

## Part 4 Minimum Materials, Engineering and Construction Requirements

### 1.0 GENERAL REQUIREMENTS

The requirements indicated here are minimum performance requirements. More specific project functional and performance requirements, scope items and expected quality levels over and above the standards in Part 4 are identified in Part 3 of the Request for Proposal or Basic Ordering Agreement. The Contractor is encouraged to exceed the minimum requirements. The Contractor's performance evaluation will be based in part on enhancements to materials, engineering, design and construction provided for the contract that exceed minimum requirements.

Part 4 is a general section. Not all items in Part 4 will be required for this project. See Part 3 for project-specific requirements. See "Contract and Order of Precedence" paragraph in Part 2 for relationships between all parts of the RFP.

In general, unless otherwise indicated, provide all labor, equipment and materials necessary to complete the work required for the contract. All work must be in conformance with all applicable referenced criteria, construction standards, laws and regulations, including applicable building fire and life safety codes.

#### **Recycled Materials Considerations:**

An Affirmative Procurement Program has been established within the Federal government to promote the purchase of products containing recovered materials. This program promotes the purchase of products containing materials recovered from the solid waste stream. The intent is to conserve resources and reduce solid waste by developing markets for recycled products and encouraging manufacturers to produce quality recycled content products. Use products that meet or exceed the EPA guideline standards for recovered content as required by the Federal Acquisition Regulations (FAR). Availability lists of manufacturers and EPA research on product usage are on the Construction Criteria Base (CCB) at [www.wbdg.org/ccb/ccb.php](http://www.wbdg.org/ccb/ccb.php) under Documents Library, NAVFAC Criteria. A partial list of products containing recycled materials for possible use is as follows:

- Rock Wool Insulation
- Fiberglass Insulation
- Cellulose Insulation
- Structural Fiberboard and Laminated Paperboard
- Cement and Concrete - Coal Fly Ash
- Carpet including backings and cushions
- Floor Tiles
- Reprocessed and Consolidated Latex Paint
- Crushed Concrete Aggregate for new asphalt, concrete or subgrade

- Recycled glass for terrazzo aggregate
- Acoustical Ceiling Tile
- Gypsum Wallboard
- Steel wall studs
- Cellulose spray applied fireproofing
- HDPE Toilet Partitions

## 1.1 MATERIALS AND METHODS OF CONSTRUCTION

Only new materials and equipment are to be installed in the work. All materials, equipment and appliances must be of the current manufacturers' products. Do not use obsolete or discontinued materials, equipment and appliances, except that construction materials containing recycled content as described in Paragraph 1 of this Part that completely comply with all materials specifications found elsewhere in this Part may be used.

## 1.2 APPLICABLE CODES AND STANDARDS

The design and construction must be in accordance with established construction practices, and the latest revision/edition of the following referenced codes and standards. The term "Latest Revision/Edition" is defined as the version as of the project award date. References are available at [www.wbdg.org/ndbm/](http://www.wbdg.org/ndbm/). The advisory provisions of all codes and standards is mandatory, as though the word "must" had been substituted for "should" wherever it appears. Reference to the "authority having jurisdiction" is to be construed to mean "Contracting Officer". Comply with the required and advisory portions of the current edition of the standard at the time of contract award. All work must comply with UFC 1-200-01, *General Building Requirements*, and IBC 2009 or later edition as modified by applicable NFPA Standard as well as codes and standards listed in RFP Part 2.

## 1.3 LOCATION-SPECIFIC CODES AND STANDARDS

See Part 3.

## 1.4 DISCREPANCIES

When discrepancies in the referenced standards and the contract requirements occur, the more stringent requirements govern. The word "should" in all NFPA publications is to be interpreted as a requirement. The Authority Having Jurisdiction in the interpretation of the codes and standards, and approving the exceptions allowed in the referenced standards, is the Contracting Officer, and the parties designated by the Contracting Officer.

## 2.0 PERFORMANCE TECHNICAL SPECIFICATIONS

Note: The paragraph numbers used correspond with the numbers used in UNIFORMAT II/Work Breakdown Structures (WBS) as listed in the Whole Building Design Guide, Navy Design Build Master, accessible at this website: [www.wbdg.org/ndbm/](http://www.wbdg.org/ndbm/).

## SECTION A. SUBSTRUCTURE

### A10 FOUNDATION

Foundations must be reinforced concrete slabs-on-grade with continuous strip footings or isolated spread footings. Concrete slabs must not be less than 4 inches in thickness and footings must not be less than 18 inches below the lowest adjacent grade. Design and construct foundations of reinforced concrete. Comply with IBC, applicable UFGS and with applicable requirements in Section B Shell. For the purposes of interpreting IBC Chapter 18, the "Owner" and "Building Official" is interpreted to mean the "Government", and the "Applicant" is interpreted to mean the "Contractor/Designer of Record".

1. **Contractor-Foundation Design:** The Designer of Record must evaluate the RFP data, and obtain and evaluate all additional data as required to support the design and construction.
2. **Geotechnical Site Data required in Design Drawings:** The Contractor's final design drawings must include:
  - a. Notes identifying the soil allowable bearing capacity used in design.
  - b. Subsurface soil information, be it Government provided or Contractor obtained, that represents subsurface conditions existing on the project site (such as boring logs, test pits, laboratory test results and groundwater observations). The locations of all borings must be indicated on the drawings.
3. **Performance Verification and Acceptance Testing:** Verification of satisfactory construction and system performance is required to be via Performance Verification Testing, as detailed in this part of the RFP.
  - a. **Earthwork:** Perform quality assurance for earthwork in accordance with IBC Chapter 17 and applicable UFGS. See Section G1030.

### A20 BASEMENT CONSTRUCTION

[Provide basement construction in accordance with UFC 3-301-01, *Structural Engineering*. Basement walls include exterior walls below the ground floor level of the building, including walls that are below grade, elevator pits and other pits. Provide basement walls constructed of [cast-in-place concrete] [precast concrete] [or] [masonry]. Provide waterproofing [and insulation] of basement walls.] If basement construction is required in Part 3, refer to Standard Design-Build template PTS Section A20 BASEMENT CONSTRUCTION.

## SECTION B. SHELL

### B10 SUPERSTRUCTURES

Superstructure work includes structural frames, bearing walls, floors, roofs, roof canopies, and balcony construction. Unless otherwise specified in Part 3, superstructures may be designed and constructed using any materials or combination of different materials allowed by applicable codes and standards. Comply with IBC and applicable UFGS. Special inspection, testing, approvals, certifications, observations and quality assurance plans as prescribed in Chapter 17 of the IBC are required.

