gpm | 1,260 | 1240 | 1,250 | | 3,750 |

FH 10200-2
Static B 72 psi Residual B 69 psi

Elevation 560.5 ft

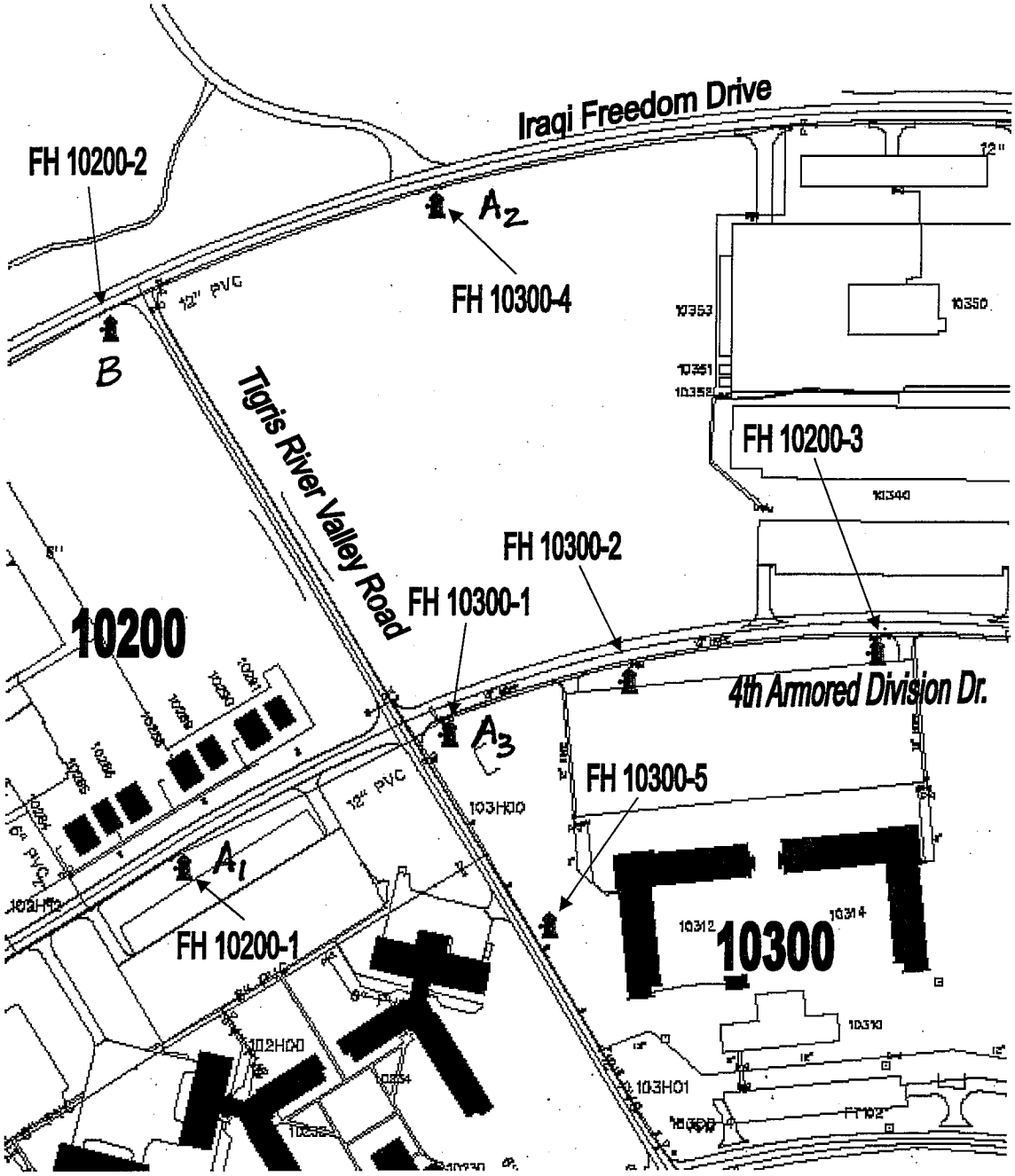
Projected results: @20 psi residual _____ gpm or @ _____ psi residual _____ gpm

Remarks: See Sketch. Smooth radius outlets on all hydrants. Only one 2.5" nozzle open on each of the three flow hydrants. Insufficient pressure drop for accurate flow projection.

Location map: Show sizes and distances to next cross-connected line. Show valves and hydrant branch size. Indicate north. Show flowing hydrants and label as **$A_1$**, **$A_2$**, **$A_3$**, **$A_4$**. Show location of static and residual and label as **B**.

Indicate **B**: Hydrant ☒ Sprinkler ☐ Other (identify) ☐

# FIRE FLOW LOCATION MAP



# HYDRANT FLOW TEST REPORT #4

Location Tigris River Valley Road / 4th Armored Div. Dr., Fort Drum

Date 03/03/2010

Test made by Tim Titus & James Currier

Time 10:45 AM

Representative of Aubertine and Currier Architects, Engineers & Land Surveyors, PLLC

Witness Jim Sadler, Fire Department Doug Ward & Tom Davis, PW

Purpose of Test Indoor Range Site Investigation PN 71727

Consumption rate during test 6,540 gpm

If pumps affected test, indicate pumps operating n/a

| | FH 10200-1 | FH 10300-4 | FH 10300-1 | | |
|---|---|---|---|---|---|
| Flow Hydrants | $A_1$ | $A_2$ | $A_3$ | $A_4$ | |
| Elevation | 573.0 | 564.5 | 577.0 | | |
| Size Nozzle | (2) 2 1/2" | (2) 2 1/2" | (2) 2 1/2" | | |
| Pitot Reading | 1,160 | 1,010 | 1,100 | | |
| Discharge Coefficient | 1.0 | 1.0 | 1.0 | | TOTAL GPM |
| gpm | 2,320 | 2,020 | 2,200 | | 6,540 |

FH 10200-2
Static B 74 psi Residual B 65 psi

Elevation 560.5 ft

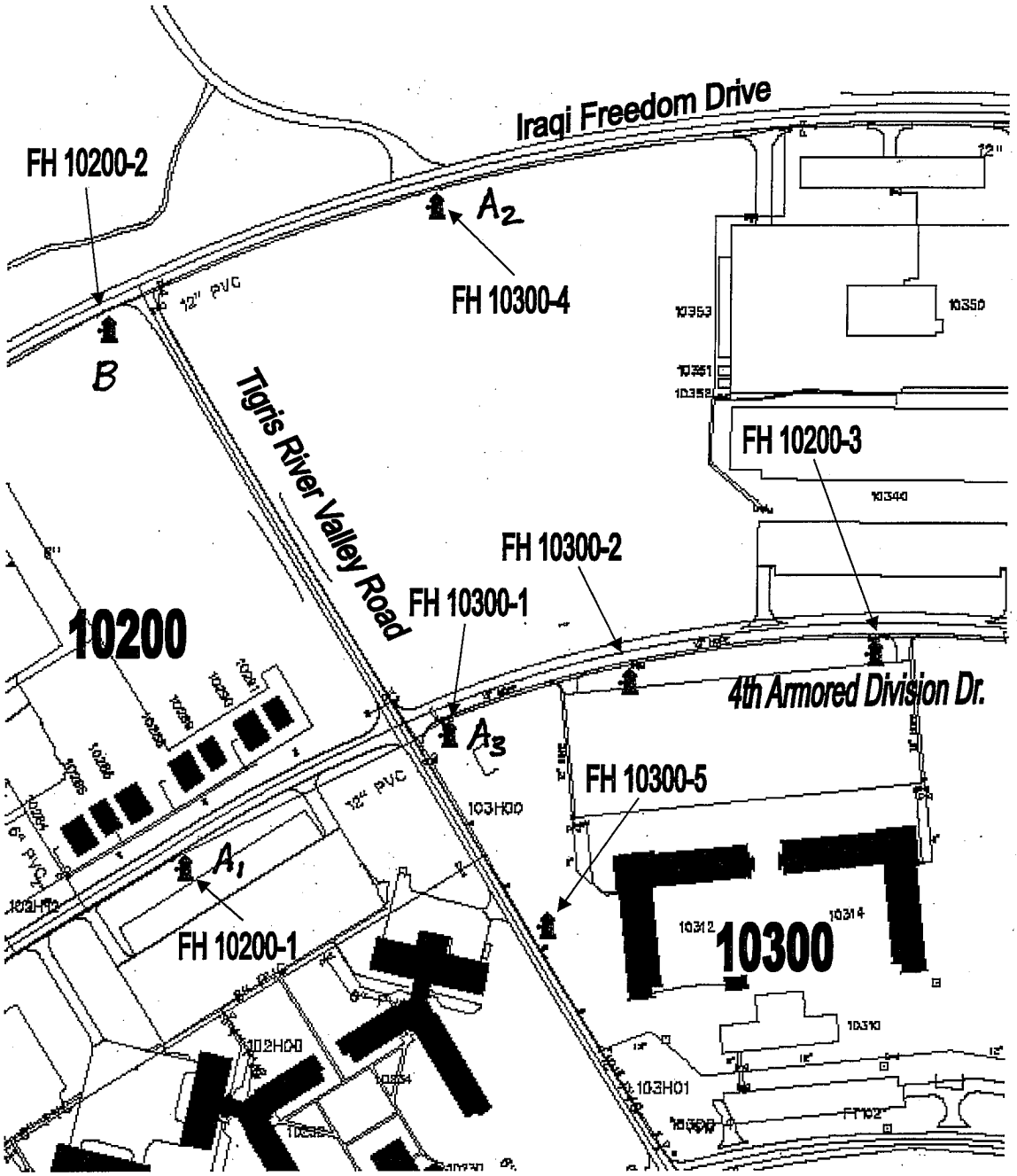
Projected results: @20 psi residual 17,460 gpm or @ _____ psi residual _____ gpm

Remarks: See Sketch. Smooth radius outlets on all hydrants. Opened both 2 1/2 outlets on each hydrant to increase flow and resulting pressure drop. Ideal pressure drop would be 10 psi, 9 psi results were deemed sufficient due to extremely strong systems strength and resulting flow values well above those required by the Indoor Range.

Location map: Show sizes and distances to next cross-connected line. Show valves and hydrant branch size. Indicate north. Show flowing hydrants and label as **A**$_1$, **A**$_2$, **A**$_3$, **A**$_4$. Show location of static and residual and label as **B**.

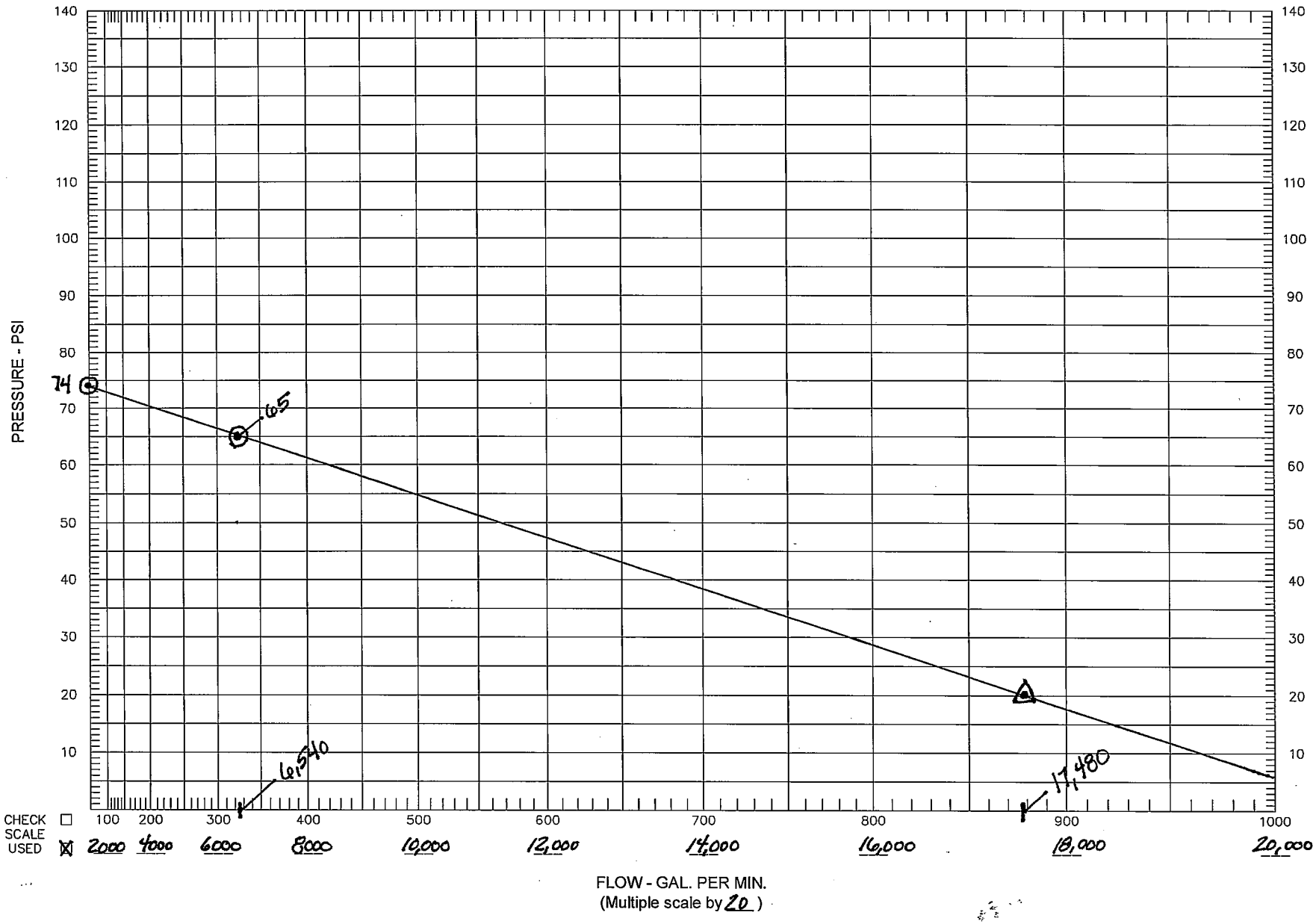
Indicate **B**: Hydrant ☒ Sprinkler ☐ Other (identify) ☐

# FIRE FLOW LOCATION MAP



AUBERTINE and CURRIER
ARCHITECTS, ENGINEERS & LAND SURVEYORS, PLLC
522 Bradley Street
Watertown, NY 13601
Phone: 315-782-2005
Fax: 315-782-1472
Web: www.aubertinecurrier.com

Project No. 2010 - 018
Project Name. INDOOR RANGE SITE INVESTIGATION
Date 3/3/2010 Time 10:45AM
Hydrant Test #4



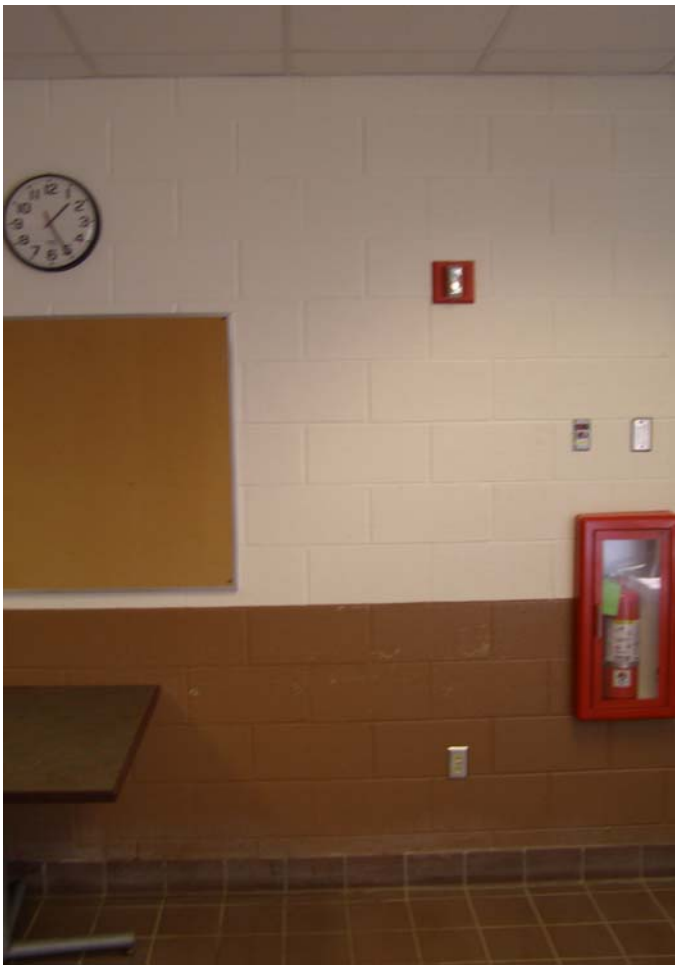
# APPENDIX E
# Environmental Information

Not Used

# Photos of Existing Indoor Range, Fort Drum

Contractor shall match the theme of the existing facility.

4



OFFICE - #104
ARMOR CLASS - #107B
REPORTING DESK

10th MOUNTAIN DIVISION
COMET
UNIT ARMORERS COURSE

# APPENDIX G
# GIS Data

Not Used

## 8.5 Signage

### *Building Numbers*

Building numbers are to be used on all installation buildings. The numbers can be individually pin-mounted to the building, or can be mounted on a metal plate that is fastened to the structure. The method used would be based upon the mounting surface and would need to be approved by Public Works.

All buildings numbers within an area should show a consistent appearance. The normal font is Helvetica with an aluminum finish. If the numbers are to be mounted on a metal plate, the metal plate should be finished to match the color of the adjacent building finish upon which it will be mounted.

- **Size**
  The size of the building numbers is determined by the distance from the primary street or main flow of traffic:

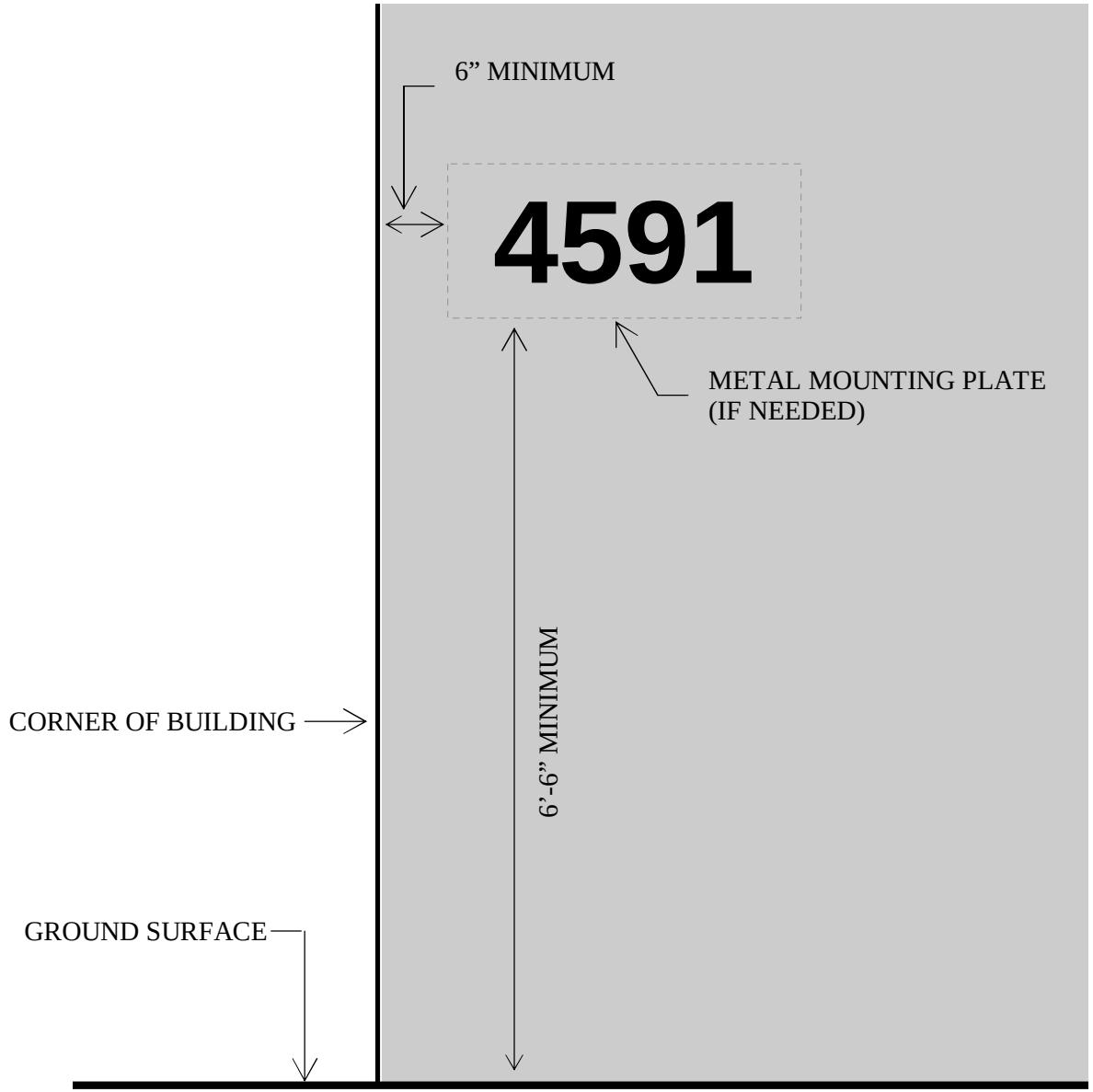
  Less than 35' - 8" high numbers

  35' or greater - 12" high numbers

- **Mounting Height**
  Building numbers are to be mounted a minimum of 6'-6" from the ground surface. The numbers can be mounted higher if they will be reasonably blocked from view by other site or building objects, or use of the facility dictates the numbers to be mounted higher. The government project manager will need to approve the mounting height suggested by the contractor.

- **Locations**
  Building numbers are to be mounted on two separate vertical faces of the building. Typically this will be the corner facing the primary street or main flow of traffic.

**FIGURE 8-5c** Building Numbers



# APPENDIX I
## Acceptable Plants List

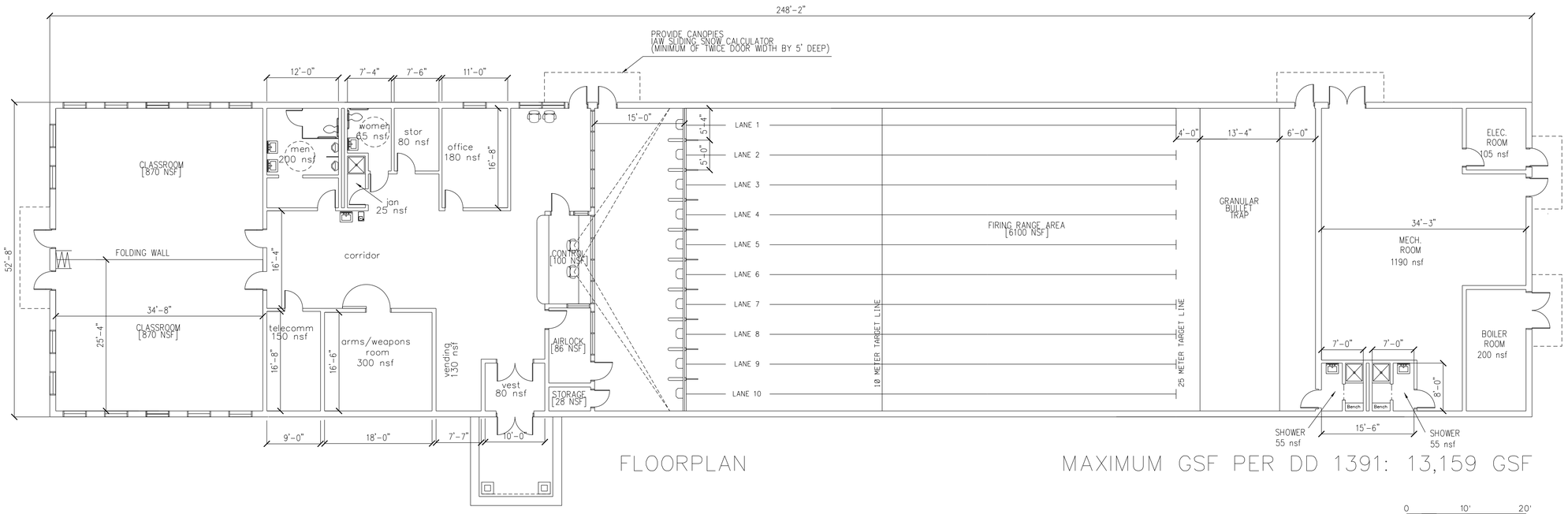
Not Used

# APPENDIX J

1. A-100 – Floor Plan
2. C-001 – Site Plan
3. C-100 – WQv Treatment Design
4. C-101 – Drainage Details

MAY 2009 NYD BORDER

Section:

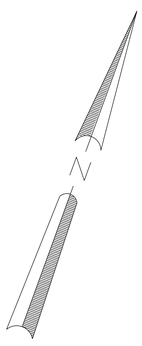


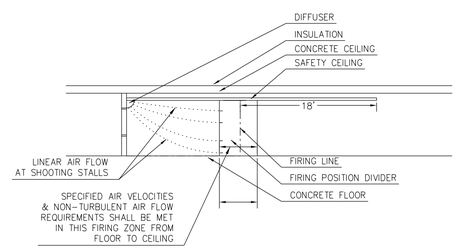

FLOORPLAN

MAXIMUM GSF PER DD 1391: 13,159 GSF

0 10' 20'

SCALE: 1"= 10'






RANGE FIRING POSITION SECTION

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0 1"
THIS BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

US Army Corps
of Engineers
New York District

| MARK | DESCRIPTION | DATE | APPR. | MARK | DESCRIPTION | DATE | APPR. |
|---|---|---|---|---|---|---|---|

U. S. ARMY ENGINEER DISTRICT
NEW YORK
http://www.nan.usace.army.mil

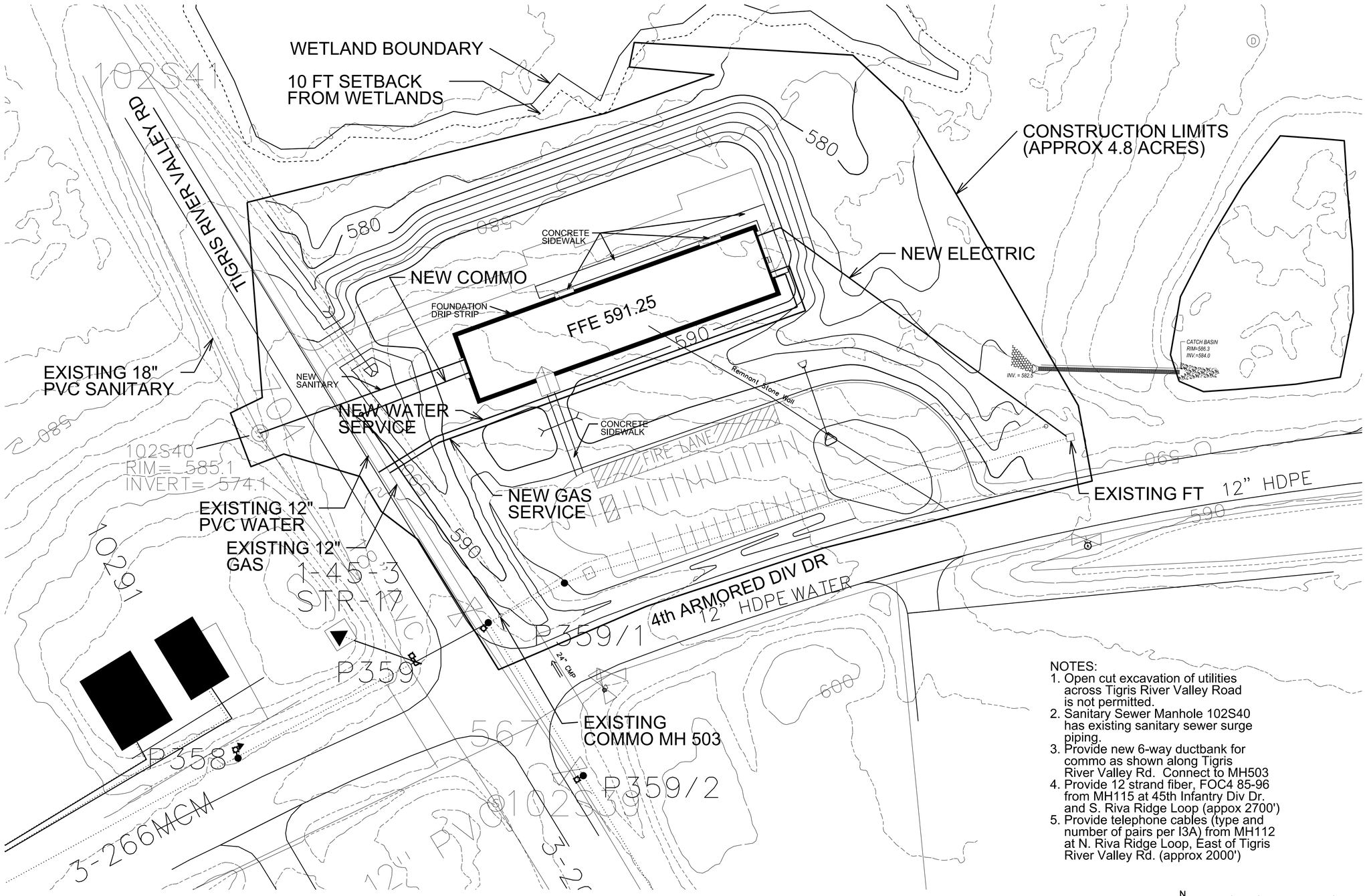
DESIGNED BY: | DATE: 30 JUN 2010
DWN BY: | CKD BY: | SOLICITATION NO.:
SUBMITTED BY: | CONTRACT NO.:
FILE NAME: $IP_SHORT_DESIGN$
SIZE: ANSI D | PLOTTED BY: | PLOT DATE:

FY10 PN 71727
INDOOR BAFFLE RANGE
FORT DRUM, NY

FLOOPLAN

SHEET
REFERENCE
NUMBER
A-100

MAY 2009 NYD BORDER




NOTES:
1. Open cut excavation of utilities across Tigris River Valley Road is not permitted.
2. Sanitary Sewer Manhole 102S40 has existing sanitary sewer surge piping.
3. Provide new 6-way ductbank for commo as shown along Tigris River Valley Rd. Connect to MH503
4. Provide 12 strand fiber, FOC4 85-96 from MH115 at 45th Infantry Div Dr. and S. Riva Ridge Loop (appox 2700')
5. Provide telephone cables (type and number of pairs per I3A) from MH112 at N. Riva Ridge Loop, East of Tigris River Valley Rd. (approx 2000')

N

40' 20' 0 40'

SCALE: 1'' = 40'-0"

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New York District

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DESIGNED BY: | DATE: 7 JUL 2010
DWN BY: | CKD BY: | SOLICITATION NO.:
SUBMITTED BY: X. X. X. | CONTRACT NO.:
FILE NAME: $IP_SHORT_DESIGN$ | PLOT DATE: $$YTIME$
SIZE: ANSI D | PLOTTED BY: $USERNAME$

U. S. ARMY ENGINEER DISTRICT
NEW YORK
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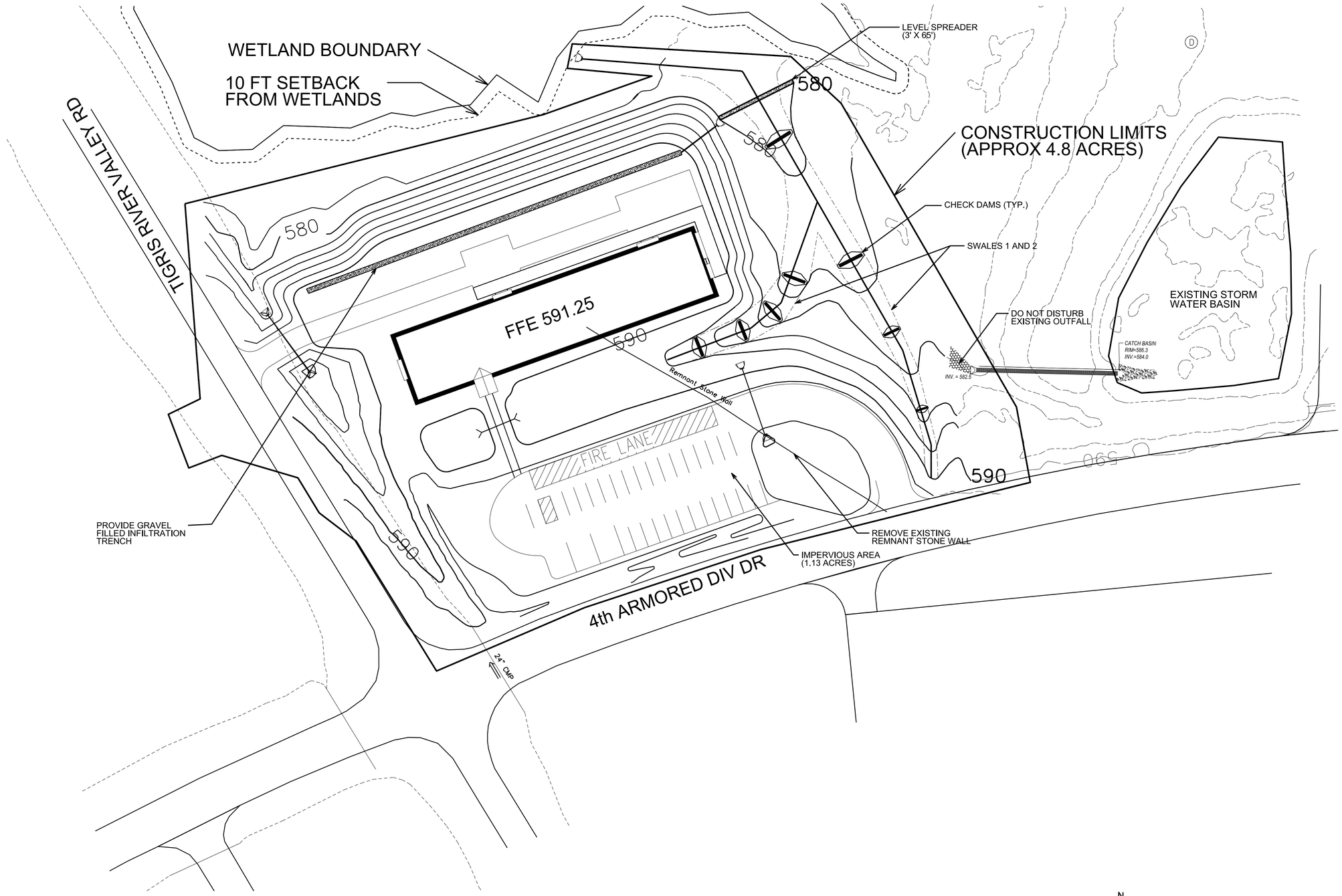
FY10 PN 71727
INDOOR BAFFLE RANGE
FORT DRUM, NY

SITE PLAN

SHEET REFERENCE NUMBER
C-001

MAY 2009 NYD BORDER




N

40' 20' 0 40'

SCALE: 1'' = 40'-0"

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New York District

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|---|---|---|---|---|---|---|---|

U. S. ARMY ENGINEER DISTRICT
NEW YORK
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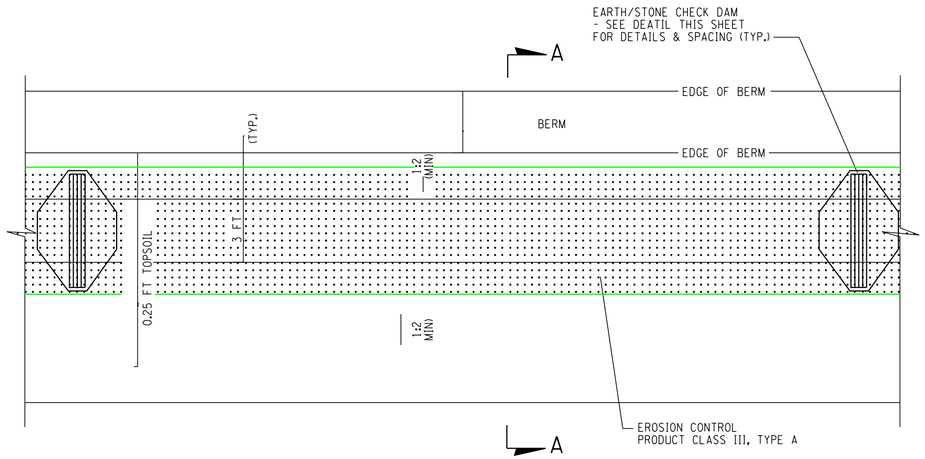
DESIGNED BY: | DATE: 30 JUN 2010
DWN BY: | CKD BY: | SOLICITATION NO.:
SUBMITTED BY: X. X. X. | CONTRACT NO.:
FILE NAME: $IP_SHORT_DESIGN$
SIZE: ANSI D | PLOTTED BY: $USERNAME$ | PLOT DATE: $SYTIME$

FY10 PN 71727
INDOOR BAFFLE RANGE
FORT DRUM, NY

WQv TREATMENT DESIGN

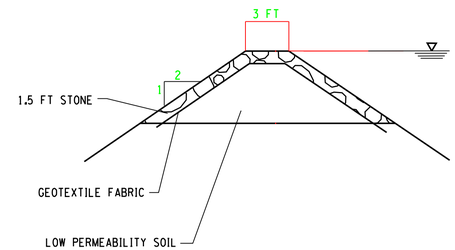
SHEET REFERENCE NUMBER
C-100




DRY SWALE (O-1) PLAN

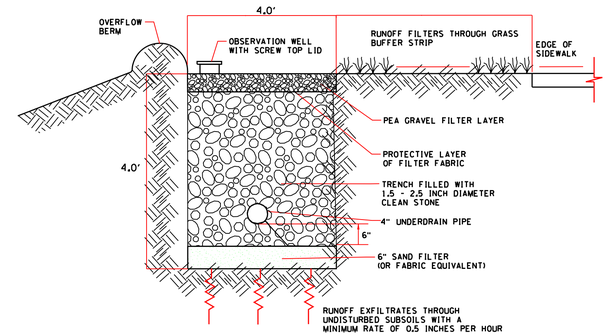
SCALE: NONE

| SWALE OVERFLOW SPILLWAY SPACING | |
|---|---|
| SWALE | SPACING (FT) |
| 1 | 64.0 |
| 2 | 22.0 |



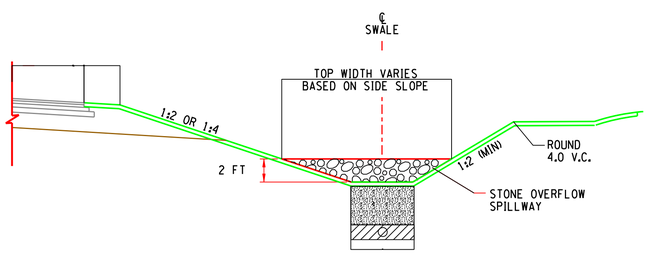

STONE CHECK DAM DETAIL

SCALE: NONE




INFILTRATION TRENCH DETAIL ADJACENT TO BUILDING AND SIDEWALK

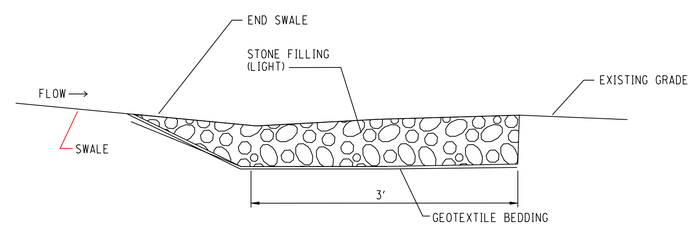
SCALE: NONE



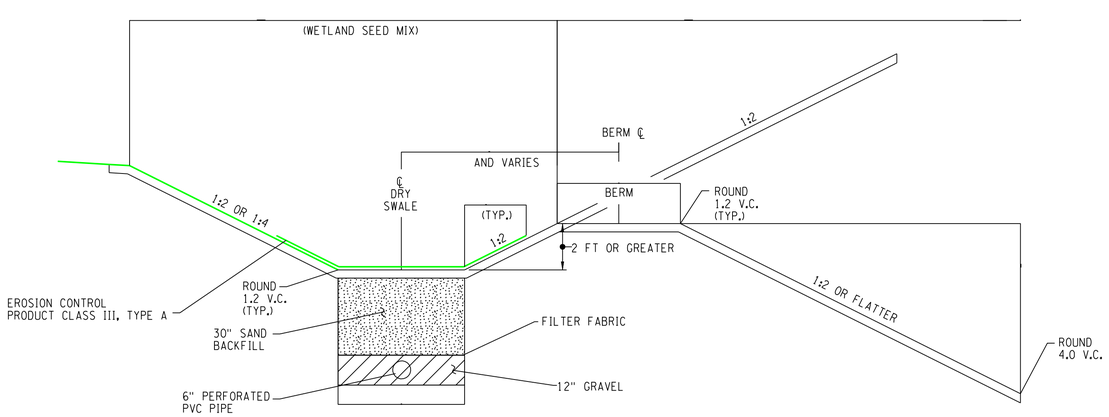

SECTION A-A
STONE OVERFLOW SPILLWAY

SCALE: NONE

| SWALE DIMENSIONS | | | | |
|---|---|---|---|---|
| SWALE | BOTTOM WIDTH (FT) | TOP WIDTH (FT) | LENGTH (FT) | SIDE SLOPES (FT/FT) |
| 1 | 8.0 | 20.0 | 270 | 1:3 |
| 2 | 3.0 | 10.0 | 140 | 1:3 |