1. **Concrete:** All concrete must be constructed in accordance with ACI 301. Concrete must have a 28-day minimum compressive strength of 3,000 psi. Slump must be between 2 and 4 inches in accordance with ASTM C143. Provide joints as required to minimize cracking. All concrete must be reinforced. Provide joints as required by applicable ACI standards. Unless otherwise specified in Part 3 or as indicated by the contracting officer, provide steel trowel finish for all exposed floor surfaces. Exterior surfaces must be a broom finish.
2. **Masonry:**
  - a. All concrete masonry must be constructed in accordance with ACI 530.1. Concrete masonry must have a minimum 28-day compressive strength of 1500 psi. Concrete masonry units must conform to ASTM C90, grade A1. Broken blocks are not allowed. Use only standard size and shape blocks. Block may be cut when necessary. Mortar must be Type S.
  - b. When used, brick must conform to ASTM C216. In exposed construction, broken brick is not be allowed. Standard size brick may be cut to fit job condition. Use Type S mortar.
  - c. Provide metal anchors for masonry and brick, including veneer construction as required by IBC.
3. **Structural Steel:** Structural steel exposed to weathering must be adequately protected to prevent corrosion.
4. **Steel deck:** Steel form deck must have a G90 galvanized finish, and must have a minimum 26-gage thickness. All other steel deck must have a G90 galvanized finish, and must have a minimum 20-gage thickness.
5. **Cold-formed metal framing:** Cold-formed steel studs, joists and track must be galvanized with a minimum thickness of 20-gage.
6. **Wood framing:** Wood framing members must be new lumber, unless otherwise allowed by Part 3. Timber can be Douglas Fir, Douglas Fir-Larch, Hem-Fir, Southern Pine or other structurally competent species allowed by applicable codes and standards. Wood framing must meet the following minimum grading requirements:
  - a. Studs - #2
  - b. Joists and rafters- #2
  - c. Beams, 4x and larger - #1
  - d. Posts, 4x and larger - #1
  - e. Blocking - #3
  - f. Fascia, trim - #1
  - g. Wood Structural Panel Sheathing (Exterior Glue)
  - h. Roof - APA rated with span index of 24/0 - minimum thickness 1/2 inch
  - i. Walls - APA rated with span index of 32/16 - minimum thickness 1/2 inch
  - j. Flooring- APA rated with span index of 48/24 - minimum thickness 3/4 inch

## **B20 EXTERIOR ENCLOSURE**

## B2010 EXTERIOR WALLS

### 1. Exterior Wall Performance:

- a. **Vapor Transmission Analysis:** Perform a job specific vapor transmission analysis in accordance with ASHRAE 90.1 or WUFI. The conclusion of the analysis must indicate the appropriate locations of needed vapor retarders, air barriers, and anticipated dew-point locations in the exterior enclosure during different critical times of the year.
- b. **Maximum Air Infiltration:** The air leak flow rate must not exceed 0.25 CFM at 75 Pa per square foot (0.076 cm 75 Pa per square meter) of building envelope area including roof or ceiling, walls and floor as provided by the DOR.

Where required in RFP Part 3, provide air barrier testing. Perform testing as required by UFGS 07 05 23 *Pressure Testing an Air Barrier System for Air Tightness* and UFGS 07 27 10.00 10 *Building Air Barrier System*. DOR must edit this section and incorporate into the project specification. Repair leaks and repeat testing until prescribed maximum air leak flow rate is achieved. Provide intermediate and final reports.

- c. **Wind Loads:** Provide wind load calculations for exterior cladding in accordance with ASCE-7 with comparative analysis of the cladding system to be provided.
- d. **Water Penetration:** No water penetration is acceptable at a pressure of 39 Kg/m<sup>2</sup> (8 psf) of fixed area when tested in accordance with ASTM E 331.
- e. **Insulating Value:** Provide complete thermal envelope in accordance with ASHRAE 90.1, Chapter 5 with improvements required to meet project energy goals.

Where required in RFP Part 3, provide infrared thermal envelope performance testing. Test the building envelope using Infrared Thermography in accordance with the requirements of ASTM C1060 (latest edition) and ISO 6781. The Contracting Officer will witness the testing. Provide thermography test report including thermographs in color and a color temperature scale to define the temperature indicated by the various colors. The report must identify the high temperature reading, the outdoor air temperature, the building indoor air temperature, and the wind speed and direction. Report to note any areas of compromise in the building envelope, and note all actions required and taken to correct those areas. Repair and repeat testing until discrepancies are demonstrated to be resolved.

### 2. Masonry Veneer Exterior Wall Closure Components: Masonry veneer includes load bearing and non-load bearing exterior walls of the structure, and must include colored mortar, special shapes such as sills, headers, trim units and copings of brick masonry, precast concrete, concrete masonry units, or other approved material. Utilize BIA Technical Notes to design, detail, and construct brick masonry walls. Substitute directive language in the place of BIA suggestive language. The results of these wording substitutions change this document to required procedures. Tie the veneer to the backup wall system with a system that allows the veneer to move independently of the backup wall system, while being structurally supported. The masonry veneer must allow for expansion and contraction of the veneer without cracking the exterior material.

- a. **Masonry Veneer Installation:** Conform to ACI 530.1 for masonry veneer installation, including cold weather construction. Antifreeze admixtures are not to be used.

- b. **Mortar:** Provide factory-tinted colored mortar conforming to ASTM C270, unless DOR directs otherwise.
  - c. **Expansion/Control Joints:** Locate expansion/control joints and seal with proper backing material and ASTM C 920 polyurethane sealant, or preformed foam or rubberized expansion joint closure. Conform to UFC 3-101-01, *Architecture* and BIA Technotes 18, 18A.
  - d. **Brick:** Meet ASTM C216, Grade SW, type FBS, or type FBX for detail work. ASTM C67 test rating shall be "Not effloresced". Use FBA brick only for special architectural effects requiring a non-uniform size.
  - e. **Split Faced or Ground Faced Masonry:** ASTM C 90
  - f. **Cast Stone Trim Units:** Cast Stone must meet or exceed the requirements of ASTM C 1364.
  - g. **Wall Cavity:** shall Comply with the and BIA Technical Notes 21A, 21B, 21C, 28B
  - h. **Through-Wall Flashing Components:** Through-wall flashing with weep holes must be incorporated in cavity wall construction. Flashing must be 7 ounce copper flashing with a 3 ounce bituminous coating on each side or a fiberglass fabric bonded on each side of the copper sheet; 16-ounce uncoated copper, 28 gauge Type 302 or 304 stainless steel is also acceptable. Flexible membrane flashing, plastic or PVC-based membrane flashing is prohibited.
  - i. **Reinforcing in Veneer Layer:** Reinforcing in the veneer layer must be galvanized in accordance with ASTM A 123/A123M, ASTM A153/A153M, or ASTM A653/A653M, Z275 (G90) coating, and be of sufficient size to eliminate damage to the veneer layer from wind and other live and dead loads imposed on the veneer layer.
  - j. **Masonry Cleaning:** Clean the masonry in accordance with manufacturer's instructions and BIA Technote 20.
3. **Metal Wall Panel Exterior Closure:** Panels must have factory applied, baked coating to the exterior and interior of metal wall panels and metal accessories. Exterior finish topcoat must be of 70 percent polyvinylidene fluoride (PVDF) resin with not less than 0.8 mil dry film thickness (DFT). Exterior primer must be standard with panel manufacturer with not less than 0.8 mil dry film thickness (DFT).