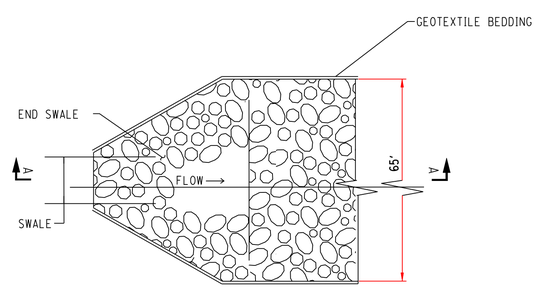



SECTION A-A




SECTION A-A
DRY SWALE (O-1) TYPICAL SECTION

SCALE: NONE




PLAN VIEW

STONE LINED APRON FOR SWALE OUTLET

SCALE: NONE

US Army Corps of Engineers New York District

| Revisions | | | |
|---|---|---|---|
| Symbol | No. | Description | Date | Approved |

Designed By: BJC,MCO,LMW
Date: 2/19/2010
Drawn By: NEG
File No.
Checked By: BJC,MCO
I.S.O. Sheet File Name:
Reviewed By: MDP
Solicitation Number: PN 693347

UNITED STATES ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT

Engineering and Land Surveying, P.C.
1533 Crescent Road - Clifton Park, NY 12065

FORT DRUM, NY
FORT DRUM PLEASANT CREEK WEST
FY 2010 SWPPP

DRAINAGE DETAILS

Sheet Identification
C-101

FILE NAME = DGN$SPEC0123456789012345678901234567890123456789012345678901234
DATE/TIME = $DATE$ $TIME$
USER = DGN$USERNAME

# APPENDIX K
## Fuel Cost Information

The following utility rates for this installation are provided for design

**Electrical:**
Demand Charge - $6.55 per kilowatt

Energy Charge - $ 0.0859 per kilowatt-hour Blended Rate - $ 0.0963 per kilowatt-hour (blended annual energy and demand cost)

**Natural Gas:**
Commodity Charge Rate - $ 10.04 per thousand cubic feet

**Water:**
Commodity Charge Rate - $2.06 per 1,000 gallon

**Sewer**:
Commodity Charge Rate - $3.06 per 1,000 gallon

**Purchased/Central Steam:**
Commodity Charge Rate – n/a

**Purchased High Temperature Water:**
Commodity Charge Rate – n/a

**Purchased Chilled Water:**
Commodity Charge Rate – n/a

# 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 | | |
| | | | | |
| **WATER EFFICIENCY** | | | | |
| WEPR1 | Water Use Reduction (Version 3 only) | Rqd | Rqd | All LEED prerequisites are required to be met. |
| WE1.1 | Water Efficient Landscaping: Reduce by 50% | Pref | | See paragraph IRRIGATION. Project must include landscaping to be eligible for this credit. |
| WE1.2 | Water Efficient Landscaping: No Potable Water Use or No Irrigation | Pref | | Project must include landscaping to be eligible for this credit. |
| WE2 | Innovative Wastewater Technologies - OPTION 1 | | | |
| WE2 | Innovative Wastewater Technologies - OPTION 2 | | | |
| WE3 | Water Use Reduction | Pref | | See paragraph BUILDING WATER USE REDUCTION. |
| | | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| **ENERGY AND ATMOSPHERE** | | | | |
| EAPR1 | Fundamental Commissioning of the Building Energy Systems (PREREQUISITE) | Rqd | Rqd | All LEED prerequisites are required to be met. |
| EAPR2 | Minimum Energy Performance (PREREQUISITE) | Rqd | Rqd | All LEED prerequisites are required to be met. |
| EAPR3 | Fundamental Refrigerant Management (PREREQUISITE) | Rqd | Rqd | All LEED prerequisites are required to be met. |
| EA1 | Optimize Energy Performance | Rqd | 1 | Earning of LEED EA1 points as indicated in paragraph ENERGY CONSERVATION, as a minimum, is required. |
| EA2.1 | On-Site Renewable Energy | Pref | | See paragraph ENERGY CONSERVATION. |
| EA3 | Enhanced Commissioning | Rqd | | See paragraph COMMISSIONING. The Commissioning Authority may be provided through the Design-Build Contractor only if in accordance with USGBC Credit Interpretation Ruling (CIR) dated 9/15/06. Commissioning Authority activities begin during design phase and continue well beyond beneficial occupancy. Assume Government will not provide CxA post-occupancy activities unless indicated otherwise. |
| EA4 | Enhanced Refrigerant Management | | | |
| EA5 | Measurement & Verification | | | Assume Government will not provide post-occupancy activities unless indicated otherwise. |
| EA6 | Green Power | | X | See paragraph LEED CREDITS COORDINATION. |
| | | | | |

| | | | | |
|---|---|---|---|---|
| **MATERIALS AND RESOURCES** | | | | |
| MRPR1 | Storage & Collection of Recyclables (PREREQUISITE) | Rqd | Rqd | All LEED prerequisites are required to be met. Coordinate with Installation during design development on collection service and receptacles. |
| MR1 | Building Reuse | | | |
| | | | | |
| | | | | |
| MR2.1 | Construction Waste Management: Divert 50% From Disposal | Pref | | See paragraph CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT. |
| MR2.2 | Construction Waste Management: Divert 75% From Disposal | Pref | | |
| MR3 | Materials Reuse | | | |
| | | | | |
| MR4.1 | Recycled Content: 10% (post-consumer + 1/2 pre-consumer) | Pref | | See paragraph RECYCLED CONTENT. |
| MR4.2 | Recycled Content: 20% (post-consumer + 1/2 pre-consumer) | Pref | | |
| MR5.1 | Regional Materials:10% Extracted, Processed & Manufactured Regionally | | | |
| MR5.2 | Regional Materials:20% Extracted, Processed & Manufactured Regionally | | | |

| | | | | |
|---|---|---|---|---|
| MR6 | Rapidly Renewable Materials | Pref | | See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS and paragraph FEDERAL BIOBASED PRODUCTS PREFERRED PROCUREMENT PROGRAM. |
| MR7 | Certified Wood | Pref | | See paragraph BIOBASED AND ENVIRONMENTALLY PREFERABLE MATERIALS. |
| | | | | |
| **INDOOR ENVIRONMENTAL QUALITY** | | | | |
| EQPR1 | Minimum IAQ Performance (PREREQUISITE) | Rqd | Rqd | All LEED prerequisites are required to be met. |
| EQPR2 | Environmental Tobacco Smoke (ETS) Control (PREREQUISITE) | Rqd | Rqd | All LEED prerequisites are required to be met. Assume all buildings are smoke free unless indicated otherwise (family housing, barracks and other lodging are facility types where smoking may be permitted in some cases). |
| 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. |

# Owner's Project Requirements Document for LEED Fundamental Commissioning

Project: FY 2010 PN 71727 Indoor Baffle Range, Fort Drum ____

Approved: _____ _____ _____
Name Owner's Representative Date

_____ _____ _____
Name Design Agent's Representative Date

## Overview and Instructions

The purpose of this document is to provide clear and concise documentation of the Owner's goals, expectations and requirements for commissioned systems, and shall be utilized throughout the project delivery and commissioning process to provide an informed baseline and focus for design development and for validating systems' energy and environmental performance.

The Owner's Project Requirements Document is a required document for LEED Version 3 EA Prerequisite 1, Fundamental Commissioning of the Building Energy Systems.

The intent of the Owner's Project Requirements Document, per the LEED v3 (2009) Reference Guide, is to detail the functional requirements of a project and the expectations of the building's use and operation as it relates to commissioned systems. This template contains the basic recommended components indicated in the LEED Reference Guide. It should be adapted as needed to suit the project, remaining reflective of the LEED intent.

The Owner's Project Requirements Document should ideally be completed before the start of design and furnished to the design team. It must be completed prior to the approval of Contractor submittals of any commissioned equipment or systems to meet LEED requirements.

Updates to the Owner's Project Requirements Document throughout the course of project delivery will be made by the Corps District/Design Agent based on decisions and agreements coordinated with and agreed to by the Installation/User/Proponent.

The Owner's Project Requirements Document shall be included in the project's LEED documentation file under EA PR1, Fundamental Commissioning of the Building Energy Systems.

## Owner's Project Requirements Document for LEED Fundamental Commissioning

## Table of Contents

1. Owner and User Requirements
   - Primary Purpose, Program and Use
   - Project History
   - Broad Goals
2. Environmental and Sustainability Goals
   - Energy Efficiency Goals
   - General
   - Siting
   - Building Façade
   - Building Fenestration
   - Building Envelope
   - Roof
   - Other
3. Indoor Environmental Quality Requirements
   - Intended Use
   - Occupancy Schedule
   - Accommodations for After-Hours Use
   - Lighting, Temperature, Humidity, Air Quality, Ventilation, Filtration
   - Acoustics
   - Occupant Ability to Adjust System Controls
   - Types of Lighting
4. Equipment and Systems Expectations
   - Space Heating
   - Ventilation
   - Air Conditioning
   - Refrigeration
   - HVAC Controls
   - Domestic Hot Water
   - Lighting Controls
   - Daylighting Controls
   - Emergency Power
   - Other
5. Building Occupant and O&M Personnel Requirements
   - Facility Operation
   - EMCS
   - Occupant Training and Orientation
   - O&M Staff Training and Orientation

TABLE 1

## 1. *Owner and User Requirements*

What is the primary purpose, program and use of this project? (example: office building with data center)

This project is to construct an Indoor Firing Range to provide 10 lanes of live-fire, indoor, practice area for Soldiers to improve marksmanship skills. The building will include the firing range area and a classroom/ administrative area for in-briefing and out-briefing.

Describe pertinent project history. (example: standard design development)

This project is based on a previously constructed similar facility at Fort Drum, NY, as well as lessons learned from recently constructed ranges at other installations. It is the intent of the Government to issue a design-build Request for Proposal (RFP) under an existing contract.

### *Broad Goals*

What are the broad goals relative to program needs?

To maximize quality training opportunities for basic skills during all weather conditions.

What are the broad goals relative to future expansion?

Structure spaces to allow maximum flexibility for future modifications.

What are the broad goals relative to flexibility?

Structure spaces to allow maximum flexibility for future modifications.

What are the broad goals relative to quality of materials?

It is the Army's objective that this building will have a 25-year useful design life before a possible reuse/repurpose or renovation requirement, to include normal sustainment, restoration, modernization activities and a 50-year building replacement life.

What are the broad goals relative to construction costs?

The Government places value in methods that streamline construction, manage labor and other resource constraints in an effort to reduce costs and support an aggressive schedule, including such things as fast-tracking, using factory built modules or assemblies, panelization, pre-cast, tilt-up, standard designs, etc.., while meeting contract and quality requirements.

What are the broad goals relative to operational costs?

Meet EPACT (reduced water, energy consumption). Minimize operating costs as much as possible within first cost budget.

_____
_____

What are the broad goals relative to life cycle of the equipment?

_____
_____
_____

Other broad goals: *(Insert as applicable)*

_____
_____
_____

## *2. Environmental and Sustainability Goals*

What are the project goals relative to sustainability and environmental issues? (example: LEED Silver rating)

LEED Silver _____
_____
_____

What are the project goals relative to energy efficiency? (example: Meet EPACT)

Meet or exceed EPACT requirements_____
_____
_____

What are the project goals and requirements for building siting that will impact energy use?

Special local requirements are indicated in Paragraph 6 of the Scope of Work. Consistent building orientation can not always be expected. _____
_____
_____

What are the project goals and requirements for building facade that will impact energy use?

Exterior appearance will vary to be compatible with adjoining environment's architectural theme. Special local requirements are indicated in Paragraph 6 of the Scope of Work._____
_____
_____

What are the project goals and requirements for building fenestration that will impact energy use?

Fenestration will vary to be compatible with adjoining environment's architectural theme and Antiterrorism/Force Protection criteria (UFC 4-010-01)._____
_____
_____

What are the project goals and requirements for building envelope that will impact energy use?

ASHRAE 90.1 and EPAct are required. Special local requirements are indicated in Paragraph 6 of the Scope of Work. _____

What are the project goals and requirements for building roof that will impact energy use?

Special local requirements are indicated in Paragraph 6 of the Scope of Work. _____

Other: *(Insert as applicable)*

### *3. Indoor Environmental Quality Requirements*

What is the intended use for all spaces? For all spaces that have an intended use that is not readily apparent from the space name, provide this information in Table 1.

See Scope of Work _____

What is the anticipated occupancy schedule (numbers of occupants and time frames) for all occupied spaces? Indicate the default occupancy schedule below and for all spaces that have an occupancy schedule that differs from the default, provide this information in Table 1.

Typical occupancy is similar to an educational facility._____

What accommodations for after-hours use are required? (example: access control, lighting controls, HVAC controls) Indicate general accommodations required below and for all spaces that have special requirements, provide this information in Table 1.

Accommodations for after-hours will require access control, lighting controls, and HVAC controls. Special local requirements are indicated in Paragraph 6 of the Scope of Work. _____

What are the lighting, temperature, humidity, air quality, ventilation and filtration requirements for all spaces? Indicate the default requirements below and for all spaces that have a requirement that differs from the default, provide this information in Table 1.

Lighting: IESNA as interpreted in UFC 3-530-01 _____
Temperature: See Scope of Work_____

Humidity: 30% to 50% _____
Air Quality: ASHRAE 62.1, Special Requirements for Range area_____

Ventilation: ASHRAE 62.1, Special Requirements for Range area _____

Filtration: ASHRAE 52.1 and 52.2, Special Requirements for Range area _____

What are the acoustical requirements for all spaces? Indicate the default acoustical requirements below and for all spaces that have a requirement that differs from the default, provide this information in Table 1.

See Scope of Work._____
_____
_____

What is the desired level of occupant ability to adjust systems controls? Indicate the default desired levels below and for all spaces that have a desired level that differs from the default, provide this information in Table 1.

Lighting: On/Off and/or space sensors _____

Temperature: Thermostatic control_____
Humidity: None _____
Air Quality: Adjustable through HVAC controls _____

Ventilation: Adjustable through HVAC controls _____

What, if any, specific types of lighting are desired? (example: fluorescent in 2x2 grid, accent lighting, particular lamps)

See Scope of Work._____
_____
_____

## *4. Equipment and System Expectations*

*(Complete for each category as applicable or indicate "none identified" or "N/A". Add desired features information for other anticipated commissioned systems as applicable)*

## *5. Building Occupant and O&M Personnel Requirements*

How will the facility be operated? Who will operate the facility?

All references to the owner shall be coordinated with and approved by the Contracting Officer._
_____
_____

Will the facility be connected to an EMCS? If so, what are the interface requirements? (example: monitoring points, control points, scheduling)

Yes, see Scope of Work._____
_____
_____

What is the desired level of training and orientation for building occupants to understand and use the building systems?

See Scope of Work _____
_____
_____

What is the desired level of training and orientation for O&M staff to understand and maintain the building systems?

See Scope of Work _____
_____

# APPENDIX N
## LEED Requirements for Multiple Contractor Combined Projects

Not Used

# APPENDIX O
## LEED Strategy Tables

Not Used

# APPENDIX P

## LEED Registration of Army Projects

## 15 April 2010

**Number of Registrations**
Each building must be registered separately, except multiple instances of a standard building on a shared site may be registered as a single project. If a single registration for multiple buildings is chosen, all buildings under the single registration must earn exactly the same points. Do not register buildings that are exempt from a specific LEED achievement requirement.

**Typical Registration Procedure**
1. Login, complete the online registration form (see guidance below) at the GBCI LEED Online website http://www.gbci.org/DisplayPage.aspx?CMSPageID=174 and submit it online.
2. Pay the registration fee via credit card (USACE staff: credit card PR&C is funded by project design or S&A funds).
3. GBCI will follow up with a final invoice, the LEED-online passwords and template information.
4. The individual who registers the project online is, by default, the Project Administrator.

**Completing the Registration Form**

**BEFORE YOU BEGIN:**
**Create a personal account with USGBC if you do not have one.**
**You will need the following information:**
**Project name as it appears in P2 (obtain from USACE Project Manager)**
**Building number/physical address of project**
**Zip code for Installation/project location**
**Anticipated construction start and end dates**
**Total gross area all non-exempt buildings in registration**
**Total construction cost all non-exempt buildings only (see Project Details Section instructions below)**

**ACCOUNT/LOGIN INFORMATION**
1. The person registering the project **must have an account with USGBC** (login and password) to complete the form. Go to http://www.gbci.org/ , click on “register a project” at the drop-down menu for project certification (at the top of the page) and select “register now for LEED 2009” to start the project registration process. If you have an account, login with your email address and password and select “register new project” to proceed. If you do not have an account, you may select “register a new account” and follow the instructions. It is recommended that you create an account separately on the USGBC website before you start the form. IMPORTANT: USACE team members are members of USGBC and are eligible for Member prices. USACE team members registering projects should be sure to include the USACE Corporate Access ID in their personal account profile (if you do not have it contact richard.l.schneider@usace.army.mil or judith.f.milton@usace.army.mil for the number).
2. The Account/Login Information section is filled out by the person registering the project. It may be a Contractor or a USACE staff member.

**ELIGIBILITY SECTION**
Follow directions (accepting the terms and conditions)
Review your profile information and make corrections if needed

**RATING SYSTEM SELECTION SECTION**
Select single project registration and I know which rating system.
Select the rating system - currently only LEED-NC and LEED for Homes are approved for Army use without special approval.
LEED Minimum Program Requirements: select YES

**RATING SYSTEM RESULTS SECTION**

Confirm selected rating system.

**PROJECT INFORMATION SECTION**

**Project Title:** Begin the project title with a one-word identifier for the Installation. Do not include the word "Fort". After this match the project name used in P2 (contact the USACE Project Manager for this information) and identify the building being registered. Example: "Stewart 4th IBCT - DFAC".
**Project Address 1 and 2:** This is the physical location of the project. Provide building number, street address, block number or whatever is known to best describe the location of the project on the Installation.
**Project City:** Installation Name
**State, Country, Zip Code:** Self-explanatory
**Anticipated Construction Start and End Dates:** Self-explanatory – give your best guess if unknown. Note that required data entry format is: 1 or 2 digit month/1 or 2 digit date/4 digit year (example 3/23/2010)
**Gross Square Footage:** Provide total area all buildings in LEED project. Exclude the area of any buildings that are exempt from the LEED achievement requirement (for example, exclude an unconditioned storage shed to be constructed with a barracks complex).
**Is Project Confidential:** Indicate NO except, if project has security sensitivity (elements that are FOUO or higher security), indicate YES.
**Notification of Local Chapter:** Indicate NO unless Government/USACE Project Manager requests you to indicate YES.
**Anticipated Project Type:** Select the most appropriate option from the drop-down menu.
**Anticipated Certification Level:** Select the applicable option from the drop-down menu (Silver is the usual level).

**PROJECT OWNER INFORMATION SECTION**

**Project Owner First Name, Last Name, email, phone, address:** The Project Owner is the USACE Project Manager. Obtain this info from the USACE Project Manager.
**Organization:** U.S. Army Corps of Engineers. This field MUST be completed this way because it will be used as a search field by higher HQ to find all USACE registered projects. You may supplement it with district name at the end but DO NOT revise or use an acronym.
**May we publish Owner information:** Indicate NO
**Owner Type:** Pick Federal Government from drop-down menu.
**Project Owner Assertion:** Check the box

**PAYMENT INFORMATION**

Self-explanatory

# APPENDIX Q
# REV 1.1 – 31 MAY 2009
# AREA COMPUTATIONS

**Computation of Areas:** Compute the "gross area" and "net area" of facilities (excluding family housing) in accordance with the following subparagraphs:

**(1) Enclosed Spaces:** The "gross area" is the sum of all floor spaces with an average clear height ≥6′-11″ (as measured to the underside of the structural system) and having perimeter walls which are ≥4′-11″. The area is calculated by measuring to the exterior dimensions of surfaces and walls.