Wall system and attachments must resist wind loads as determined by ASCE 7, with a factor of safety appropriate for the material holding the anchor. Maximum deflection due to wind on aluminum wall panels must be 1/60. Maximum deflection due to wind on steel wall panels and girts behind aluminum or steel wall panels must be limited to 1/120 of their respective spans, except that when interior finishes are used the maximum allowable deflection must be limited to 1/180 of their respective spans.

Conformations - Non-insulated steel or aluminum wall panels must have configurations for overlapping adjacent sheets or interlocking ribs for securing adjacent sheets and must be fastened to framework using concealed fasteners, or choose the option for exposed fasteners when exposed fasteners are acceptable at the installation. Length of sheets must be sufficient to cover the entire height of any unbroken wall surface.

- a. **Steel Wall Panels:**
  - 1) **Material and Coating:** Form sheets from steel conforming to ASTM A 653/A 653M, Structural Grade 40, galvanized coating conforming to ASTM A 924/A 924M, Class G-90; aluminum-coated steel conforming to SAE AMS 5036; or steel-coated with aluminum-zinc alloy conforming to ASTM A 792/A 792M, except that coating chemical composition must be approximately 55 percent

aluminum, 1.6 percent silicon, and 43.4 percent zinc with minimum coating weight of 0.5 ounce per square foot.

2) Gage: Minimum 22 U.S. Standard Gage for wall panels, but in no case lighter than required to meet maximum deflection requirements specified.

b. **Aluminum Wall Panels:**

1) Material and Coating - Form sheets of Alloy 3004 or Alclad 3004 conforming to ASTM B 209 having proper temper to suit respective forming operations.

2) Thickness - Minimum 0.81 mm (0.032 inch) nominal, but in no case thinner than that required to meet maximum deflection requirements specified.

c. **Insulated Aluminum or Steel Wall Panels:** Insulated wall panels must be steel or aluminum factory-fabricated units with insulating core between metal face sheets securely fastened together and uniformly separated with rigid spacers. Panels must have a factory color finish. Wall panels must have edge configurations with interlocking ribs for securing adjacent panels. System must utilize factory fabricated corners and trim pieces at intersections with other materials. Insulated wall panels must be fastened to framework using concealed fasteners.

1) Insulated Steel Panels - Zinc-coated steel conforming to ASTM A 653/A 653M; or Aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating. Uncoated wall panels must be 0.61 mm (0.024 inch) thick minimum.

2) Insulated Aluminum Panels - Alloy conforming to ASTM B209, temper as required for the forming operation, minimum 0.81 mm (0.032 inch) thick.

4. **Stucco Exterior Wall Closure**

a. **Portland Cement Plaster:** ASTM C150, gray Portland cement Type II with 13 mm (1/2 inch) maximum chopped alkali resistant fiberglass strands, minimum 1.5 percent by weight to cement; .68 kg (1 1/2 pounds) per sack of cement. Lime must conform to ASTM C206, Type S. System must utilize stainless steel or zinc corner beads, J-beads and other accessories. Unless specifically deleted, the system must utilize an acrylic admixture or coating to give additional moisture suppression to control fungus growth.

b. **Exterior Insulation and Finish System (EIFS):** EIMA TM 101 and 01 EIMA TM 101.86. EIFS must be used as the non-primary or the primary exterior finish material only for projects where it is necessary to match existing EIFS.

5. **Precast Concrete Wall Panels:** ACI 211.1 and ACI 301. PCI MNL-116 or PCI MNL-117. Concrete must have a minimum 28-day compressive strength of 281 Kg/cm<sup>2</sup> (4000 psi). Joints must include properly sized and placed backing material and fully loaded and tooled sealant joint of no less than 1/4 inch sealant material thickness.

6. **Other Wall Finish Systems**

a. **Horizontal Wood Siding:** Horizontal Wood Siding: DOC PS 20, exterior, lap type, 6 inches wide, maximum practicable lengths, 11 mm (7/16 inch) thick, smooth face. All surfaces of wood siding and trim must be shop coated with an alkyd primer.

Species and Grades 1. Grade 1 Common spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA. 2. Grade Prime or D finish, pressure-preservative-treated hem-fir; NLGA, WCLIB, or WWPA.; 3. Grade D Select (Quality) eastern white

pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NELMA, NLGA, WCLIB, or WWPA. 4. Grade D Select northern white cedar; NELMA or NLGA. 5. Grade B & B, pressure-preservative-treated southern pine; SPIB.

- b. **Vinyl Siding System:** Integrally colored, vinyl siding complying with ASTM D 3679.
- c. **Manufactured Faced Panels Systems Exterior Wall Siding:** Glass Fiber Reinforced Cementitious Panels System: Siding made from fiber-cement board that does not contain asbestos fibers; complies with ASTM C 1186, Type A, Grade II; horizontal or vertical pattern in plain or beaded-edge style. Texture: Rough sawn or smooth, factory primed.

7. **Exterior Wall Backup Construction**

- a. **Concrete Unit Masonry:** Provide concrete unit masonry to comply with ACI 530.1. Load-bearing units: ASTM C90, Non-load bearing- units: ASTM C129, Type I or II. Provide ground face units, split-faced units, ground-faced units, or split-ribbed units for exposed exterior walls. Provide water repellent admixture to masonry units where the exterior face of the units will not receive a waterproof coating such as paint.
- b. **Dampproofing:** Dampproof the cavity-facing wythe of the backup masonry using asphaltic primer according to ASTM D 41, if dampproofing is not provided by a sprayed on foam or other DOR-approved membrane insulation system.

8. **Load-Bearing Metal Framing System:** If permitted, provide load-bearing metal framing including top and bottom tracks, bracing, fastenings, and other accessories necessary for complete installation. Framing members must have the structural properties indicated. Where physical structural properties are not indicated, they must be as necessary to withstand all imposed loads. Design framing in accordance with AISI SG-673. Install in accordance with DOR-approved shop drawings and manufacturer's installation instructions.

9. **Exterior Studs:**

MAX DEFLECTION CRITERIA	EXTERIOR FINISH
L/360	Cement Plaster, Wood Veneer, Synthetic Plaster, Metal Panels
L/600	Brick Veneer, Stone Panels

Wall deflections must be computed on the basis that studs withstand all lateral forces independent of any composite action from sheathing materials. Studs abutting windows or louvers must also be designed not to exceed 1/4-inch maximum deflection and as required in UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings.

- 1. Studs - ASTM A 1003/ASTM A 1003M, Structural Grade 50, Type H minimum; provide Z180 (G60) galvanized coating in accordance with ASTM A 653/ASTM A 653M. Do not expose studs to direct moisture contact
- 2. Bracing - Provide horizontal bracing in accordance with design calculations and AISI SG-673, consisting of, as a minimum, runner channel cut to fit between and welded to the studs.
- 3. Sheathing - Provide sheathing to withstand structural loads imposed on the wall structure. Cover sheathing with either a 15 pound asphalt-impregnated building

- paper, or air barrier as required by the wall moisture analysis. Sheathing must be one of the following:
- a. Plywood: C-D Grade, Exposure 1;
  - b. Structural-Use and OSB Panels;
  - c. Gypsum: ASTM C 79/C 79M and ASTM C 1177/C 1177M, 13 mm (1/2 inch) thick fire retardant (Type X) 15 mm (5/8 inch) thick; 1.2 meters (4 feet) wide with square edge for supports 400 mm (16 inches) o.c. with or without corner bracing of framing. Gypsum sheathing must be faced with materials capable of resisting six months of weathering exposure without degradation of the covering or the gypsum. Seal all joints as recommended by the manufacturer.
10. **Wood Framing System:** All materials shall be kiln-dried lumber complying with DOC PS 20. Installation must be in accordance with AF&PA T11. Use preservative pressure treated lumber at sill plates and other members in contact with concrete and masonry surfaces.
- a. **Species and Grades:** Provide species and grades listed: 1) Grade 2 Common spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA; 2) Grade 2 Common, hem-fir; Douglas-fir; NLGA, WCLIB, or WWPA; 3) Grade 2 Common, southern pine; SPIB.
  - b. **Sheathing:** Sheathing must withstand structural loads imposed on the wall structure. Cover sheathing with either a 15 pound asphalt-impregnated building paper, or air barrier as required by the wall moisture analysis. Sheathing must be as for Metal Studs.
11. **Cast-in-place Concrete System:** Concrete construction must be in accordance with ACI 301.
12. **Insulation and Vapor Retarder:** Insulation, Vapor Retarders, and Air Barrier Systems in or on Exterior Enclosure must include: insulation, liquid, sheet or continuous film materials installed separately in or on wall assemblies to provide resistance to heat loss/gain, and vapor penetration.
- a. **Vapor retarder:** Comply with ASTM C755. Incorporate in the exterior wall system where required by vapor transmission calculations or dew point analysis indicates the need or in conditions of high moisture exposure.
  - b. **Bituminous Dampproofing:** Bituminous Dampproofing must be ASTM D449, Type I or Type II bituminous dampproofing on the exterior surface of the interior wythe of masonry in a cavity wall (back-up wall for masonry veneer).
  - c. **Building Paper:** FS UU-B-790, Type I, Grade D, Style 1.
  - d. **Air Barrier:** Building wrap consisting of air barrier sheeting complying with ASTM E 1677, Type 1, not less than 3 mils thick with a permeance of not less than 575 ng/Pa x s x sq.m. (10 perms). Building wrap must have a flame spread index of less than 25 in accordance with ASTM E 84. Provide building wrap over sheathing of wood or metal framed construction to reduce air penetration and airborne vapor penetration. Provide building wrap tape as recommended by the manufacturer for sealing all joints in the building wrap. Install in accordance with manufacturer's instructions. Air barrier installation at windows must be in accordance with ASTM E 2112.
  - e. **Insulation Systems:** Vertical and horizontal polystyrene insulation conforming to ASTM C578 or rigid polyisocyanurate board wall insulating products conforming to ASTM C591 or mineral-fiber blanket insulation conforming to ASTM C 665 must be provided.

13. **Parapets:** Avoid parapets when possible, but when necessary, provide parapets with the same materials as the exterior wall construction. Provide scuppers and wall edge according to SMACNA.
14. **Exterior Louvers and Screens:** If required, provide louvers for Screened Equipment Enclosure or as louvers for exterior doors.  
  
Storm shutters must comply with ASTM E 1996-03.
15. **Balcony Walls and Handrails:** Balcony walls to match exterior construction. Handrails to comply with the IBC and OSHA.
16. **Exterior Soffits:** Exterior soffit system.
17. **Exterior Painting and Special Finishes;** All painting and coating materials must be low VOC. Painting practices must comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates.  
  
All paint must be in accordance with the Master Painters Institute (MPI) standards for the exterior architectural surface being finished. The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. Provide paint systems tested to "Detailed Performance Level" standard as defined by MPI.
18. **Exterior Joint Sealant:** Sealant joint design, priming, tooling, masking, cleaning and application must be in accordance with the general requirements of Sealants: A Professionals' Guide from the Sealant, Waterproofing & Restoration Institute (SWRI). All sealant must conform to ASTM C 920.
19. **Sun Control Devices:** Sun control devices must be manufactured devices to provide sun control on exterior windows and storefronts. Sun control devices must be designed and installed to withstand the wind loads prevailing at the project site.

## B2020 EXTERIOR WINDOWS

All windows and doors in new or existing buildings, which are subject to Anti-terrorism Standards, must be blast-resistant as prescribed in UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

Unless otherwise allowed by Part 3, windows for new facilities must be aluminum. In building additions or renovations windows must match existing window materials, except when all windows are to be replaced. If all windows are to be replaced, they shall be aluminum. Exterior windows design, dimension, and construction must meet or exceed the requirements for Anti Terrorism Force Protection requirements. In addition, exterior windows must meet or exceed Energy Star requirements. The design and placement of exterior windows must take into considerations view, natural light, privacy, and protection for the occupants of the facilities. Provide operable hardware and insect screen for exterior windows. Windows must be fabricated by manufacturers normally involved in the manufacturing of windows and be of the current make and model. Do not use obsolete or discontinued windows. Provide weather stripping, STC and IIC rating, commensurate with the intended use of the facility. Submit catalog information and manufacturer's specifications for approval by Contracting Officer prior to purchase of windows.