**(2) Half-Scope Spaces:** Areas of the following spaces shall count as one-half scope when calculating "gross area":

- Balconies
- Porches
- Covered exterior loading platforms or facilities
- Covered but not enclosed passageways and walks
- Open stairways (both covered and uncovered)
- Covered ramps
- Interior corridors (Unaccompanied Enlisted Personnel Housing Only)

**(3) Excluded Spaces:** The following spaces shall be excluded from the "gross area" calculation:

- Crawl spaces
- Uncovered exterior loading platforms or facilities
- Exterior insulation applied to existing buildings
- Open courtyards
- Open paved terraces
- Uncovered ramps
- Uncovered stoops
- Utility tunnels and raceways
- Roof overhangs and soffits measuring less than 3′-0″ from the exterior face of the building to the fascia

**(4) Net Floor Area:** Where required, "net area" is calculated by measuring the inside clear dimensions from the finish surfaces of walls. If required, overall "assignable net area" is determined by subtracting the following spaces from the "gross area":

- Basements not suited as office, special mechanical, or storage space
- Elevator shafts and machinery space
- Exterior walls
- Interior partitions
- Mechanical equipment and water supply equipment space
- Permanent corridors and hallways
- Stairs and stair towers
- Janitor closets
- Electrical equipment space
- Electronic/communications equipment space

# RMS SUBMITTAL REGISTER INPUT FORM

CONTRACT NUMBER

DELIVERY ORDER

TITLE AND LOCATION

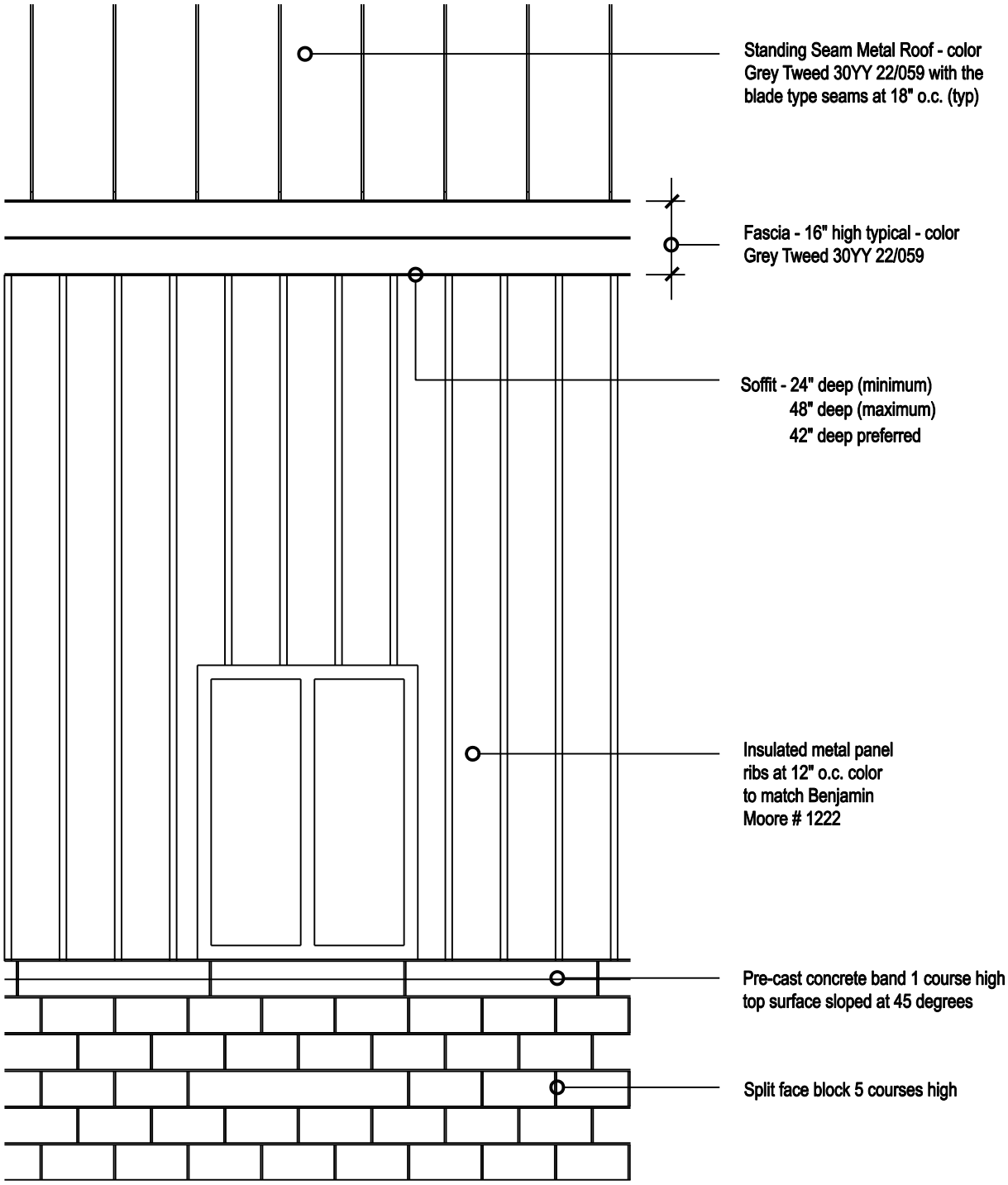
Button <-----Right click for Instructions

| SECTION | PARAGRAPH NUMBER | DESCRIPTION OF ITEM SUBMITTED | TYPE OF SUBMITTAL | | | | | | | | | | | CLASSIFICATION | | | | | | REVIEWING OFFICE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 01 - PRECON SUBMITTALS | 02 - SHOP DRAWINGS | 03 - PRODUCT DATA | 04 - SAMPLES | 05 - DESIGN DATA | 06 - TEST REPORTS | 07 - CERTIFICATES | 08 - MFRS INSTRUCTIONS | 09 - MFRS FIELD REPORT | 10 - O&M DATA | 11 - CLOSEOUT SUBMITTALS | FIO - FOR INFORMATION ONLY | GA - GOVERNMENT APPROVED | DA - DESIGNER OF RECORD APPROVAL | CR - CONFORMANCE REVIEW | DA / CR | DA / GA | DO - DISTRICT OFFICE | AO - AREA OFFICE | RO - RESIDENT OFFICE | PO - PROJECT OFFICE | DR - DESIGNER OF RECORD | AE - ARCHITECT / ENGINEER |
| 00 72 00 | 52.236-13 | Accident Prevention Plan | X | | | | | | | | | | | | | | X | | | | X | | | | |
| 00 73 00 | 1.11 | Dev. From Accept. Design. No Deviation from Contract | | | | | X | | | | | | | | | | | X | | | X | | | X | |
| 00 73 00 | 1.11 | Dev. From Accepted Design - Deviates from Contract | | | | | X | | | | | | | | | | | | X | | X | | | X | |
| 00 73 00 | 1.17 | Supplemental Price Breakdown | X | | | | | | | | | | | X | | | | | | | X | | | | |
| 00 73 00 | 1.18 | SSHO Qualifications | X | | | | | | | | | | | | X | | | | | | X | | | | |
| 01 10 00 | 5.2.3.1 | (if concrete pavement) Joint Layout Plan with design drawings | | | | | X | | | | | | | | | | X | | | | | | | | |
| 01 10 00 | 5.5.2 | Building Envelope Sealing Performance Testing | | | | | | X | | | | | | X | | | | | | | X | | | | |
| 01 10 10 | *** | Tests as Req by Codes - DOR Develops Test Program | | | | | | X | | | | | | X | | | | | | | X | | | X | |
| 01 10 00 | 5.8.3 | BAS Review Information | | X | | | | | | | | | | | | | | X | | X | X | | | X | |
| 01 10 00 | 5.8.3 | BAS Performance Verification Test | | | | | | X | | | | | | X | | | | | | | X | | | X | |
| 01 10 00 | 5.8.4 | Testing Adjusting and Balancing | | | | | | X | | | | | | X | | | | | | | X | | | X | |
| 01 10 00 | 5.8.5 | Commissioning | | | | | | X | | | | | | X | | | | | | | X | | | X | |
| 01 10 00 | 6.15 | Environmental As Required for Site Specific | | | | | X | | | | | | | | | | X | | | | X | | | X | |
| 01 10 00 | 6.16 | Permits as required for Site specific | | | | | X | | | | | | | | | | X | | | | X | | | X | |
| 01 10 00 | 5.10.2 | Fire Protection Tests | | | | | | X | X | | | | | X | | | | | | | X | | | X | |
| 01 32 01.00 10 | 3.4.1 | Preliminary Project Schedule | X | | | | | | | | | | | | X | | | | | | X | | | | |
| 01 32 01.00 10 | 3.4.2 | Initial Project Schedule | X | | | | | | | | | | | | X | | | | | | X | | | | |
| 01 32 01.00 10 | 3.4.3 | Design Package Schedule | X | | | | | | | | | | | | X | | | | | | X | | | | |
| 01 32 01.00 10 | 3.6.1 | Periodic schedule updates from the Contractor | X | | | | | | | | | | | | X | | | | | | X | | | | |
| 01 32 01.00 10 | 3.7 | Time Extension Request (Schedule) | X | | | | | | | | | | | | X | | | | | | X | | | | |
| 01 33 00 | 1.8 | Submittal Register - DOR Input Required | X | | | | | | | | | | | | X | | | | | | X | | | X | |
| 01 33 00 | 1.8 | Submittal Register Updates (Design Packages, etc.) | X | | | | | | | | | | | | X | | | | | | X | | | X | |
| 01 33 00 | 1.3.1 | Substitution of Manuf or Model Named in Proposal | | X | X | | | | | | | | | | | | | X | | | X | | | X | |
| 01 33 16 | 1.2 | Identify Designer(s) of Record | X | | | | | | | | | | | | X | | | | | | X | | | | |
| 01 33 16 | 1.1.2 / 3.2.4 | Fast Track Design Package(s) | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 1.2 | Identification of all Designers of Record | X | | | | | | | | | | | | | | X | | | | X | | | | |
| 01 33 16 | 3.2.1 | Site and Utility Des Package, incl. Substantiation | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.2.2/3.5 | Interim Des Subm Package(s), incl. Substantiation | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.1 | Drawings | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.2 | Sitework Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.3 | Structural Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.4 | Security Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.5 | Architectural Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.6 | Mechanical Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.7 | Life Safety Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.8 | Plumbing Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.9 | Elevator Design Analyses (as Applicable) | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.10 | Electrical Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.11 | Telecommunications Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.2.12 | Cathodic Protection Design Analyses | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.3 | Geotechnical Investigations and Reports | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.4 | LEED Submittals | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.5 | Energy Conservation Documentation | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.6 | Specifications | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.5.7 | Building Rendering | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.2.4/3.7 | Final Des Submittal Package(s), incl. Substantiation | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.7.5 | DD Form 1354 (Transfer of Real Property) | | | | | | | | | | | X | | | | X | | | | X | | | | |
| 01 33 16 | 3.2.5/3.8 | Design Complete Submittal Package(s) | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | 3.3.3 | Design and Code Review Checklists | | | | | X | | | | | | | | | | X | | | X | X | | | | |
| 01 33 16 | A-2.0 | SID - Interim and Final (as applicable) | | | X | X | X | | | | | | | | X | | | | | | X | | | | |
| 01 33 16 | B-2.0 | FFE (as Applicable) | | | | | X | | | | | | | | X | | | | | | X | | | | |
| 01 45 04.00 10 | 3.2 | Design and Construction QC Plan | X | | | | | | | | | | | | | | X | | | | X | | | | |
| 01 57 20.00.10 | 1.2 | Environmental Protection Plan | X | | | | | | | | | | | | | | X | | | | X | | | | |
| 01 78 02.00 10 | 1.2.1 | Final as-Built Drawings | | | | | | | | | | | X | | X | | | | | | | | | | |
| 01 78 02.00 10 | 1.2.3.11 | Non-Hazardous Solid Waste Diversion Reports | | | | | | | X | | | | | X | | | | | | | X | | | | |
| 01 78 02.00 10 | 1.2.7 | Provide final as-built CADD and BIM Model files | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.2.9 | Provide scans of all other docs in Adobe.pdf format | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.3.1 | Equip-in-Place list of all installed equip and cost | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.3.2 | Data on equip not addressed in O&M manuals | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.3.3 | Final as-built specs - electronic files | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.4.2.1 | Warranty management plan - FAR 52.246-21 | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.4.2.1 | Certificates of Warranty for extended warranty items | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.4.2.1 | Contractor's POCs for implementing warranty process | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.4.2.1 | List of each warranted equip, item, feature or system | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.5 | See also Section 01 10 00 par. 5.8.4 and 5.8.5 | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.6.1.2 | Equipment O&M Manuals - 1 electronic / 2 hard copies | | | | | | | | | | | X | | X | | | | | | X | | | | |
| 01 78 02.00 10 | 1.7 | Field Training DVD Videos | | | | | | | | | | X | | X | | | | | | | X | | | | |
| 01 78 02.00 10 | 1.8 | Pricing of CF/CI and GF/CI Property | | | | | | | | | | | X | X | | | | | | | X | | | | |
| 01 78 02.00 10 | 1.11 | List of Completed Cleanup Items | | | | | | | | | | | X | | | | X | | | | X | | | | |

RMS INPUT FORM 4288A

**Export to RMS in CSV(MS-DOS) (*.csv) Format**

**Note:** Reviewing Office Optional




# Typical North Post - Indoor Range

NOTES:
1. ICI (Glidden Paints) color names and numbering system used to establish theme, products of equal color and pattern may be substituted with approval from Fort Drum Public Work Master Planning
2. Pre-cast band produced with a type 1 cement from Glens Falls, New York with a lightly sandblasted finish
3. Split face block as manufactured by Taylor Concrete Products of Watertown, New York and identified as "10th Mountain Tan"
4. Benjamin Moore color number number system used to establish theme, products of equal color and pattern may be substituted with approval from Fort Drum Public Work Master Planning

Created : 22 May 2006

# CHART # 1 - ARCHITECTURAL THEME FOR NORTH POST

| Zones | 1 & 2 | 3 | 4 | 5 | 5 | 5 | 6 | 10 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| | North | North | North | North | North | North | North | Airfield | Airfield |
| Type | Hq/Admin/Troop Hsg | Troop Maint | Industrial | Community | Community | Community | Medical | Hq/Admin/Troop Hsg | Maintenance |
| Materials | | | | See note # 4 below | See note # 5 below | See note # 6 below | | | |
| Metal Roof Standing Seam Only | 30YY 22/059 Grey Tweed | 30YY 22/059 Grey Tweed | 30YY 22/059 Grey Tweed | 30YY 22/059 Grey Tweed | PPG DURANAR Blue-Grey # 5MA94902 | Not Applicable | 30YY 22/059 Grey Tweed | 30YY 22/059 Grey Tweed | 30YY 22/059 Grey Tweed |
| Brick, Face | Glen-Gery Old Bridge C-107 | Not Applicable | Not Applicable | Glen-Gery Old Bridge C-107 | Glen-Gery Old Bridge C-107 | Not Applicable | Glen-Gery Old Bridge C-107 | Glen-Gery Old Bridge C-107 | Not Applicable |
| Brick, Accent | Not Applicable | Not Applicable | Not Applicable | Glen-Gery Fall Gray "Wire-Cut" (At designers discretion) | Glen-Gery Fall Gray "Wire-Cut" (At designers discretion) | Not Applicable | Not Applicable | Not Applicable | Not Applicable |
| Block, Split Face | See note #1 below | See note #1 below | See note #1 below | See note #1 below | See note #1 below | See note #1 below | See note #1 below | See note #1 below | See note #1 below |
| Block, Smooth Face | Not Applicable | See note # 3 below | See note # 3 below | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable |
| Concrete, Precast | Warm Gray see note # 2 below | Warm Gray see note # 2 below | Warm Gray see note # 2 below | Not Applicable | Not Applicable | Not Applicable | Warm Gray see note # 2 below | Not Applicable | Not Applicable |
| Metal Siding | Not Applicable | Benjamin Moore # 1222 | Benjamin Moore # 1222 | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Benjamin Moore # 1222 |
| Aluminum Storefront | 30YY 16/032 Grey Hearth | 30YY 16/032 Grey Hearth | 30YY 16/032 Grey Hearth | 40YY 48/048 Grey Expectations | PPG DURANAR Blue-Grey # 5MA94902 or Dark Brown or Bronze | 40YY 48/048 Grey Expectations | 40YY 48/048 Grey Expectations | 30YY 16/032 Grey Hearth | Pratt & Lambert Sequoia Color # RO202A |
| Windows Frames | 40YY 48/048 Grey Expectations | 40YY 48/048 Grey Expectations | 40YY 48/048 Grey Expectations | 40YY 48/048 Grey Expectations | PPG DURANAR Blue-Grey # 5MA94902 or Dark Brown or Bronze | 40YY 48/048 Grey Expectations | 40YY 48/048 Grey Expectations | 40YY 48/048 Grey Expectations | Pratt & Lambert Sequoia Color # RO202A |
| Glazing | Clear | PPG Bronze tinted | PPG Bronze tinted | PPG Solex Blue-Green Tint or Clear | PPG Solex Blue-Green Tint or Clear | PPG Solex Blue-Green Tint | Clear | Clear | Clear |
| Mandoors & Frames | 30YY 16/032 Grey Hearth | 30YY 16/032 Grey Hearth | Not Applicable | 40YY 48/048 Grey Expectations | PPG DURANAR Blue-Grey # 5MA94902 or Dark Brown or Bronze | 40YY 48/048 Grey Expectations | 40YY 48/048 Grey Expectations | 30YY 16/032 Grey Hearth | Pratt & Lambert Sequoia Color # RO202A |
| Overhead Doors & Frames | 30YY 16/032 Grey Hearth | Pratt & Lambert Sequoia Color # RO202A | Pratt & Lambert Sequoia Color # RO202A | 40YY 48/048 Grey Expectations | PPG DURANAR Blue-Grey # 5MA94902 or Dark Brown or Bronze | 40YY 48/048 Grey Expectations | 40YY 48/048 Grey Expectations | 30YY 16/032 Grey Hearth | Pratt & Lambert Sequoia Color # RO202A |
| Louvers / Exterior Calking | Colors to match surrounding building materials | Colors to match surrounding building materials | Colors to match surrounding building materials | Colors to match surrounding building materials | Colors to match surrounding building materials | Colors to match surrounding building materials | Colors to match surrounding building materials | Colors to match surrounding building materials | Colors to match surrounding building materials |
| Mortar & Control Joints | Warm gray color for both brick & block MEDUSA Group # "Brikset" | Warm gray color MEDUSA Group # "Brikset" | Warm gray color MEDUSA Group # "Brikset" | Warm gray color MEDUSA Group # "Brikset" | Warm gray color MEDUSA Group # "Brikset" | Warm gray color MEDUSA Group # "Brikset" | Warm gray color for both brick & block MEDUSA Group # "Brikset" | Warm gray color MEDUSA Group # "Brikset" | Not Applicable |

ICI (Glidden Paints) PRODUCTS numbering and name system is used in the above color chart.
These are for identification purposes only and products of equal color and pattern may be substituted with Fort Drum PW Architectural Compliance Board Approval

NOTES:
1. Concrete products as manufactured by Taylor Concrete Products of Watertown, New York and identified as "10th Mountain Tan".
2. The precast is produced with a type I cement from Glens Falls, New York with a lightly sand-blasted finish.
3. The block needs to match the product originally provided by Adams Concrete Products of Durham, N.C. and was identified as Natural Gray No. 110.
4. The facilities that fall into this category need to match those that are located in between Po Valley Road and Chapel Drive.
5. The facilities that fall into this category need to match those that are located on either side of South Memorial Drive between North and South Riva Ridge Loop.
6. The facilities that fall into this category need to match those that are located on the north side of North Memorial Drive.
7. All bollards to be used on the North Post shall be painted using color # 40YY 10/101 "Cormorant" with the top 6 inches painted Federal highway color of "Safety Yellow".