All window assemblies must meet performance grade CW 60 minimum tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-08 or most current edition of this standard.

Where windows separate conditioned spaces from non-conditioned spaces, provide windows bearing NFRC energy label indicating window exceeds current EnergyStar criteria. For storefront or curtainwall systems, provide thermally broken framing and insulating glazing with whole-assembly U-value of 0.40 or less. Provide windows exceeding requirements of ASHRAE 90.1, Table 5.5 for project climate zone.

Windows must consist of fixed and operable sash used singly and in multiples. Provide operable sash in spaces occupied by people as a minimum. Include operating hardware, non-corroding framed metal screens for operable sash, integrated blinds set between glass panels and security grilles. Provide jamb support for larger windows where recommended by manufacturer.

1. **Metal Windows:** All windows must conform to ANSI/AAMA/WDMA 101. Metal windows with insulating glass must have thermally broken frames and sash. Factory finish aluminum windows and provide with aluminum frame screens with aluminum mesh at operable sash, hardware and locks, and tinted glazing. Aluminum screens must comply with ANSI/SMA 1004.
2. **Wood Windows:** Clad wood and wood windows must consist of complete units including sash, glass, frame, weatherstripping, insect screen, and hardware. Window units must meet the requirements of AAMA 101, except maximum air infiltration shall not exceed 0.30 CFM per linear foot of sash crack when tested under uniform static air pressure difference of 7.66 Kg/m<sup>2</sup> (1.57 psf).
3. **Storefronts:** Provide one-story storefront system fabricated from formed and extruded aluminum and glass components for exterior use. Utilize the specific section of the Standard Design-Build Performance Technical Specifications Section B202002 for the storefront to be provided. Storefront framing must meet or exceed the structural requirements, as measured in accordance with ANSI/ASTM E330: Design system to withstand this as a minimum and comply with design pressure established within the required ASCE 7-05 Wind Speed Calculations determined by the overall average opening within the project.
4. **Glazing:** All exterior glazing must be insulating glass.
  - a. Clear Glass - Type I, Class 1 (clear), Quality q4 (A);
  - b. Heat-Absorbing Glass - ASTM 1036, Type I, Class 2 Quality q3 (select) ray frames;
  - c. Wire Glass - Type II, Class 1, Form 1, Quality q8 Mesh m1 or Form 2, Quality q7;
  - d. Laminated Glass - ASTM 1172, total thickness shall be nominally 6 mm (1/4 inch);
  - e. Insulating Glass Units - Typically ASTM C 1036, Type I, Class 1, Quality q4, minimum 6 mm;
  - f. Tempered Glass - ASTM C 1048, Kind FT (fully tempered);
  - g. Patterned Glass - ASTM 1036, Type II, Class 1 (translucent), Form 3 (patterned), Quality q7 (decorative), Finish f1 (patterned one side), Pattern p2 (geometric) 5.55 mm (7/32 inch) thick.

## B2030 EXTERIOR DOORS

Exterior doors must be heavy duty insulated steel doors and frames for service access. Provide door frames with welded corners. Use heavy-duty overhead holder and closer to protect doors from wind damage. Steel must have G60 galvanized coating in accordance with ASTM A 924/A 924M and ASTM A 653/A 653M when the job site is located within 300 feet from a body of salt water. Provide commercial quality, coating Class A zinc coating in accordance with ASTM A591 for other steel or steel skin hollow metal doors at other locations. Provide kickplates on the inside face of all exterior doors. Weather-protect all exterior doors and related construction with low infiltration weatherstripping and sealants. Provide threshold with offset to stop water penetration while maintaining accessibility compliance. Conform to the design criteria of ASCE 7. See the hardware schedule for door hardware requirements.

Where doors separate conditioned spaces from non-conditioned spaces, provide doors exceeding current EnergyStar criteria. For storefront entrances, provide thermally broken door framing and insulating glazing with whole-assembly U-value of 0.67 or less. Provide doors exceeding requirements of ASHRAE 90.1, Table 5.5 for project climate zone.

1. **Steel Doors:** Exterior doors must comply with ANSI A250.8-1998 (SDI-100). Hardware preparation must be in accordance with ANSI A250.6. Doors must be hung in accordance with ANSI A115.16.
  - a. Doors Required:
    - 1) Standard Duty Doors - Level 1, MSG # 20 (IP 0.032", 0.8 mm), physical performance Level C, Model 1 or 2.
    - 2) Heavy Duty Doors - MSG # 18 (IP 0,042", 1 mm), physical performance Level B, Model 1 or 2.
    - 3) Extra Heavy Duty Doors - Level 3, MSG #16, (0.053", 1.3 mm) physical performance Level A, Model 1, 2, or 3.4) Maximum Duty Doors - Level 4 (IP 0.067", 1.6 mm), physical performance Level A, Model 1 or 2.
  - b. Insulated steel doors and frames are required for entrances to dwelling units, and may also be specified as a Contractor's option to Level 1 standard hollow metal doors. Do not use wood doors for exterior doors, unless they are fully protected from the elements, an exterior grade species, and specially finished. If wood doors are used, provide in accordance with Standard Design-Build Performance Technical Specification Paragraph B203001 2.
2. **Standard Steel Frames:** ANSI A 250.8. Form frames with welded corners for installation in exterior walls. Form stops and beads of 20 gage steel. Frames must be set in accordance with ASTM A250.11. Anchor all frames with a minimum of three jamb anchors and base steel anchors per frame, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gage. Mortar infill frames in masonry walls, and infill with gypsum board compound at each jamb anchor in metal frame walls. Only use surface exposed bolted anchors in concrete walls.
3. **Door and Frame Finishes:** a) Exterior Doors, Factory-Primed and Field Painted Finish - Doors and frames must be factory primed with a rust inhibitive coating as specified in ANSI A250.8. Factory prime doors on six sides of the door; b) Exterior Doors Galvanized Finish -- Must be Commercial Quality, Coating Class A, zinc coating in accordance with ASTM A 591 when facility is located further than 91 meters (300 feet) from the ocean. When facility is located within 91 meters (300 feet) of the ocean, provide G60 galvanized coating in accordance with ASTM A 924/A 924M and ASTM A 653/A 653M.