# Chart # 4 - Interior Color Selection Chart for North Post Area Only

| Area / Material | Color Palette 1 | 2 | 3 | 4 | Comments |
|---|---|---|---|---|---|
| Primary<br>*Wall surface* | 39YY 85/046<br>"Egret" | 70YY 83/075<br>"Vapor" | 70YY 83/075<br>"Vapor" | 30YY 75/145<br>"Macadamia White" | |
| | | | | | |
| Accents<br>*Grilles*<br>*Radiators* | 90BG 10/067<br>"Black Sable" | 70BB 11/223<br>"Deep Purple" | 90BG 16/060<br>"Inland Waters" | 30YY 57/342 (1)<br>"Golden Spa" | |
| | | | | | |
| Trim<br>*Frames*<br>*Moldings* | Wood | 44YY 87/118<br>"Summer Haze" | 28YY 86/106<br>"Icy Peach" | 30YY 61/300<br>"Summer Straw" | |
| *Wainscot* | As deemed appropriate by the Designer and as approved by the Architectural Compliance Board | | | | |
| | | | | | |
| Wall Paper | As deemed appropriate by the Designer and as approved by the Architectural Compliance Board | | | | |
| Carpet | Blue Gray (2) | Blue Gray (2) | Gray Beige (2) | Gray Beige (2) | Submit for approval (2) |

| NORTH POST COLOR PALETTE (3) | | | | | |
|---|---|---|---|---|---|
| PALETTE NO. | WALL | ACCENT | TRIM | CARPET | WALL PAPER |
| 1. | 39YY 85/046<br>"Egret" | 90BG 10/067<br>"Black Sable" | Wood | Blue Gray (2) | See note above |
| 2. | 70YY 83/075<br>"Vapor" | 70BB 11/223<br>"Deep Purple" | 44YY 87/118<br>"Summer Haze" | Blue Gray (2) | See note above |
| 3. | 70YY 83/075<br>"Vapor" | 90BG 16/060<br>"Inland Waters" | 28YY 86/106<br>"Icy Peach" | Gray Beige (2) | See note above |
| 4. | 30YY 75/145<br>"Macadamia White" | 30YY 57/342 (1)<br>"Golden Spa" | 30YY 61/300<br>"Summer Straw" | Gray Beige (2) | See note above |

## NOTES:

(1) This color relates to the old Glidden # 79-34 not the # 80-10.
(2) Submit carpet samples for approval by the Architectural Compliance Board.
(3) The above paint colors are based on Glidden Paint numbers.

**SECTION 01 33 16**
**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.**

**USE THIS TABLE IN LIEU OF THE ONE INCLUDED IN SECTION 01 33 16**

| 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 | **In addition to standard disciplines, include separate narratives addressing**<br>**1. Bullet Trap**<br>**2. Range Ventilation**<br>**3. Sound Attenuation** |
| | 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 | **In addition to standard design analyses and calcs, include separate analyses and calcs for**<br>**1. Bullet Trap**<br>**2. Range Ventilation (including CFD model)**<br>**3. Sound Attenuation** |
| | | 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). | |

# GATE ACCESS FORMS

Procedures for getting Contractor Gate Access Updates into the system. It is best if we get updates in the AM each day.

Contractors need to get NEW workers to complete and sign the Individual Form. These completed forms then need to be faxed or hand-carried to the Resident Office fax 315-772-5834.

Contractor then needs to complete the Excel table (with updates for both new and existing workers) and email the excel file as an attachment to:

J.Steinbeck@uasce.army.mil and
FTDRUMCOE@drum.army.mil

J. Steinbeck, PE
Ft. Drum Resident Office
4895 Nininger Street
Fort Drum, NY 13602
315-772-5151
315-772-5834 fax

| | Lname | Fname | Type | Sponsor | Purpose | Expiration Date | |
|---|---|---|---|---|---|---|---|
| Company | | | Use Serv, or Const | COE | | mm/dd/yyyy | Form |
| XYZ | Brown | John | Const | COE | Project Name | 9/1/2008 | Faxed (date), On File, Delete |

# CONTRACTOR GATE ACCESS FORM

**LAST NAME, FIRST NAME, MI** **SSN** **SEX**

**COMPANY NAME**

**DATE OF BIRTH** **WEIGHT** **HEIGHT** **COLOR OF HAIR** **COLOR OF EYES**

**SIGNATURE OF APPLICANT:** __ _____ **DATE:** _____

**Privacy Act Statement**

Section 6311 of title 5, United States Code, authorizes collection of this information. The primary use of this information is by management and your payroll office to approve and record your use of leave. Additional disclosures of the information may be: To the department of Labor when processing a claim for compensation regarding a job connected injury or illness; to a State unemployment compensation office regarding a claim; to Federal Life Insurance of Health Benefits carriers regarding a claim; to a Federal, State, or local law enforcement agency when your agency becomes aware of a violation or possible violation of civil or criminal law; to a Federal agency when conducting an investigation for employment or security reasons; to the Office of Personnel Management or the General Accounting Office when the information is required for evaluation of leave administration; or the General Services Administration in connection with its responsibilities for records management.

Public Law 104-134 (April 26, 1996) requires that any person doing business with the Federal Government furnish a social security number or tax identification number. This is an amendment to title 31, Section 7701. Furnishing the social security number, as well as other data, is voluntary, but but failure to do so may delay or prevent action on the application. If your agency uses the information furnished on this form for the purposes other than those indicated above, it may provide you with an additional statement reflecting those purposes.

## PROJECT IDENTIFICATION SIGN
## MILITARY PROJECT

The graphic format for this 4' x 6' sign panel follows the legend guidelines and layout as specified below. The large 4' x 4' section of the panel in the right is to be white with black legend. The 2' x 4' section of the sign on the left with the full corps Signature (reverse version) is to be screen printed Communications Red on the white background. The castle insignia will be furnished by the Government in pressure sensitive vinyl for affixing by the Contractor. See attached sheet for fabrication and mounting guidelines.

Legend Group 1: One- to two-line description of Corps relationship to project
Color: White
Typeface: 1.25" Helvetica Regular
Maximum line length: 19"

Legend Group 2: Division or District Name (optional). Place below 10.5" Reverse Signature (6" Castle)
Color: White
Typeface: 1.25" Helvetica Regular

Legend Group 3: One- to three-line project title legend describes the work being done under this contract.
Color: Black
Typeface: 3" Helvetica Bold
Maximum line length: 42"

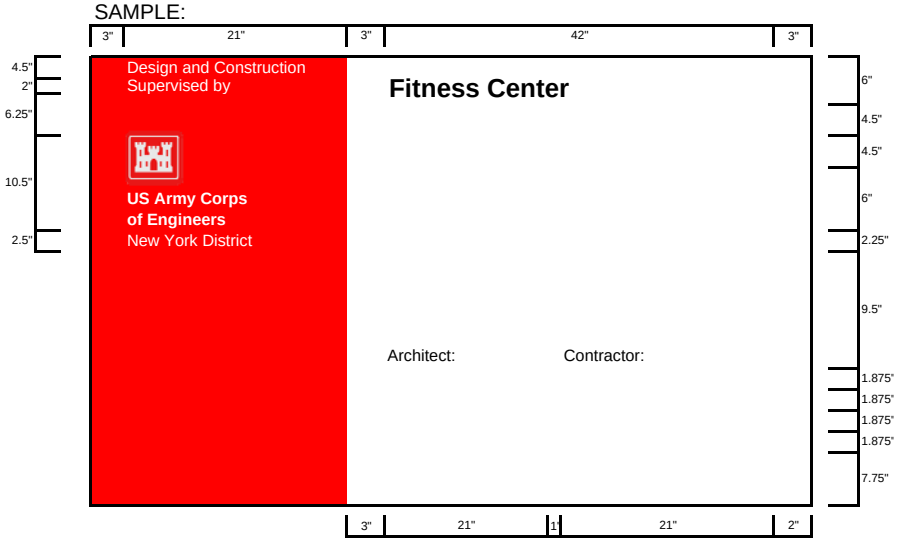
Legend Group 4: One-to two-line identification of project or facility (civil works) or name of sponsoring department (military).
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Cross-align the first of Legend Group 4 with the first line of the Corps Signature (US Army Corps) as shown.

Legend Group 5a-b: One-to-five line identification of prime contractors including: type (architect, general contractor, etc.), corporate or firm name, city, state. Use of Legend Group 5 is optional.
Color: Black
Typeface: 1.25" Helvetica Regular
Maximum line length: 21"

All typography is flush left and rag right upper and lower case with initial capitals only as shown. Letter and word spacing to follow Corps standards as specified in
* Appendix D

SAMPLE:




(Dimensions are in inches)

| Sign Type | Legend | Panel Size | Post Size | Specification Code | Mounting Height | Color Bkg/Lgd |
|---|---|---|---|---|---|---|
| CID-01 | various | 4' x 6' | 4' x 4' | HDO-3 | 48" | WH-RD/BK |

* Refers to the U.S. Army Corps of Engineers, "Sign Standards Manual", EPS-310-1-6.

# Fabrication and Mounting Guidelines

As Construction Project Identification signs and Safety Performance signs are to be fabricated and installed as described below. The signs are to be erected at a location designated by the contracting officer and shall conform to the size, format, and typographic standards shown on the attached sheets.

The sign panels are to be fabricated from .75" High Density Overlay Plywood. Panel preparation to follow HDD specifications provided in Appendix B. **

Sign graphics to be prepared on a white non-reflective vinyl film with positionable adhesive backing.

All graphics except for the Communications Red background with Corps signature on the project sign are to be die-cut or computer-cut non-reflective vinyl, pre-spaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown on the attached sheets.

The 2'x4' Communications Red panel (to match PMS-032) with full Corps signature (reverse version) is to be screen printed on the white background. Identification of the District or Division may be applied under the signature with white cut vinyl letters prepared to Corps standards. Large scale reproduction artwork for the signature is provided on page 4.8 (photographically enlarge from 6.875" to 10.5"). **

Drill and Insert six (6) .375" T-nuts from the front face of the HDD sign panel. Position holes as shown. Flange of T-nut to be flush with sign face.

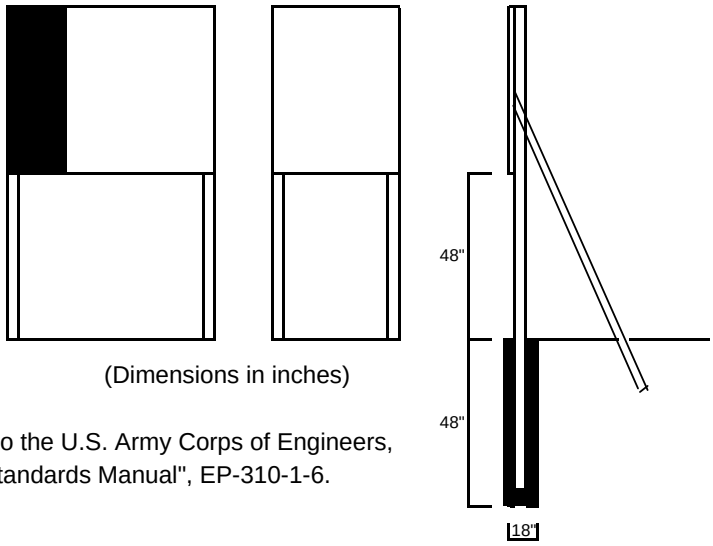
Apply graphic panel to prepared HDD plywood panel following manufacturers' instructions.

Sign uprights to be structural grade 4"x4" treated Douglas Fir or Southern Yellow Pine. No.1 or better. Post to be 12" long. Drill six (6) .375" mounting holes in uprights to align with T-nuts in sign panel. Countersink (.5") back of hole to accept socket head cap screw (4"x.375").

Assemble sign panel and uprights. Imbed assembled sign panel and uprights in 4" hole. Local soil conditions and/or wind loading may require bolting additional 2"x4" struts on inside face of uprights to reinforce installation as shown

Detailed specifications for HDD plywood panel preparation are provided in Appendix B.**

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when preparing sign legend orders.




(Dimensions in inches)

** Refers to the U.S. Army Corps of Engineers, "Sign Standards Manual", EP-310-1-6.

Construction Project Sign
Legend Group 1: Corps Relationship

1. _____
2. _____

Legend Group 2: Division/District Name

1. _____
2. _____

Legend Group 3: Project Title

1. _____
2. _____
3. _____

Legend Group 4: Facility Name

1. _____
2. _____

Legend Group 5a: Contractor/A&E

1. _____
2. _____
3. _____
4. _____
5. _____

Legend Group 5b: Contractor /A&E

1. _____
2. _____
3. _____
4. _____
5. _____

Safety Performance Sign
Legend Group 1: Project Title

1. _____
2. _____

Legend Group 2: Contractor/A&E

1. _____
2. _____

# SAFETY PERFORMANCE SIGN

The graphic format, color, size and type-faces used on the sign are to be reproduced exactly as specified below. The title with First Aid logo in the top section of the sign, and the performance record captions are standard for all signs of this type. Legend Group 2 and 3 below identify the project and the contractor and are to be placed on the sign as shown. Safety record numbers are mounted on individual metal plates and are screw-mounted to the background to allow for daily revisions to posted safety performance record.

Legend Group1: Standard two-line title "safety is a Job Requirement", with (8" od.) Safety Green First Aid logo. Color: To match PMS 347
Typeface: 3" Helvetica Bold
Color: Black

Legend Group 2: One- to two-line project title legend describes the work being done under this contract and name of host project.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

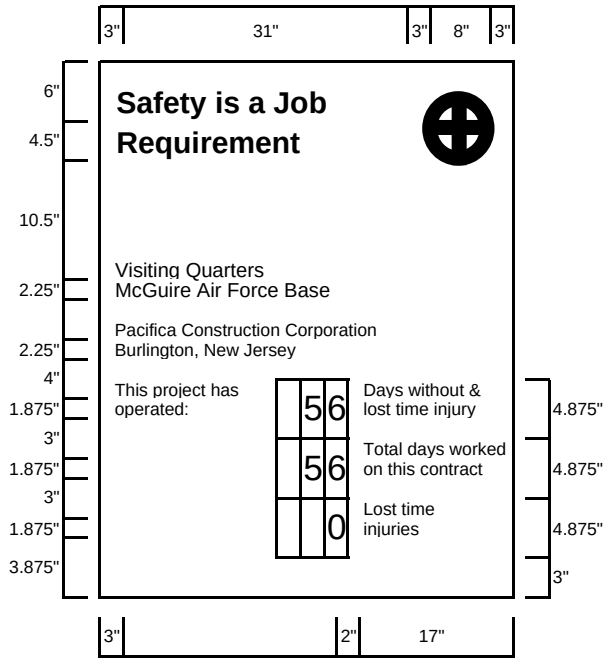
Legend Group 3: One - to two-line identification: name of prime contractor and city, state address.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 4: Standard safety record captions as shown.
Color: Black

Typeface: 1.25" Helvetica Regular

Replaceable numbers are to be mounted on white .060: aluminum plates and screw-mounted to background.
Color: Black
Typeface: 3" Helvetica Regular
Plate size: 2.5"x.5"

All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards as specified in Appendix D. *

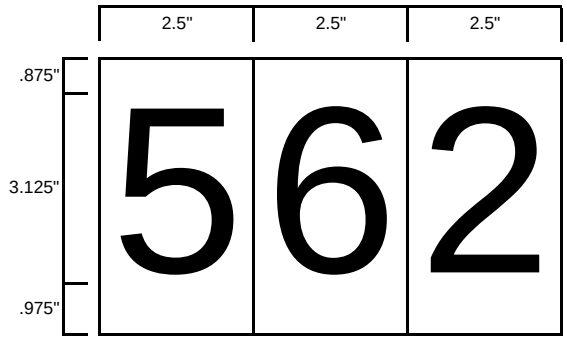



Dimensions inches.

See attached sheet for fabrication and mounting guidelines.

* Refer to the U.S. Army Corps of Engineers, "Sign Standards Manual", EPS-310-1-6.

| Sign Type | Legend Size | Panel Size | Post Size | Specifications Code | Mounting Height | Color Bkg/Lgd |
|---|---|---|---|---|---|---|
| CID-02 | various | 4"x4" | 4"x4" | HDO-3 | 48" | WH/BK-GR |



## Horizontal Distance That Sliding Snow Can Fall Beyond the Eaves

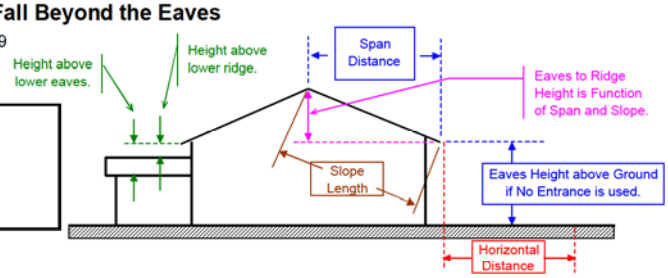
Created by Alan Greatorex and Jim Buska on 15 October, 1999

Worksheet is protected. Only the input cells below can be changed.

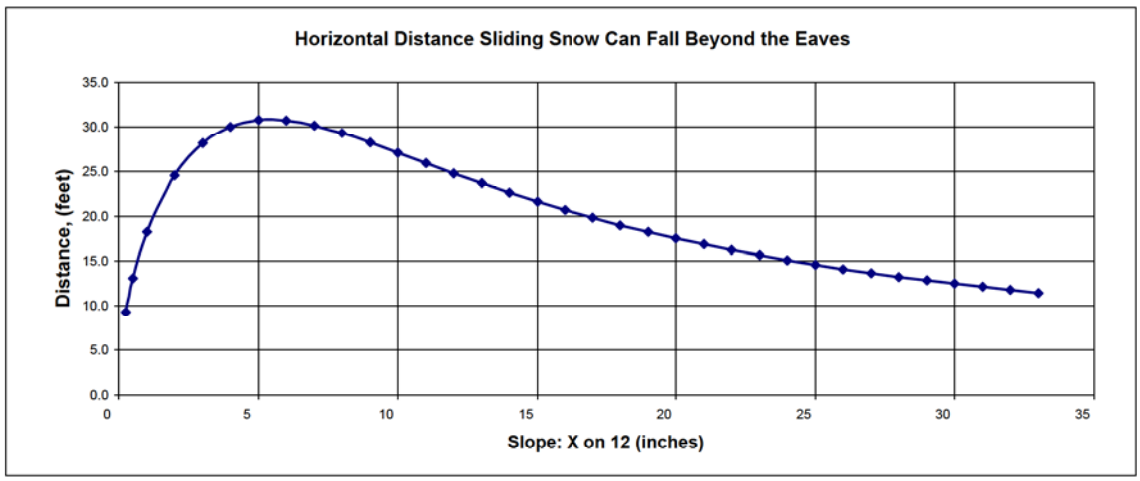
**Inputs** [1]

| | | |
|---|---|---|
| Span Distance = | 30 ft | 0 in. |
| Height of Eaves Above Ground (or Height of Eaves Above Lower Roof Ridge or Lower Roof Eaves) = | 35 ft | 0 in. |

Acceleration Due to Gravity = -32.16 ft / sec²




| Slope X on 12 | Slope | Slope length | Acceleration Parallel to Slope [2] | Time Required to Traverse Slope Length | Horizontal Velocity at Eaves | Vertical Velocity at Eaves | Time to Fall from Eaves to Lower Surface | Horizontal Distance [3] | Eaves to Ridge Height |
|---|---|---|---|---|---|---|---|---|---|
| inches | degrees | feet | ft / sec² | seconds | ft / sec | ft / sec | seconds | feet | feet |
| 1/4 | 1.19 | 30.0 | 0.7 | 9.47 | 6.3 | -0.1 | 1.47 | 9.3 | 0.6 |
| 1/2 | 2.39 | 30.0 | 1.3 | 6.70 | 9.0 | -0.4 | 1.46 | 13.1 | 1.3 |
| 1 | 4.76 | 30.1 | 2.7 | 4.75 | 12.6 | -1.1 | 1.44 | 18.2 | 2.5 |
| 2 | 9.46 | 30.4 | 5.3 | 3.39 | 17.7 | -2.9 | 1.39 | 24.5 | 5.0 |
| 3 | 14.04 | 30.9 | 7.8 | 2.82 | 21.3 | -5.3 | 1.32 | 28.1 | 7.5 |
| 4 | 18.43 | 31.6 | 10.2 | 2.49 | 24.1 | -8.0 | 1.25 | 30.0 | 10.0 |
| 5 | 22.62 | 32.5 | 12.4 | 2.29 | 26.2 | -10.9 | 1.17 | 30.7 | 12.5 |
| 6 | 26.57 | 33.5 | 14.4 | 2.16 | 27.8 | -13.9 | 1.11 | 30.7 | 15.0 |
| 7 | 30.26 | 34.7 | 16.2 | 2.07 | 29.0 | -16.9 | 1.04 | 30.2 | 17.5 |
| 8 | 33.69 | 36.1 | 17.8 | 2.01 | 29.8 | -19.9 | 0.98 | 29.3 | 20.0 |
| 9 | 36.87 | 37.5 | 19.3 | 1.97 | 30.4 | -22.8 | 0.93 | 28.2 | 22.5 |
| 10 | 39.81 | 39.1 | 20.6 | 1.95 | 30.8 | -25.7 | 0.88 | 27.1 | 25.0 |
| 11 | 42.51 | 40.7 | 21.7 | 1.94 | 31.0 | -28.4 | 0.84 | 25.9 | 27.5 |
| 12 | 45.00 | 42.4 | 22.7 | 1.93 | 31.1 | -31.1 | 0.80 | 24.8 | 30.0 |
| 13 | 47.29 | 44.2 | 23.6 | 1.93 | 31.0 | -33.6 | 0.76 | 23.7 | 32.5 |
| 14 | 49.40 | 46.1 | 24.4 | 1.94 | 30.9 | -36.0 | 0.73 | 22.6 | 35.0 |
| 15 | 51.34 | 48.0 | 25.1 | 1.96 | 30.7 | -38.4 | 0.70 | 21.6 | 37.5 |
| 16 | 53.13 | 50.0 | 25.7 | 1.97 | 30.4 | -40.6 | 0.68 | 20.7 | 40.0 |
| 17 | 54.78 | 52.0 | 26.3 | 1.99 | 30.2 | -42.7 | 0.66 | 19.8 | 42.5 |
| 18 | 56.31 | 54.1 | 26.8 | 2.01 | 29.8 | -44.8 | 0.64 | 19.0 | 45.0 |
| 19 | 57.72 | 56.2 | 27.2 | 2.03 | 29.5 | -46.7 | 0.62 | 18.2 | 47.5 |
| 20 | 59.04 | 58.3 | 27.6 | 2.06 | 29.2 | -48.6 | 0.60 | 17.5 | 50.0 |
| 21 | 60.26 | 60.5 | 27.9 | 2.08 | 28.8 | -50.5 | 0.58 | 16.9 | 52.5 |
| 22 | 61.39 | 62.6 | 28.2 | 2.11 | 28.5 | -52.2 | 0.57 | 16.2 | 55.0 |
| 23 | 62.45 | 64.9 | 28.5 | 2.13 | 28.1 | -53.9 | 0.56 | 15.7 | 57.5 |
| 24 | 63.43 | 67.1 | 28.8 | 2.16 | 27.8 | -55.6 | 0.54 | 15.1 | 60.0 |
| 25 | 64.36 | 69.3 | 29.0 | 2.19 | 27.4 | -57.2 | 0.53 | 14.6 | 62.5 |
| 26 | 65.22 | 71.6 | 29.2 | 2.21 | 27.1 | -58.7 | 0.52 | 14.1 | 65.0 |
| 27 | 66.04 | 73.9 | 29.4 | 2.24 | 26.8 | -60.2 | 0.51 | 13.7 | 67.5 |
| 28 | 66.80 | 76.2 | 29.6 | 2.27 | 26.4 | -61.7 | 0.50 | 13.3 | 70.0 |
| 29 | 67.52 | 78.5 | 29.7 | 2.30 | 26.1 | -63.1 | 0.49 | 12.9 | 72.5 |
| 30 | 68.20 | 80.8 | 29.9 | 2.33 | 25.8 | -64.5 | 0.48 | 12.5 | 75.0 |
| 31 | 68.84 | 83.1 | 30.0 | 2.35 | 25.5 | -65.8 | 0.48 | 12.1 | 77.5 |
| 32 | 69.44 | 85.4 | 30.1 | 2.38 | 25.2 | -67.2 | 0.47 | 11.8 | 80.0 |
| 33 | 70.02 | 87.8 | 30.2 | 2.41 | 24.9 | -68.5 | 0.46 | 11.5 | 82.5 |




1. The roof slope and span distance must be known to use this calculator.
2. The coefficient of friction between the snow and the surface on which it slides is assumed to be zero in these calculations. This yields the worst case terms of speed and distance.
3. The horizontal distance that snow will fall beyond the eaves is the maximum distance that snow sliding all the way from the ridge will land. Snow will land throughout the range from directly below the eaves to this maximum distance.

**General Notes:**

a. This calculator is for slippery metal or membrane roofs (e.g., EPDM or Hypalon)
b. Snow can fall to lower entrance roofs (at their ridges or eaves) under the eaves of higher roofs, or all the way to the groun
c. Choose the appropriate slope from the choices above and follow that row across the table
d. Up is assumed to be the positive sign direction.
e. If a velocity is negative, then it is in the downward directior
f. The equations assume that the snow is sliding to the right side (positive). To make the lower gable in the illustration work in this manner, "walk arounc to the other gable end

**International Conference on Building Envelope Systems and Technologies (ICBEST-2001)**
Ottawa, Canada

# MINIMIZING THE ADVERSE EFFECTS OF SNOW AND ICE ON ROOFS

James Buska[1] and Wayne Tobiasson[2]

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2 P.E., Research Civil Engineer retired and now volunteering at CRREL. WEWorkshop@aol.com

**ABSTRACT**

Snow load design criteria in the United States are established in ASCE Standard 7, "Minimum Design Loads for Buildings and Other Structures." The information in that standard documents how dramatically the geometry of a building can influence snow loads on its roof. Problems can be avoided and more functional designs developed when the design team considers snow and ice issues early in the design process as the shape of the building evolves. Examples are presented to document how the adverse effects of snow drifting, sliding snow, ice damming, and snow ingestion can be minimized.

## 1. INTRODUCTION

Building configuration and its thermal design can dramatically influence the distribution of snow and ice on its roof. The snow load provisions of ASCE Standard 7 [1] document how the geometry and thermal characteristics of a building affect snow loads on its roof. Problems can be avoided and more functional designs developed when snow and ice issues are considered as the design of the building evolves.

## 2. DRAINAGE

Most steep roofs drain over their eaves. Some low-slope roofs also drain to cold eaves, but others drain internally. Over-the-eaves

drainage in cold climates can result in the problems shown in Figure 1 and the following:

- Creeping, sliding, and falling snow and ice should be anticipated from roofs that drain to cold eaves. Property has been damaged and people have been injured and killed by snow and ice falling from roofs that slope to cold eaves. Steep slopes, warm roofs, and slippery surfaces increase these risks.
- Falling ice and snow can damage lower roofs.
- Meltwater can cause problems associated with excess ground water and below-grade dampness beneath the eaves.
- Problematic icicles and ice dams can develop on warm roofs that drain to cold eaves (Fig. 2). Meltwater that backs up behind such icings may leak into buildings, causing serious interior damage and possible loss of occupancy.
- Roofing system deterioration can result from leaks due to severe winter icings.
- Snow and ice removal operations in response to winter roof leaks at cold eaves usually damage the roofing and create more leaks.
- Icicles and ice dams can create heavy concentrated loads along eaves.
- Narrow eaves or inadequate drip edges can cause icing of walls, which then deteriorate rapidly. A 12-inch overhang is a good minimum in cold climates. Wider overhangs may produce bigger icings.
- Ice dams or ice-blocked scuppers and leaders can cause extensive ponding on low-sloped roofs. This increases the potential for leaks and progressive collapse.

In cold climates, internally drained low-slope roofing systems have an important advantage over systems that drain to cold eaves, since they avoid all of the above problems. Unfortunately, it is impractical to drain low-slope metal roofs internally.

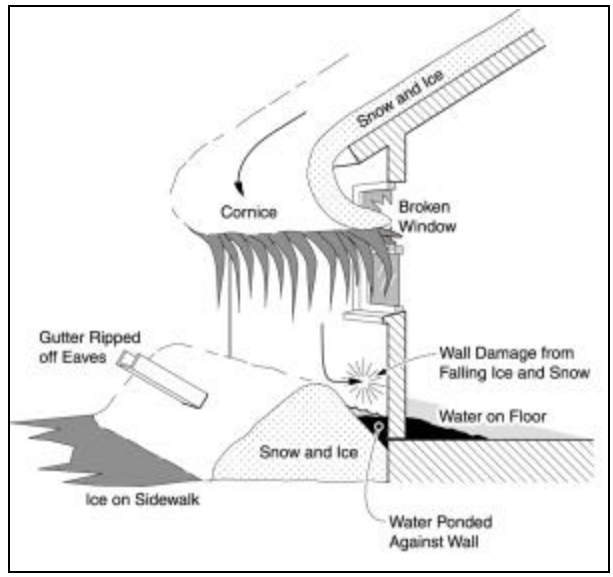


Figure 1. Over-the-eaves drainage problems.

Figure 2. This large ice dam caused this metal roof to leak at its eaves.

Because of waterproofing issues, a dead flat roof is a design mistake. Membrane roofing systems with a slope of ¼ inch/foot to internal drains are appropriate. It is not necessary to increase the slope of such roofs to ½ inch/foot in snow country. Switching from internal drains to over-the-eaves drainage or scuppers along a raised edge can lead to problematic, dangerous icings, ponding of water over large areas of the membrane, and inevitable leaks.

## 3. SNOW DRIFTING

Snow will drift into areas of "aerodynamic shade." Figure 3 illustrates such places and the

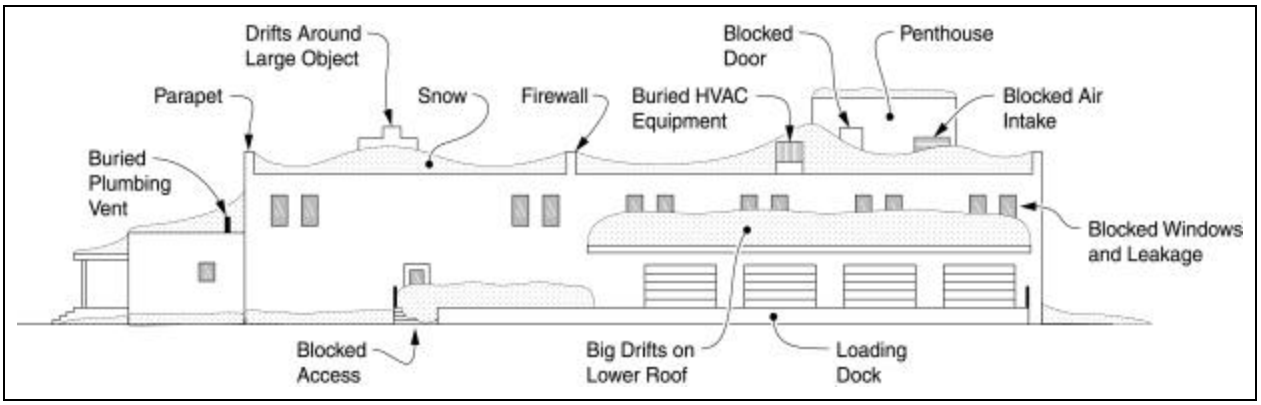


Figure 3. Snow drifts and their consequences.

kinds of problems that are encountered. Drifted snow can then affect the operation of plumbing and HVAC equipment or restrict access to the facility. Solutions to these problems are generally self-evident (e.g., place air intakes high up on the wall, keep windows at roof steps as high above the lower roof as possible, locate plumbing vents and HVAC equipment away from places where drifts are to be expected).

Figure 4. The peak snow load of this drift was 130 psf. The ground snow load at the time was 20 psf, and the snow load on the upper roof was 15 psf.

Big drifts often form on lower roofs. Figure 4 shows a large snow load due to drifting on a flat lower roof. The peak snow load on the lower roof is about nine times the load on the upper roof.

ASCE Standard 7 requires designers to assume that the high winds that cause snow to drift could come from any direction. Nonetheless, information should be sought from "locals" on drift orientation. Where such information indicates strong preferential orientation of snow drifting, give thought to placing drift-prone features (e.g., loading dock roofs) either upwind or alongside the building rather than at its downwind end. Design loads will not change, but the amount of drifting may be reduced significantly (Fig. 5). Raising or

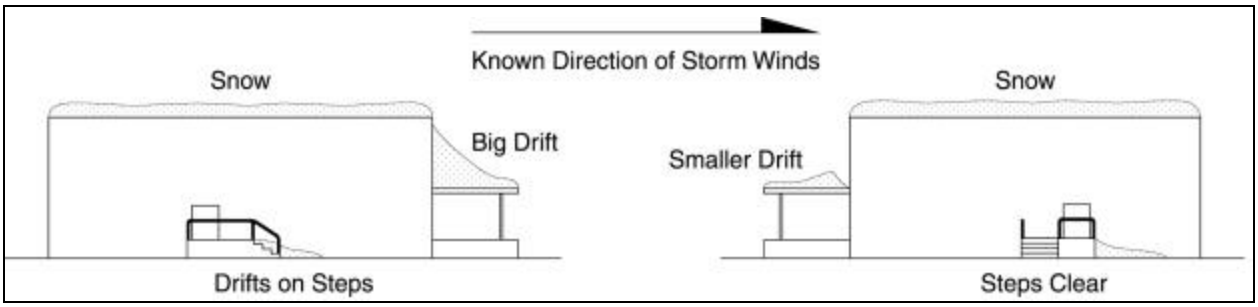


Figure 5. Orienting buildings with respect to the known direction of winter storm winds can reduce actual drifting, even though design loads do not change.

sloping roofs over the loading docks can also reduce drift loads. However, sloping may introduce drainage, ice damming, and sliding snow problems.

## 4. SLIDING SNOW

The ability of slippery unobstructed roofs to shed snow loads by sliding can be an advantage and a disadvantage [2, 3, 4]. Loads on a roof are reduced when snow slides off, but loads will increase on any lower roofs onto which that snow slides. If snow or ice drops some distance, dynamic loads may be imposed on a lower roof or on an object located below (Fig. 6). Several sliding snow issues are illustrated in Figure 7.

Figure 6. Vehicle damaged by snow and ice that fell from a roof.

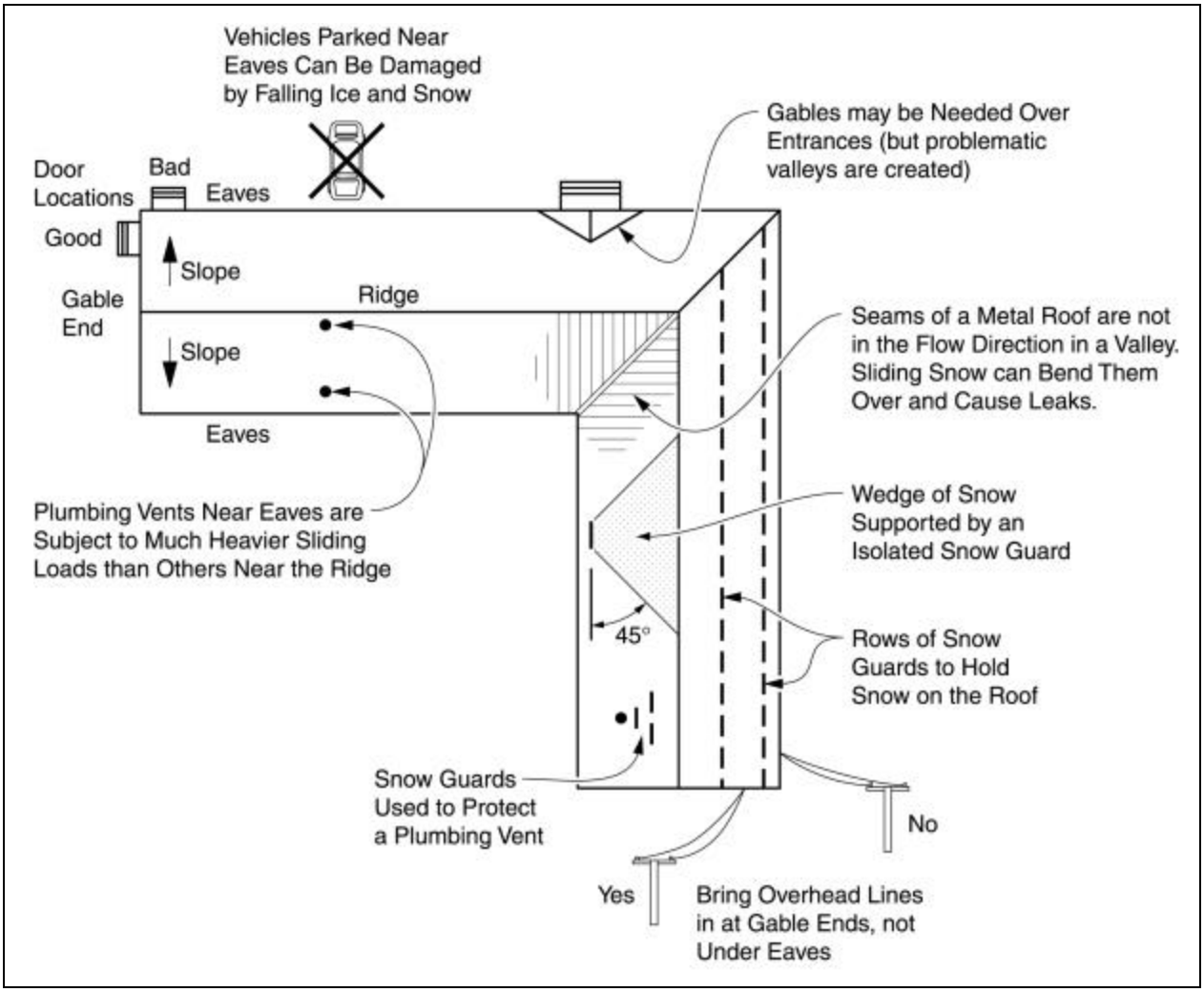


Figure 7. Plan view of a gabled-roof building showing some sliding snow issues.

Snow and ice sliding off sloped slippery roofs can damage property and injure people as far as 30 feet away from two-story facilities. Snow sliding off roofs can block pedestrian and vehicle access. Providing access at the gabled ends of a facility is one way to avoid such hazards (Fig. 7). Entrances located under eaves should be covered.

Snow can creep and glide slowly down slippery surfaces, even those with very shallow slopes. Moving snow can drag plumbing vents (Fig. 8) and other roof penetrations with it, damaging them and creating holes in the roof (Fig. 9) and leaks. By minimizing the number of roof penetrations on slippery roofs and placing them near the ridge, such problems can be reduced. Penetrations that must be placed farther down a slippery roof should be strengthened or protected by snow guards (Fig. 7). If snow slides from roofs having gutters, they will probably be ripped off. Parapets and fascias can also be damaged. Flow of snow down valleys can bend the standing seams of metal roofing, reducing their strength and violating their waterproofing integrity (Fig. 7).

Electrical service entrance cables and other overhead lines located below eaves can be ripped loose by falling snow or damaged by the weight of ice that collects on them from roof meltwater (Fig. 7 and 10).

Large curling snow cornices can be created at eaves (Fig. 1). Such cornices can be quite heavy, and they may curl around enough to damage walls and windows. When they break off, piles of snow and ice are created on the ground. These piles may deflect falling snow sideways towards walls, damaging them. Meltwater that drips onto these piles can enter the building at the base of the wall if that base is not far above the finished grade outside.

Consideration must be given to the fate of meltwater draining onto lower roofs. That meltwater will exacerbate the problems of icings at lower eaves. In addition, lower roofs may need protection from damage due to snow and ice falling from higher roofs. Snow guards may be needed to hold snow in place on slippery roofs.

Figure 8. Plumbing vent displaced by snow creeping down a slippery metal roof.

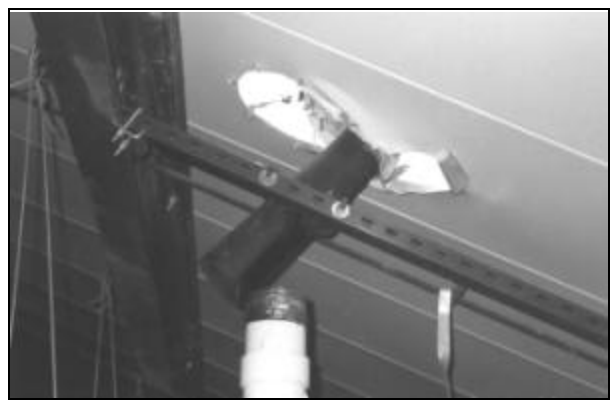

Figure 9. Tear in metal roof caused by plumbing vent displacement shown in Fig. 8.

Figure 10. Electrical service entrance cables should not be located below cold eaves.