4. **Upward Acting Doors:** Upward acting doors must be capable of withstanding the design wind loading of ASCE 7. Provide galvanized steel tracks not lighter than 14 gage for 50 mm (2 inch) tracks and not lighter than 12 gage for 75 mm (3 inch) track. Provide a positive locking device and cylinder lock with two keys on manually operated doors.
5. **Overhead and Roll-up Doors:** Large exterior overhead and roll-up doors system must consist of manual or automatic exterior doors and door assemblies.
6. **Rolling Service Doors and Grilles:** Coiling overhead doors must have minimum 22 gage thermal insulated slats. Electric operators must have three-button switches conforming to NEMA MG 1, NEMA ICS 1, and NEMA ICS 2, and auxiliary hand chain operation, weather-stripping and wind-locks. Doors must be capable of withstanding the design wind loading of ASCE 7 and still operate normally. Finish of the door must be hot-dipped galvanized with a painted finish.
7. **Sectional Overhead Doors:** Sectional overhead doors must conform to NAGDM 102, Residential or Commercial or Industrial door standards. If doors are electrically operated, pushbuttons must be full-guarded to prevent accidental operation, and include limit switches to automatically stop doors at the fully open and closed positions. Limit switch positions must be readily adjustable.
8. **Hardware:** Provide the services of a Certified Door Hardware Consultant to prepare the door hardware schedule.

Provide all new hardware with satin chrome finish throughout. Hardware must be commercial grade, suitable for the operational requirements and in compliance with life safety code and handicapped accessibility requirements, similar in quality to the hardware shown in C1020 Interior Doors and Hardware below.

Coordination: Provide a master keying system compatible with the existing base system. Provide an emergency access key box for exterior door fireman key access. Coordinate with the local authority and the Contracting Officer to determine the local requirements for hardware, keying and master keying.

## B30 ROOFING

For repair of existing roofing, the cutting of the existing roof shall be kept to a minimum and, where necessary, must be made in a clean and orderly manner to prevent the appearance of a patch.

Repair all damage to existing and new roofing caused by the work of this Contract at no additional cost to the Government. The work must be executed in such a manner as to maintain the integrity of the existing roofing manufacturer's warranty.

1. **Pre-Roofing Conference:** Prior to beginning roofing work, hold a Pre-Roofing Conference with the personnel directly responsible for the roofing systems work, as well as the roofing manufacturer's technical representative.
2. **Roof Design Assurance:** If the roofing project is significant (Significant Roof - A single or group of buildings greater than 1,400 m<sup>2</sup> (15,000 sf)), or where extenuating circumstances of the roof project such as building use, content, safety, or visibility require a roofing consultant, provide the services of a Registered Roof Consultant (RRC) certified by the Roof Consultant Institute, or a Registered Professional architect or Engineer who specializes in roofing, to approve the roof design. The roof consultant must be engaged in roofing design and roofing construction as his primary endeavor. The roof consultant

must verify in writing that the design for the project is in accordance with the current edition of *NRCA Roofing and Waterproofing Manual*, UFC's, and RFP, and standard industry practices and building codes.

If a Roof Design Assurance Consultant is needed, consider using a Registered Roof Observer as a QC specialist.

## B3010 ROOF COVERINGS

Roof coverings and procedures must comply with the requirements of UFC 3-110-03, *Roofing*, and NRCA, *Roofing and Waterproofing Manual* found at <http://www.nrca.net/rp/technical/manual/manual.aspx> as the primary NAVFAC roofing criteria. Roof selection must comply with UFC 3-110-03, *Roofing*. Determine wind uplift using wind speed in accordance with ASCE-7.

1. **STEEP SLOPE ROOF SYSTEMS:** Steep slope systems bare roofs with a pitch greater than 3 in 12. Steep Slope Systems are slate roofing, Asphalt Shingles, Roof Tiles, Foam Set Tiles, Metal Roof Panels (Architectural Standing Seam Metal Roofs on supported substrate), and Structural Standing Seam Metal Roof (SSSMR). Asphalt shingles can only be used for residential construction and light commercial construction.
2. **LOW SLOPE ROOF SYSTEMS:** Low slope systems are roofs with a pitch 3 in 12 or less. Low slope roofing systems must be built-up asphalt roofing (aggregate surfaced, with modified bituminous components), modified bituminous membrane roofing of a minimum of 3 plies with aggregate surface or granular surface modified bitumen cap sheet, or structural standing seam metal roofing. Use EPDM systems only to match existing construction.
3. **ROOF COMPONENTS:**
  - a. **Insulation:** For existing structures, provide insulation in accordance with ASHRAE 90.1. For new construction, provide R-30 insulation in the ceilings, attic spaces and soffit areas for interior spaces. Injected polyurethane and Urea Formaldehyde Foam field applied is not permitted. Provide acoustical insulation above walls separating bathroom/restrooms and corridor and adjacent occupied spaces, and between offices and corridors. Insulation must have a minimum sound attenuation rating of STC-55.

Insulation must be Polyisocyanurate Rigid Board Insulation, Mineral Fiber Blanket Insulation to conform to ASTM C 991, with Glass Mat Gypsum Roof Board for use above the deck or insulation conforming to ASTM C 1177/C 1177M, where necessary.

Only on portions of the roof where the sloping of structure does not allow the minimum slopes, provide a factory tapered roof insulation system to provide positive drainage of roof system, and to include drainage around curbs, penetrations, and projections through the roof plane.

Provide Glass Mat Protection Board meeting ASTM C 1177 for use as a thermal barrier (underlayment) or protection board for hot-mopped applications.
  - b. **Vapor Retarder:** Determine the need and location in the roof assembly for a vapor retarder. Where the mean January temperature is 40 degrees Fahrenheit or less, and the expected interior relative humidity is 45% or greater, use a vapor retarder. Otherwise, use ASHRAE 90.1 for the determination.

1) Vapor Retarders as Integral Facing - Alloy conforming to ASTM B 209, or Vapor Retarders Separate from Insulation - Vapor retarder material must be 10 mil polyethylene sheeting conforming to ASTM D 4397.

2) A slip sheet is required to separate the roofing panels from the insulation facing where the facing would be in direct contact with the roofing panels. If a slip sheet is necessary for use with a vapor retarder, use a 5 lb. per 100 square feet rosin-sized, unsaturated building paper.