## 5. SNOW GUARDS

Snow guards are objects used to hold snow on slippery roofs. Many slate and metal roofs require snow guards to protect people and property. Snow guards may also be needed on barrel vaults and other such roofs with smooth membranes. Some snow guards are attached mechanically, while others are adhered to the roof surface. Design loads on snow guards should be based on the assumption that friction between the snow and the roof is zero. Multiple rows of snow guards spaced well apart up the roof are better at holding snow in place (i.e., avoiding the dynamic loads created by sliding snow) than one row of last-resort snow guards placed near the eaves. A short snow guard on a long roof without other snow guards must be able to resist all the snow located within outward 45° angles upslope of its location (Fig. 7). The loads at the ends of such a snow guard are about twice the average load on it. The design load on a snow guard should be less than half of any failure load reported by its manufacturer. In high-risk situations (e.g., entrances and emergency exits of schools), allowable loads on snow guards should be even lower. Design guidance, test data, and performance standards on snow guards are limited, so they should be used with caution. Some guidelines are available in the paper "Snow Guards for Metal Roofs" [5].

## 6. ICICLES AND ICE DAMS

Large icicles and ice dams can form along the eaves of inadequately insulated and ventilated roofs of heated buildings that drain to cold eaves (Fig. 11). Meltwater that backs up behind such icings may leak into buildings, causing serious interior damage and possible loss of occupancy. Icings at eaves prevent snow load reductions by sliding until that ice warms up and either melts or breaks free. Falling ice is a hazard (Fig. 6).

Figure 11. Severe icings developed all along the eaves of this facility.

Figure 12. Electric heaters can create tunnels, which limit ponding behind ice dams on roofs.

An adhered waterproof membrane is needed under steep roofing such as shingles at valleys, around skylights and other large penetrations, and along eaves to avoid leaks when icings back up water in these places.

On existing buildings, electric heaters may be needed to keep small tunnels melted through ice dams (Fig. 12). The tunnels allow meltwater to run off the roof, reducing the potential for ponding, roof leakage, and ice dam growth. Electric heaters are relatively easy to install along the eaves of a roof with asphalt shingles. Installing electric heaters on standing seam metal roofs is more difficult. Guidelines are available in the paper "Electric Heating Systems for Combating Icing Problems

on Metal Roofs" [6]. Slippery surfaced roofs with electric heaters need snow guards to prevent heater damage by moving snow. New roofs should be designed so that they do not require electric heaters.

## 7. ROOF VENTILATION

Problematic icings at eaves can be avoided when roof ventilation systems are able to keep the temperature of the roof from rising above 32°F when the temperature outside is about 22°F. When it is warmer outside, icings usually do not grow, and when it is colder outside, less ventilation is needed.

Equations for sizing attic ventilation systems are presented in the article "Attic Ventilation Guidelines to Minimize Icings at Eaves" [7]. Equations and graphs for sizing ventilation systems for sloped roofs with cathedral ceilings are presented in the article "Ventilating Cathedral Ceilings to Prevent Problematic Icings at Their Eaves" [8]. The extra cost of adequately insulating and ventilating a roof to limit icings is easy to justify since the water that ponds behind ice dams is apt to leak into the building, causing significant problems.

Details often determine the success or failure of ventilation systems. Many "as-built" ventilation systems contain constrictions and blockages, which greatly diminish their performance. Attention must be given to minimizing exfiltration of warm, moist indoor air up into attics and cathedral ceiling airways, since it can significantly reduce the effectiveness of ventilation provisions. Vapor retarders are often necessary in cold climates. Air leakage at gaps in poorly installed vapor retarders is often the reason for moisture problems within roofing systems in cold climates. Vapor retarder continuity is essential.

Complex roof geometry tends to create problems in cold climates [3, 4, 9]. Simple, sloped roofs with cathedral ceilings are relatively easy to ventilate, but roofs with valleys, dormers, and other complications often require provisions such as cross-purlins to interconnect airways and move cold ventilating air into these areas as shown in Figures 13 and 14 [10, 11]. However, some fire codes restrict or prohibit this type of roof ventilation.

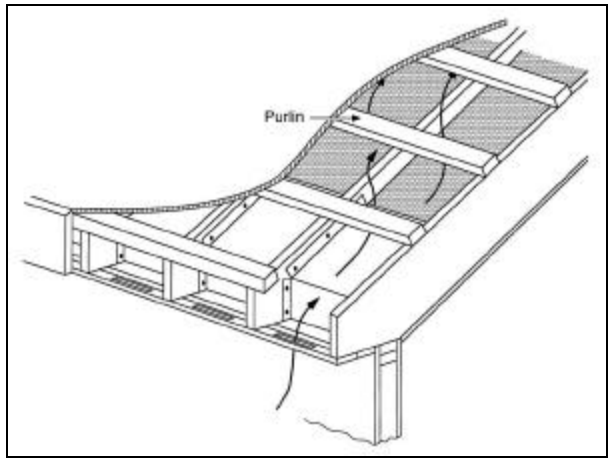


Figure 13. Use of cross-purlins to interconnect the airways of a roof.

Figure 14. Cross-purlins allow ventilation of this valley.

## 8. SNOW INGESTION

Snow ingestion can become a problem at roof ventilation openings. Wind baffles are effective at directing wind-blown snow up and over ridge vents [11]. On occasion, intakes at eaves may have to be baffled to block infiltrating snow.

## 9. CONCLUSIONS

Problems can be avoided and more functional designs developed when snow and ice issues are considered as the design of a building evolves. With a little thought during the design phase, the adverse effects of snow drifting on roofs can be minimized.

Low-slope roofs that drain to cold eaves are particularly problematic in cold climates. It is better to drain low-slope roofs internally, since that avoids all of the over-the-eaves drainage problems mentioned in this paper. It is impractical to drain low-slope metal roofs internally.

Roofs that drain to cold eaves can encounter snow and ice related problems in cold climates. Snow guards may be needed on slippery-surfaced roofs to prevent damaging snow movement. Icings at eaves are minimized when roofs are well insulated and ventilated.

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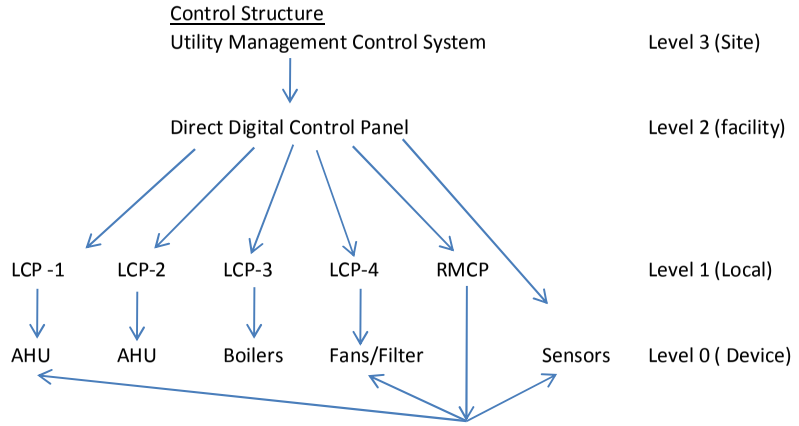
[11] Tobiasson, W. (1994) "General Considerations for Roofs," Chapter 16 in ASTM Manual 18, *Moisture Control in Buildings*, American Society for Testing and Materials, Philadelphia, PA, USA, pp. 291-320. Also available as CRREL Miscellaneous Paper 3443.

Indoor Range 1BCT PN 717127 FY 2010 Fort Drum, NY
Points List

| | Discharge Air Temperature | Static Pressure | Filter Status | Smoke Detector | Supply Fan Start/stop with VFD | Supply Fan Run Status | Supply Fan fault Status | Space Temperature | Motor operated damper position | Supply Fan Flow Rate | Burner Status | Burner Fault | Primary Pump Status | Primary Pump Fault | Secondary Pump Status | Secondary Pump Fault | Motor Operated Valve Position | Primary Loop Temperature | Secondary Loop Temperature | Sensors as required to operate pumps, boilers | Safeties | Pump flow rate | Fan Start stop with VFD | Fan run Status | Pre-filter status | Static pressure (HEPA Filter) | HEPA Filter Status | Flow Switch | Hand, off, auto switch | Lighting control | Alarms -- Visual "DO NOT SHOOT, SAFE TO SHOOT, WARNING" | Alarms -- Audible | Range AHU Supply fan airflow readout | Range AHU Exhaust Fan airflow readout | Pressurization indicator - green ok, red warning | Gas Meter | Outside Air Temperature | Room Air Temperature | Bullet Trap door opened/closed | Range doors opened/ closed | Range to range officer booth air pressure differential |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Local Control Panel (LCP-1) Range Air Handling Unit | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Local Control Panel (LCP-2) Office/ Classroom Air handling Unit | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Local Control Panel (LCP-3) Boiler Control Panel | | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| Local Control Panel (LCP-4) Exhaust Fan and Filter Bank | | | | | | | | | | | | | | | | | | | | | | | X | X | X | X | X | X | | | | | | | | | | | | | |
| Range Management Control Panel (RMCP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | X | X | X | X | X | X | | | | | | |
| Sensors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | X | X | X | X | X |
| Input from Utility Management Control System to DDC | | | | | X | X | X | X | | | | | X | X | X | X | | | | | | | X | X | | | | | | | | | | | | | | | | | |
| Output from DDC to Utility Management Control System | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | X | X | X | X | X | X | X | | | X | | | | X | X | X | X | X | X | X |
| Note: this points list indicates some of the required points, any additional points required to provide a complete functioning system shall also be provided. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



# REQUIREMENTS AND GUIDANCE FOR IMPLEMENTING THE BIOLOGICAL OPINION FOR THE FEDERALLY-ENDANGERED INDIANA BAT ON FORT DRUM MILITARY INSTALLATION

**JUNE 2010**

**Prepared By:**
**U.S. Army Garrison Fort Drum**
**Fish & Wildlife Management Program**
**Environmental Division, Directorate of Public Works**

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**MANDATORY TRAINING REQUIREMENT:**

The Environmental Division will provide mandatory annual endangered species training for all project personnel that are directly or indirectly responsible for actions conducted on Fort Drum. Therefore, your organization should maintain a list of personnel responsible for these types of actions, and if new personnel enter your organization and are tasked with these requirements, they should immediately be identified to the Environmental Division for training. Please contact 772-6108 or 772-4999 to schedule training for your organization.

**ANNUAL REPORTING REQUIREMENTS:**

Information on construction and vegetation management activities (e.g., maintaining right-of-ways for roads, railroad tracks, and utility lines; clearing vegetation from trails and fencelines; mowing open areas; removing individual trees due to hazards or aesthetics, roots growing into underground pipes or branches growing into utility lines; pesticide/herbicide application, etc.) must be tracked and submitted quarterly (June 30, September 30, December 31, March 31) to the Fort Drum Fish and Wildlife Management Program. Mowing of landscaped yards does not need to be reported.

Additionally, electronic maps of the project limits must be submitted to Fort Drum's Fish and Wildlife Management Program in the form of an appropriately formatted and scaled GIS shapefile or DGN prior to the project (as accurate as possible). A final electronic GIS shapefile or DGN "As Built" must be submitted after the completion of the project (accurately surveyed). If only individual trees greater than 4 inches (diameter breast height) are to be removed, then a list of the tree count, diameters, and species must be submitted via the Record of Environmental Consideration (REC) process prior to the action. DPW-Environmental can assist with this requirement as requested.

**WHAT TO DO IF YOU FIND BATS:**

All bats found must be immediately reported to Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636). Do not attempt to handle any live bats, regardless of condition. If a live bat is found in a building please contact 772-2072 or 772-4999.

All applicable measures/requirements below are to be followed by your organization.

**CONSTRUCTION:**

1. If any bats are discovered during the demolition or repair of buildings (to include work such as complete and partial building demo, removal/replacement of roofs, siding, etc.), all work must cease and Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) must be immediately contacted. If the building has pre-existing known bat colonies, then Fort Drum's Fish and Wildlife Management Program must be contacted before work is to occur. (Currently, only buildings within Fort Drum's historic LeRay Area are known to contain bat colonies).

2. A Bat Conservation Area (BCA) has been established to protect known Indiana bat roosting and foraging areas from permanent development within the Cantonment Area and Training Areas 3A and 4A. No permanent facility is to be constructed within the BCA, with the exception of some small facilities (e.g. cabins, picnic shelters, parking lots, a campground, etc.)

that may impact no more than 8 ac (3 ha). These actions must be coordinated with Fort Drum's Fish and Wildlife Management Program. The BCA GIS layer is available from the Public Works GIS offices (772-5709 or 772-1502).

3. New buildings should be appropriately designed and constructed so cracks and crevices are not created, vents are screened, etc. Properly constructed buildings will discourage bats from roosting in buildings, thus minimizing human/bat conflicts in occupied dwellings.

4. For all future projects, light minimization measures are to be incorporated that may include but are not limited to full cutoffs, reflectors, shields, and/or downward angling of lights. The following are guidelines that have been established for light minimization within the draft Installation Design Guide and must be followed to the maximum extent possible. Additional guidance and clarification can also be found in the Lighting Guidance document in Appendix 2:

a. Maximum light at the edge of parking lot/road pavement will be 2 foot candles or its equivalent.
b. Light levels for parking lots/sidewalks shall be in accordance with Illuminating Engineering Society (IES) Lighting Handbook.
c. A Professional Engineer must review the lighting plan and ensure it is sound and meets minimization requirements.
d. Use full cutoff luminaires for road, parking lot, and sidewalk illumination. These are luminaires that allows no direct light emissions above a horizontal plane through the luminaire's lowest light emitting part.
e. Use downward-angling lights and appropriate shields in all applicable locations.

5. No night lighting for construction projects is authorized without prior coordination and authorization from the project manager and Fort Drum's Fish and Wildlife Management Program.

6. Project planning and design should attempt to minimize building footprints by combining infrastructure (i.e. roads, utility lines, etc.) for multiple buildings or by constructing multi-story versus multiple or expanded single story buildings whenever possible.

7. All construction projects over an acre are required to prepare a sediment and erosion control plan or a storm water pollution prevention plan (SWPPP), which details all erosion and sediment control practices and, when necessary, post-construction storm water management practices.

8. Stormwater management plans should be reviewed with the objective of moving towards integrated infrastructure to reduce the number or completely eliminate the need for stormwater retention ponds and the excessive land use required.

9. Flagging or signs must be used to demarcate forested areas to be cleared vs. not cleared prior to any construction activities for a given project. Flagging must be removed upon completion of the project.

10. All personnel responsible for construction activities will be informed about the need to follow design plans, stay within flagging, minimize impacts to wildlife, and other environmental

concerns. This may be done through training, Environmental Protection Plans and/or other contract language.

11. The project proponent must ensure coordination with the Forest Management Program and the Fish and Wildlife Management Program prior to felling trees greater than 4 inches (diameter breast height).

12. Felling of trees greater than 4 inches (diameter breast height) must occur between October 1- April 15.

13. Clearing of natural vegetation (e.g., shrubs and trees) less than 4 inches (diameter breast height) should typically occur between August 1 - April 15 to minimize the impact to migratory birds and to maintain foraging areas for bats. The project proponent must ensure coordination with the Fish and Wildlife Management Program, via the REC process or direct contact, prior to clearing of any natural vegetation less than 4 inches (diameter breast height).

14. No new trails may be constructed within the Bat Conservation Area (BCA) without prior coordination with Fort Drum's Fish and Wildlife Program (772-4999 or 772-9636) and consultation with the USFWS.

15. All female roost trees, including roosts identified in the future, will be protected from construction for the lifespan of the roost tree. Additionally, a buffer will be placed around all female roosts to protect the roost from disturbance and to maintain a semblance of a natural environment for Indiana bats. The size and shape of a buffer will be determined on a case by case basis by Fort Drum's Fish and Wildlife Management Program in consultation with the United States Fish and Wildlife Service. Coordinate with Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) to determine roost locations.

16. If wetland mitigation is required, only areas (both on- and off-post) that have no or minimal (e.g., a few isolated trees within a landscape of open grass or shrubland) tree removal will be recommended for wetland mitigation sites. The exception to this would be restoring or creating forested wetlands.

**MECHANICAL VEGETATION REMOVAL AND MANAGEMENT:**

1. A Bat Conservation Area (BCA) has been established to protect known Indiana bat roosting and foraging areas from permanent development within the Cantonment Area and Training Areas 3A and 4A. No permanent facility is to be constructed within the BCA with the exception of some small facilities (e.g., cabins, picnic shelters, parking lots, a campground, etc.) that may impact no more than 8 ac (3 ha). Coordinate with Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) for all vegetation management actions in the BCA. The BCA GIS layer is available from the Public Works GIS offices (772-5709 or 772-1502).

2. All female roost trees, including roosts identified in the future, will be protected for the lifespan of the roost tree. Additionally, a buffer will be placed around all female roosts to protect the roost from disturbance and to maintain a semblance of a natural environment for Indiana bats. The size and shape of a buffer will be determined on a case by case basis by Fort Drum's Fish and Wildlife Management Program in consultation with the U.S. Fish and Wildlife Service

(USFWS). Coordinate with Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) to determine roost locations.

3. The project proponent must ensure coordination with the Forest Management Program and the Fish and Wildlife Management Program prior to felling trees greater than 4 inches (diameter breast height).

4. Felling of trees greater than 4 inches (diameter breast height) must occur between October 1 - April 15, unless a high risk hazard tree has been identified by the Forest Management Program (772-5614 or 772-6767). All trees that are believed to be hazards need to be assessed by the Forest Management Program. They will determine whether or not the trees are truly a hazard, and it will then be determined when the trees need to be removed. If a hazard tree is determined to be of high risk, is greater than 4 inches (diameter breast height), and needs to be removed between April 16 - September 30, the Fort Drum Fish and Wildlife Management Program must be notified in advance so they may also assess the tree. If appropriate, an emergence survey will be conducted and if no bats are observed, then the hazard tree must be promptly removed.

5. Trees that are considered aesthetically unappealing for landscaping purposes may be removed during the tree clearing window (October 1 - April 15) if it is not a known roost tree. These trees are typically trees that have structural defects, do not leaf-out completely, and/or are dead. Trees that need to be removed for aesthetic reasons are not the same as hazard trees, because they do not pose an immediate risk to harming people or are damaging property. See above for a description of hazard tree management.

6. Clearing of natural vegetation (e.g., shrubs and trees) less than 4 inches (diameter breast height) should typically occur between August 1 - April 15 to minimize the impact to migratory birds and to maintain foraging areas for bats. This excludes mowing of landscaped yards, which are generally defined as those areas that are adjacent to buildings and/or contain grasses less than 4 inches tall. The project proponent must ensure coordination with the Fish and Wildlife Management Program, via the REC process or direct contact, prior to clearing of any natural vegetation less than 4 inches (diameter breast height).

7. If soils are impacted by vegetation clearing, degraded areas should be repaired via actions that may include grading, compacting, seeding, and application of fertilizer, lime, and mulch. This minimizes erosion run-off into waterways, and thus protects water quality and associated invertebrate abundance, including possible prey for Indiana bats.

8. Vegetation management activities should typically avoid delineated water bodies/wetlands. Although there is no formal buffer requirement around wetlands, a 20-30 ft (6-9 m) buffer is typically maintained around identified wetlands. This leads to less impacts to water quality and protects water sources for Indiana bats.

**PESTICIDE/HERBICIDE APPLICATION:**

1. Only pesticides registered by the Environmental Protection Agency and State of New York and listed within the Biological Assessment for the Indiana bat may be applied and only in accordance with their label.

2. Aerial application of pesticides in the Bat Conservation Area (BCA) is prohibited. The BCA GIS layer or map is available from the Public Works GIS offices (772-5709 or 772-1502).

3. Aerial application of pesticides outside the BCA must occur between the hours of sunrise and 1 hour before sunset.

4. Application of pesticides that result in broad dispersal (i.e. vehicle mounted spraying) will be conducted at least 100 ft (30 m) away from known roost trees (including roosts identified in the future) and 250 ft (76 m) from known primary roosts. Coordinate with Fort Drum's Fish and Wildlife Management Program to determine known roost locations. Location-specific applications (i.e., hatchet injections of trees, individual application to specific plants) may be used within 100-250 ft (30-76 m) of known roosts.

5. No pesticides are to be applied outdoors when the wind speed exceeds 5 mi (8 km) per hour. Care needs to be taken to make sure that any spray drift is kept away from non-target areas and individuals.

6. Areas where herbicide will be applied aerially must be delineated by painted boundaries or other markers on the ground.

7. Helicopters are to be used for aerial application of herbicides to provide good precision and accuracy in application.

8. No herbicides will be sprayed over New York State Department of Environmental Conservation Article 24 classified wetlands (plus a 100 foot buffer surrounding the wetland) or any created wetland mitigation sites. Only herbicide approved for aquatic areas will be used in any other wetland areas that may be over-sprayed.

9. If a bat colony is found roosting in a building, then insecticides are to be used sparingly and no foggers are to be used.