- c. **EPDM Rubber Boots:** Flashing devices around pipe penetrations must be flexible, one-piece devices molded from weather-resistant EPDM rubber.
- d. **Prefabricated Curbs and Equipment Support:** Provide Prefabricated curbs and equipment supports of structural quality, hot-dipped galvanized or galvanized sheet steel, factory primed and prepared for painting with mitered and welded joints. Provide integral base plates and water diverter crickets. Minimum height of curb must be 8 inches above finish roof.
- e. **Fasteners:** Provide fasteners that meet all requirements of the NRCA and Factory Mutual.
- f. **Wood Nailers:** Wood nailers shall be pressure-preservative-treated in accordance with AWWPA M2 Standards, permanently marked or branded, and installed flush with the top of the adjacent insulation board.
- g. **Flashing and Sheet Metal:** Provide flashing and sheet metal work including scuppers, splash pans, and sheet metal roofing. Flashing and sheet metal must be provided in accordance with roof manufacturer's printed installation instructions and in compliance with NRCA and SMACNA recommendations. Fabricate Flashing and sheet metal components from Copper, Lead-Coated Copper sheet, Steel Sheet, Zinc-Coated (Galvanized) - ASTM A 653/ A 653M, Stainless Steel - ASTM A 167, Type 302 or 304, 2D finish, or Pre-Finished Aluminum.
- h. **Gutters and Downspouts:** Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited. Provide splash guards at points of discharge.
- i. **Roof Openings and Supports:** Provide flashings for roof openings and supports as recommended by the NRCA. Assure all penetration flashings extend minimum 200 mm (8 inches) above the finished roof surface.
- j. **Roof Hatches:** Provide roof hatch where required by OSHA, and as access to roof when roof mounted equipment is used or other routine roof maintenance is required.
- k. **Glazed Roof Openings:** Skylights and other glazed roof openings shall be used only to supplement interior lighting levels (generally in steep slope or vertical applications), and otherwise, are discouraged from use.
- l. **Guards:** Provide rails or guards as required by the OSHA, the International Building Code or other applicable safety standards.
- m. **Traffic Pads:** Provide on roof system to protect roof from foot traffic. Provide traffic pads around roof mounted mechanical equipment and underneath removable mechanical equipment access panels. Traffic pads must be of compatible material to roof.

#### 4. OTHER ROOFING

- a. **Lightning Protection:** Lightning protection component penetrations and

attachments must be sealed and flashed and anchored in a permanent manner and in a manner to avoid the degradation of the watertight integrity of the roof system.

- b. **Roof Drains (Existing):** Where existing roof drains are to be reused in roof replacement construction, the contractor must provide new, compatible flashing materials, a new drain clamping ring and new bolts for anchorage. Reuse of existing clamping ring and bolts is unacceptable.

## SECTION C. INTERIORS

### C10 INTERIOR CONSTRUCTION

#### C1010 PARTITIONS

1. **Fixed Partitions:** wood frame; light gage steel frame; concrete masonry complying with ACI 530.1/ASCE 6/TMS 602 and associated ASTM Standards; or cast-in-place concrete complying with UFC 1-200-01, *General Building Requirements*, ACI 117 and ACI 301/301M. In addition, interior partitions must comply with tables for sound isolation and noise reduction in Chapter 1, "Architectural Graphic Standards". Include a statement of adherence to the applicable criteria.

Gypsum board/stud partitions may be standard gypsum board, moisture resistant, or impact resistant. Use cement board in showers and other wet areas. Reinforce points where doorknobs can strike a wall and anchorage points for wall mounted equipment.

2. **Demountable or Removable Partitions:** Must be of materials allowed by code and shall be anchored firmly to the structure to carry their own weight as well as impact forces and seismic lateral forces. Sound Transmission Class (STC) rating and Impact Isolation Class (IIC) rating shall be in accordance with ASTM E 90 or ASTM E 413 for frequency data, and shall meet the requirements of the intended use in Part 3. The majority of the components and hardware must be provided by a single manufacturer and on the manufacturer's current GSA price list. The product must be included on the NAVFAC Selection Tool for Movable Walls.
3. **Glazed Partitions and Interior Windows:** Must be of the materials allowed by IBC, and must comply with fire and smoke separation requirements. Provide safety glazing and fire resistant rating where they are required.

#### C1020 INTERIOR DOORS

1. **Wood Doors:** Stile and rail wood doors must be WDMA I.S.6A-01, premium or custom grade, heavy duty or extra heavy duty. Flush wood doors must be WDMA I.S.1A-04, premium or custom grade, heavy duty or extra heavy duty; or WDMA I.S.-97 (PC-5 5-ply particleboard core or SCLC-5 5-ply structural composite lumber core). Doors adjacent to paneling or millwork must comply with corresponding AWI millwork grade. Provide interior fire doors in rated walls.
2. **Steel doors:** Must be ANSI A 250.8, Level 1, (occasional use, low abuse types such as closet doors without locks); Level 2, (low use, moderate abuse types such as office/storeroom doors); Level 3, (moderate use, high abuse types such as BEQ sleeping room doors); Level 4, (high use, high abuse types such as corridors, stairways, assembly

spaces, and main entry doors), with a physical performance level of 'A'. Maximum door undercut must not exceed 19 mm (3/4 inch).

3. **Sound Insulated Doors and Frames:** Utilize Sound Insulated Doors and Frames with sound control weatherstripping in rooms requiring wall assemblies to be sound insulated with a Sound Transmission Class (STC) rating as required. The STC rating for the door and frame assembly must be not less than the wall assembly STC rating.
4. **Aluminum Doors and Frames:** Provide swing-type aluminum doors and frames complete with framing members, transoms, side-lites, and accessories. Fabricate of ASTM B 221, Alloy 6063-TS for extrusions.
5. **Steel Door Frames:** ANSI A 250.8. Form frames with welded corners for installation in masonry partitions and knock-down field assembled corners for installation in metal stud and GWB partitions. Install frames in accordance with SDI 105. Form stops and beads with 20 gauge steel.

Provide a minimum of three jamb anchors and base steel anchors per frame, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gauge. Secure frames to previously installed concrete or masonry with expansion bolts in accordance with SDI 11-F. Provide mortar infill of frames in masonry walls, and gypsum board compound infill at each jamb anchor in metal frame walls.

6. **Fire doors:** Provide in conformance with NFPA 80 and NFPA 105. Fire doors and frames must bear the label of UL, FM or WHI attesting to the rating required. Door and frame assemblies must be tested for conformance per NFPA 252 or UL 10B (for neutral pressure) or UL 10C (for positive pressure). Wood fire doors must also comply with ASTM E 152.