**PRESCRIBED FIRE:**

1. Prescribed burns must take place between September 15-May 15.

2. Prescribed fire work plans must be adequately written to address where, when, and how fires are set. Smoke and flames should be managed to avoid forested areas where Indiana bats are known to roost. Coordinate with Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) to determine roost locations.

3. Wet lines must be established around forested areas to preclude fire from entering, to the maximum extent practicable.

4. Whenever possible, all efforts should be made to have all flames extinguished and smoke generation minimized by sunset to reduce potential direct impacts to foraging Indiana bats.

**SILVICULTURE AND FOREST MANAGEMENT:**

1. A Bat Conservation Area (BCA) has been established to protect known Indiana bat roosting and foraging areas from permanent development and habitat loss within the Cantonment Area and Training Areas 3A and 4A. No timber harvests will occur within the BCA until an appropriate management plan has been developed and consulted on with the US Fish and Wildlife Service (USFWS). If there is a bona fide need for timber harvesting in the BCA, consultation will have to be reinitiated. The BCA GIS layer is available from the Public Works GIS offices (772-5709 or 772-1502).

2. All female roost trees, including roosts identified in the future, will be protected for the lifespan of the roost tree. Additionally, a buffer will be placed around all female roosts to protect the roost from disturbance and to maintain a semblance of a natural environment for Indiana bats. The size and shape of a buffer will be determined on a case by case basis by Fort Drum's Fish and Wildlife Management Program in consultation with the USFWS. Coordinate with Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) to determine roost locations.

3. Clearcutting and overstory tree removal are not to occur within 0.75 mi (1.2 km) of known maternity roost trees located outside the BCA without further consultation with the USFWS. Selective thinning may not occur within one tree height (based on the average height of the stand surrounding the roost: ~80 ft) of the known roost tree to minimize the risk of accidentally felling a known maternity roost during the non-hibernation season. For selective thinning harvests within 0.75 mi of a known maternity roost, all snags and live trees >16 inches (diameter breast height) that have noticeable cracks, crevices, or exfoliating bark are to be retained.

4. Clearing of natural vegetation (e.g., shrubs and trees) less than 4 inches (diameter breast height) should typically occur between August 1 - April 15 to minimize the impact to migratory birds and to maintain foraging areas for bats. The project proponent must ensure coordination with the Fish and Wildlife Management Program, via the REC process or direct contact, prior to clearing any natural vegetation less than 4 inches (diameter breast height)

5. Felling of trees greater than 4 inches (diameter breast height) must occur between October 1 - April 15, unless there is a bona fide silvicultural requirement or a high risk hazard tree has been identified by the Forest Management Program. No more than 500 ac (202 ha) of early successional forests or conifer forests east of the CSX railroad on clay, clay loam, loamy sand, silt loam, and silty clay soils will be harvested between August 15 - September 30. If a hazard tree is determined to be of high risk, is greater than 4 inches (diameter breast height), and needs to be removed between April 16 - September 30, the Fort Drum Fish and Wildlife Management Program must be notified in advance so they may also assess the tree. If appropriate, an emergence survey will be conducted and if no bats are observed, then the hazard tree must be promptly removed.

6. Felling of standing trees for firewood harvest must occur between October 1 - April 15, regardless of location, forest type, and/or soil type.

7. Prior to harvests that may occur in August or September, areas must be surveyed for Indiana bats by the Fish and Wildlife Management Program. Radio transmitters will be placed on any female Indiana bats that may be captured, and these bats will be tracked for the life of the transmitter. Should any female roosts be found in the area proposed for in-season clearing,

requirements # 3 and 4 will need to be followed, and additional consultation with the USFWS may be required.

8. For timber harvests that may occur in August and September, all snags must be left standing and an adequate amount of live residual trees will be left around each snag to minimize the effects of windthrow. In addition, live trees that are greater than 16 inches (diameter breast height) that have noticeable cracks, crevices, or exfoliating bark must not be felled and must also have adequate amounts of live residual trees surrounding it to minimize windthrow.

9. All snags will be left in silvicultural treatments unless there is a safety concern for the contractor, or unless the treatment is a salvage harvest or clearcut. Snags should be distributed and retained throughout the landscape. At a minimum, contractors are required to leave a minimum of three snags greater than 9 inches (diameter breast height) every five acres for all silvicultural treatments. Two snags must be "hard" (i.e. a snag expected to stand for a number of years and more than likely has exfoliating bark) and one snag must be "soft" (i.e. a snag that may or may not have exfoliating bark and has the potential to fall within a couple of years).

10. No trees are to be cut within or along the bed or bank of streams protected under Article 15 of the New York State Environmental Conservation Law unless required to meet specific management goals and only after obtaining a permit from New York State Department of Environmental Conservation (NYSDEC).

11. Vegetation management activities should typically avoid delineated water bodies/wetlands. Although there is no formal buffer requirement around wetlands, a 20-30 ft (6-9 m) buffer is typically maintained around identified wetlands. This leads to less impacts to water quality and protects water sources for Indiana bats.

12. A minimum of 70 sq ft of residual basal area, all snags, and all live trees greater than 16 inches (diameter breast height) that have noticeable cracks, crevices, or exfoliating bark must be retained around all perennial streams and open waterbodies (2 ac or greater in size) on Fort Drum. A perennial stream is defined as having flowing water year-round during a typical year.

13. Whenever possible, new log landings should be constructed at least 200 ft (61 m) from water bodies and wetlands.

14. Spill kits and oil absorbent mats should be present on log landings in case of fuel, lubricant or hydraulic fluid spills or leaks.

15. If soils are impacted by vegetation clearing, degraded areas should be repaired via actions that may include grading, compacting, seeding, and application of fertilizer, lime, and mulch.

16. Where possible, skid trail grade needs to be maintained at less than 15%. Where higher grade is unavoidable, the grade should be broken, drainage structures should be installed, and soil stabilization practices should be used where needed to minimize runoff and erosion.

17. Debarking and other damage to residual trees should be minimized wherever possible.

18. Stream crossings should only be used when absolutely necessary.

19. Streams should be crossed by the most direct route.

20. Ruts should be filled in, and water bars and erosion barriers should be installed to prevent or minimize erosion and sedimentation from roads, skid trails and log landings.

21. Erosion control measures need to be inspected within 24 hours after a rain event and checked once per week. Erosion controls should be maintained or removed as needed.

22. No machinery is to be operated in streams protected under Article 15 of the New York State Environmental Conservation Law without first obtaining a permit from NYSDEC.

23. During hardwood removals, dead or dying oak trees that may have been typically removed from the stand should be left in the targeted units. This is limited to areas that receive large amounts of sunlight during the day (e.g. the edge of the stand, near an opening within the stand, etc.) to provide roost trees for Indiana bats and other wildlife.

24. Whenever possible, a percentage of suitable live trees (i.e., trees that look as if they have the potential to develop into future snags) should be retained, so cavities appropriate for wildlife may develop and for future snag recruitment. Suitable trees should be long lived hardwoods >15 inches (diameter breast height) and have the greatest potential to develop cavities. In wetland areas 10 ac (4 ha) or larger with open water and shorelines greater than 30 m apart, 20 suitable trees should be left for every 50 ac (20 ha) harvested within 0.5 mi (0.8 km) of wetlands.

25. When possible, unique forest openings (e.g. patch cuts of aspen varying from 1-10 ac in size removed from the stand) should be provided.

**VERTEBRATE PEST CONTROL:**

1. All bats found must be immediately reported to Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636).

2. If any colonies of bats are found in structures and there is a requirement to remove/exclude them, any actions should only be done through a systematic process and after prior coordination with Fort Drum's Fish and Wildlife Management.

3. No lethal control methods are permitted for bats unless there is a suspected human health risk for exposure to rabies or other disease. If individual bats are in buildings and there is no evidence of maternity use, then all efforts must be made to safely capture and release individual bats. Or, bats may be excluded by establishing one-way valves over the roost's exit (if feasible). Exclusions may only be done from August - early May.

4. Sealing cracks and crevices in buildings must also be done during the late fall, winter, or early spring.

5. No adhesive traps used for rodents or insects are to be placed in such a manner that they could capture bats—glue traps are not to be placed in any crawl space or attic compartment within buildings or in areas where bats are known to occur.

**MILITARY TRAINING:**

1. A Bat Conservation Area (BCA) has been established to protect known Indiana bat roosting and foraging areas from permanent development and habitat loss within the Cantonment Area and Training Areas 3A and 4A. No permanent facility is to be constructed within the BCA. Temporary facilities for training purposes may be constructed within the BCA with prior coordination with Fort Drum's Fish and Wildlife Management Program (772-4999; 772-9636). The BCA GIS layer is available from the Public Works GIS offices (772-5709 or 772-1502).

2. No tree felling will occur in the BCA for training purposes. If tree felling must occur outside the BCA, prior coordination and approval by Fort Drum's Forest Management and Fish and Wildlife Management Programs must occur. Additionally, tree felling will be in accordance with Construction and Vegetation Removal Requirements below.

3. No new trails may be constructed within the Bat Conservation Area (BCA) without prior coordination with Fort Drum's Fish and Wildlife Program (772-4999 or 772-9636) and consultation with the USFWS.

4. Felling of trees greater than 4 inches (diameter breast height) must occur between October 1 - April 15, unless there is a bona fide training emergency or a high risk hazard tree has been identified by the Forest Management Program. No more than five projects per year are to occur during the restricted tree felling period (August 15 - September 30). No more than five acres of forested habitat may be removed per project, and projects must occur east of the CSX railroad line. all trees that are believed to be hazards need to be assessed by the Forest Management Program (772-5614 or 772-6767). They will determine whether or not the trees are truly a hazard, and it will then be determined when the trees need to be removed. If it is determined to be of high risk, is greater than 4 inches (diameter breast height), and needs to be removed between April 16- September 30, the Fort Drum Fish and Wildlife Management Program must be notified in advance so they may also assess the tree. If appropriate, an emergence survey will be conducted and if no bats are observed, then the hazard tree must be promptly removed.

5. Prior to tree clearing for training emergencies in August or September, project sites must be surveyed for Indiana bats. Radio transmitters will be placed on any female Indiana bats that may be captured, and these bats will be tracked for the life of the transmitter. Should any female roosts be found in the area proposed for in-season clearing, additional requirements may need to be followed, the project may need to be re-located, and/or additional consultation with the US Fish and Wildlife Service may be required. Coordinate with Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) for surveys and monitoring of Indiana bats.

6. All female roost trees, including roosts identified in the future, will be protected for the lifespan of the roost tree. Additionally, a buffer will be placed around all female roosts to protect the roost from disturbance and to maintain a semblance of a natural environment for Indiana bats. The size and shape of a buffer will be determined on a case by case basis by Fort Drum's Fish and Wildlife Management Program in consultation with the US Fish and Wildlife Service. Coordinate with Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) to determine roost locations.

7. Smoke and obscurants must be used greater than 100 meters from known Indiana bat maternity roost areas (including roosts identified in the future) between April 16 – September 30. Coordinate with Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) to determine roost locations. The use of smoke and obscurants must also be rotated among training areas to minimize impacts to any one area.

8. Smoke Operations must not occur within 1,000 meters of the installation boundary, public roads, Cantonment Area, ammunition supply point or WSAAF in accordance with *Fort Drum Regulation 350-4 Range Regulation*. The one exception is the use of colored smoke at three mobile MOUTs within the Local Training Areas. No other smoke or obscurant may be used in the BCA.

9. Vehicular traffic is restricted to open grassy areas and within easy access of the road in the Local Training Areas in accordance with *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas*. Vehicles are not permitted to cross streams, ditches, wetlands, or dense vegetation in order to reach grassy areas without prior NEPA review.

10. POL operations are prohibited in the Local Training Areas in accordance with *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas*.

11. Any changes to *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas* must be coordinated with Fort Drum's Fish and Wildlife Management Program (772-9636; 772-4999) since some Conservation Measures are based on these regulations.

12. Fort Drum must abide by the Fort Drum Integrated Wildland Fire Management Plan (2005) which includes fire danger ratings, unless under special circumstances that are approved by the commander. Military activities that may spark fires are not to be conducted during moderate to high danger ratings in order to prevent unintentional wildfires.

**RECREATION:**

1. The current skeet range is located adjacent to the Bat Conservation Area (BCA). Shooting at this facility sends fields of fire over known fall, summer, and assumed spring foraging locations for Indiana bats. From April 15 - October 15 the skeet range must not be operated between 1 hour before sunset to 30 minutes after sunrise to prevent the accidental shooting of an Indiana bat. The skeet range may be operated during daylight hours as before.

**APPENDIX 1: LANGUAGE FOR CONTRACTS, SOWs, RFPs, EPPs, etc:**

1. The federally endangered Indiana bat is present on Fort Drum and must be considered in all actions. Actions on Fort Drum, must be in accordance with requirements negotiated with the U.S. Fish & Wildlife Service under Section 7 of the Endangered Species Act. Projects involving ANY habitat modification (e.g., vegetation removal) must be addressed by Fort Drum's Fish and Wildlife Management Program. In general, no trees greater than 4 inches (diameter breast height) may be cut from 15 April - 01 October to avoid any direct adverse effects to the Indiana bat. Clearing of natural vegetation (e.g., shrubs and trees) less than 4 inches (diameter breast height) should typically occur between August 1 - April 15 to minimize the impact to migratory birds and to maintain foraging areas for bats. The contractor (and all subcontractors) shall be responsible for coordination with Fort Drum's Fish & Wildlife Management Program to ensure compliance with the Endangered Species Act and all other applicable laws and regulations pertaining to wildlife. Overall the contractor (and all subcontractors) shall minimize interference with, disturbance to, and damage to plants, fish, wildlife, and their habitats on and adjacent to the project area.

2. Flagging or signs must be used to demarcate areas to be cleared vs. not cleared prior to any construction activities or tree clearing for a given project. Clearing must only occur within the flagged area, and flagging must be removed upon completion of the project.

3. If any bats are discovered during the demolition or repair of buildings (to include work such as complete and partial building demo, removal/replacement of roofs, siding, etc.), all work must cease and Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636) must be immediately contacted. If the building has pre-existing known bat colonies, then Fort Drum's Fish and Wildlife Management Program must be contacted before demolition is to occur. (At this time, the only structures known to contain bat colonies are within the historic LeRay Area.).

4. All found bats must be immediately reported to Fort Drum's Fish and Wildlife Management Program (772-4999 or 772-9636). Do not attempt to handle any live bats, regardless of condition. If a live bat is found in a building please contact 772-2072 or 772-4999.

5. Light minimization measures are to be incorporated for all exterior lighting that may include but are not limited to full cutoffs, reflectors, shields, and/or downward angling of lights. The following are guidelines that have been established for light minimization within the draft Installation Design Guide and must be followed to the maximum extent possible. Additional guidance and clarification can also be found in the Lighting Guidance document in Appendix 2:

a. Maximum light at the edge of parking lot/road pavement will be 2 foot candles or its equivalent.
b. Light levels for parking lots/sidewalks shall be in accordance with Illuminating Engineering Society (IES) Lighting Handbook.
c. A Professional Engineer must review the lighting plan and ensure it is sound and meets minimization requirements.
d. Use full cutoff luminaires for road, parking lot, and sidewalk illumination. These are luminaires that allow no direct light emissions above a horizontal plane through the luminaire's lowest light emitting part.
e. Use downward-angling lights and appropriate shields in all applicable locations.

6. No night lighting for construction projects is authorized without prior coordination and authorization from the project manager and Fort Drum's Fish and Wildlife Management Program.

7. Project planning and design should attempt to minimize building footprints by combining infrastructure (i.e. roads, utility lines, etc.) for multiple buildings or by constructing multi-story versus multiple or expanded single story buildings whenever possible.

## APPENDIX 2: OUTDOOR LIGHTING MINIMIZATION

### Purpose

The purpose of the Fort Drum Outdoor Lighting Guidelines is to regulate outdoor lighting in order to reduce or prevent light pollution. This means to the extent reasonably possible the reduction or prevention of glare and light trespass, the conservation of energy, and promotion of safety and security. These Guidelines will ensure appropriate outdoor lighting in compliance with the Endangered Species Act and in accordance with the Fort Drum's Army Strategic Plan for Sustainability.

### Definitions

a. Fixture Height: height of the fixture shall be the vertical distance from the ground directly below the centerline of the fixture to the lowest direct light emitting part of the fixture.

b. Foot-candles: a unit of illumination of a surface that is equal to one lumen per square foot. For the purposes of these regulations, foot-candles shall be measured at a height of 3 ft. above finished grade.

c. Fully Shielded Light: light fixtures shielded or constructed so that no light rays are directly emitted by the installed fixture at angles above the horizontal plane as certified by a photometric test report. The fixture must also be properly installed to effectively down direct light in order to conform with the definition.

d. Light Trespass: the shining of light produced by a light fixture beyond the boundaries of the property on which it is located.

e. Lumen: the unit of luminous flux, the total amount of light falling uniformly on or passing through an area of 1 square foot, each of which is 1 foot from a 1-candela source, yielding an illuminance of 1 foot candle at that distance (the output of lamps and bulbs is customarily measured in lumens, a common 100 watt incandescent light bulb, for example, having an output less than 1,800 lumens).

f. Point Light Source: the exact place from which illumination is produced (i.e., a light bulb filament or discharge capsule).

g. Sag-lens or Drop-lens: A clear or prismatic refracting lens that extends below the lowest opaque portion of a light fixture.

### Applicability

All outdoor lighting fixtures installed, retro-fitted, or replaced on Fort Drum property shall comply with these regulations. These regulations do not apply to interior lighting.

**Exemptions**

The following are exempt from the provisions of these guidelines:

a. Traffic control signals and devices.
b. Temporary emergency lighting (i.e. fire, police, repair workers).
c. Moving vehicle lights.
d. Navigation lights (i.e. airports, heliports, radio/television towers).
e. Seasonal decorations with individual lights in place no longer than 60 days.
f. Lighting for flags. Efforts should be made in these areas to minimize sky glow and light trespass whenever feasible.
g. Sports field outdoor lighting (i.e. ball fields, football, soccer, ice rink, etc.). Sports outdoor lighting is to be turned off when a sporting event is not occurring.
h. Other special situations for temporary or periodic events (i.e. fairs, festivals, carnivals, night-time construction).
i. Security lights of any wattage that are controlled by a motion-sensor switch and which do not remain on longer than 10 minutes after activation.
j. Access points, Army Supply points, or other high security areas subject to AR 190-11 or TM-8-583-2. Efforts should be made in these areas to minimize sky glow and light trespass whenever feasible.

Additional exemptions may be provided after coordination with Fort Drum's Fish and Wildlife Management Program.

**General Standards**

The following general standards shall apply to all outdoor lighting installed, retrofitted, or replaced on Fort Drum, which is not exempted above:

a. Outdoor lighting must be hooded, fully shielded (i.e. full cutoff fixtures), and/or aimed downward. Outdoor lighting used to illuminate parking spaces, driveways, maneuvering areas, or buildings shall conform to the definition for "fully shielded light fixtures" and be designed, arranged and screened so that the point light source shall not be visible from adjoining lots (i.e. woodlands) or streets.
b. The intensity of light within a site shall not exceed two (2) footcandles at any property line, edge of pavement, or road.
c. The hood or shield must mask the direct horizontal surface of the light source. The light must be aimed to insure that the illumination is only pointing downward onto the ground surface, with no escaping light permitted to contribute to sky glow by shining upward into the sky.
d. Any bright light shining onto adjacent properties (i.e. woodlands) or streets which would result in a nuisance glare or a disabling glare shall not be permitted. Light trespass beyond property boundaries or above the horizontal plane shall be considered non-compliant.
e. Existing fixtures may be adapted to comply with these guidelines by adding a properly designed hood or shield, or by pointing any upward-mounted, shielded fixture downward onto the ground surface.

f. All outdoor lighting fixtures shall be designed, installed, located and maintained such that nuisance glare onto adjacent properties (i.e. woodlands) or streets shall be minimized and all direct illumination kept within the boundaries of a building's property.
g. Accent lighting shall be directed downward onto the building or object and not toward the sky or onto adjacent properties (i.e. woodlands). Direct light emissions shall not be visible above the roof line or beyond the building edge.
h. Spotlighting on landscaping and foliage shall be limited to 150 watts (2220 lumens output) and lighting is to be angled downwards. The lamp shall be fully shielded and not create disabling or nuisance glare.
i. No sag-lens or drop-lens are to be used.

# Good Lights for Good Nights

Help eliminate light pollution. Select the best fixture for your application using this guide. Use the lowest wattage bulb appropriate for the task and turn off the light when it's not being used.

presented by the

Dark Sky Society

www.darkskysociety.org

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