Provide stainless steel astragals complying with NFPA 80 for fire-rated assemblies and NFPA 105 for smoke control assemblies.

7. **Interior Door Hardware:** Provide the services of a certified door hardware consultant to prepare the door hardware schedule. Unless otherwise noted, interior doors include latch, hinges, door stops and door silencers. Provide closers and kick plates for fire-rated, corridor, stairway and high-use non-residential doors.
  - a. **Hinges** - BHMA A156.1, Grade 1, 108 x 108 mm (4 1/2 x 4 1/2 inches) with non-removable pin or anti-friction bearing hinges.
  - b. **Locks and Latches** - For non-residential buildings use Series 1000, Operational Grade 1, Security Grade 2 for stairways, building entrances, corridors, assembly spaces, and other high use interior doors. Use Series 4000, Grade 1 for non-residential locations not using Series 1000 hardware. For residential buildings use Series 4000, Grade 2 for interior doors. a) Mortise Locks and Latches - BHMA A 156.13, Series 1000, Operation Grade 1, Security Grade 2. b) Bored Locks and Latches - BHMA A 156.2, Series 4000, Grade 1, or Grade 2.
  - c. **Exit Devices** - BHMA A 156.3, Grade 1. Provide touch bars in lieu of conventional crossbars and arms. Use manufacturer's integral touch bars in aluminum storefront doors.
  - d. **Card Key Access** - Provide card key type access units for specialized entries. Provide lithium battery powered, magnetic stripe keycard locksets that are ANSI/BHMA A156.13, Series 1000, Grade 1, mortise or ANSI/BHMA A156.2, Series 4000, Grade 1, cylindrical locks, tamper resistant, UL listed with 25 mm (1 inch) throw deadbolt, 19 mm (3/4-inch) throw latch bolt, auxiliary dead-locking latch, and 68.75 mm (2-3/4 inch) backset.

Provide hardware keying compatible with the existing base-wide keying system. Replacement interchangeable cores must be compatible with the Best Lock system.

- e. **Key Cabinet:** Provide a Key Cabinet with 30% over capacity.

## C1030 SPECIALTIES

1. **Compartments, Cubicles, & Toilet Partitions:** FS A-A-60003. Provide toilet compartments at multi-fixture toilet rooms of Type I, Style B-Ceiling Hung, C-Overhead Braced, or F-Overhead braced-alcove. Reinforce panels to receive partition-mounted accessories. Urinal screens must be FS A-A-60003. Type III, Style A, floor supported and wall hung or Style D, wall hung. Wall hung urinal screens must be secured with continuous flanges to urinal screen and wall. Steel and Plastic toilet partitions must have a recovered materials content of 20 to 30 percent. Chrome-plated or stainless steel door latches and coat hooks. Provide one coat hook per compartment door. Latches and hinges for handicapped compartments must comply with ABA Accessibility Standards.
2. **Toilet and Bath Accessories:** Provide toilet and bath accessories and install per ABA Accessibility Standards and manufacturers' requirements.
3. **Marker Boards and Tack Boards:** Provide porcelain enamel marker boards fused to a nominal 28 gauge steel sheet and tack boards of cork, with a tensile strength of at least 40 psi when tested according to ASTM F 152, with woven or vinyl covering.
4. **Signage:** All doors must have an identifying device. All handicap accessible facilities must utilize signage which meets current ABA Accessibility Standards requirements with regard to Braille, raised characters, finishes (contrast), size and mounting height. If room names are subject to frequent change, provide an interchangeable strip to be utilized to facilitate removal and replacement.
5. **Lockers:** Provide lockers to meet FS AA-L-00486 (Rev J), enameled steel with special bases.
6. **Shelving:** Provide steel shelving.
7. **Counters:** Provide solid plastic or plastic laminate counter tops and back splashes, AWI Custom grade.
8. **Cabinets:** Provide cabinetry and millwork items with associated accessories and hardware. Cabinetry must be AWI premium or custom grade and have concealed hinges with adjustable standards for shelves.
9. **Casework:** Provide all built-in premanufactured metal cabinetry for specialized functions such as laboratories, libraries, medical and dental facilities. Casework must comply with Mil Std 1691.
10. **Closets:** Provide premanufactured or millwork closets or prefabricated coat closets.
11. **Fire Extinguisher Cabinets:** Provide fire extinguisher cabinets. Size and locate fire extinguisher cabinets to encase extinguisher as required by NFPA 10 & 101. Fire extinguishers will be provided by the Customer.
12. **Firestopping Penetrations:** Provide all sleeves, caulking, and flashing for firestopping penetrations.

13. **Entrance Floor Grilles and Mats:** Provide recessed pan or surface floor mats at main entrance only or all building entrances.
14. **Ornamental Metal Work:** Provide ornamental metalwork.
15. **Other Interior Specialties:** Motorized projection screen must be wall or ceiling or above-ceiling mounting. Pull-down projection screens must be provided in lieu of motorized projection screens as approved by the Activity.

## C20 STAIR CONSTRUCTION

Provide interior and exterior stair construction. Stair design, materials and construction must comply with IBC, and applicable codes and standards, including NFPA 101. Provide refuge area at top of stair in accordance with applicable Americans with Disability Act Design Guide requirements.

## C30 INTERIOR FINISHES

### C3010 WALL FINISHES

Unless otherwise noted in the RFP, primary wall finish is painted gypsum wall board. Provide fire resistive construction and finishes for fire separation between areas of the building in accordance with the latest adopted version of the IBC, and NFPA 101. Provide water resistant cementitious board at floors and walls of tubs and showers.

1. **Ceramic Tile:** Provide ceramic tile wall systems as defined in the Tile Council of America (TCA) handbook for ceramic tile installation and materials for the service requirements listed. Provide installation and materials in accordance with ANSI A108/A118 series standards, except do not use organic adhesives. Provide manufacturer's full range of colors and styles. Tile must be a minimum of one grade above base grade. Coordinate with ceramic bath accessories for modularity. Include all trim pieces, caps, stops, and returns to complete installation.
2. **Wallcovering:** Vinyl wallcovering must conform to ASTM F793, Category V Type II, 371 g to 624 g (13.1 to 22 ounces) total weight per square yard and width of 1370 mm (54 inches). Provide ASTM F793, Category VI, Type III, 624 g (22 ounces) and above to cover rough textured walls such as masonry. High performance fabric wallcovering must be woven or non-woven Class A, fire resistive material, a minimum of 1219 mm (48 inches) wide, with a soil repellent finish and a minimum of 340 g (12 ounces) per square yard exclusive of backing. "Tackable" wall covering must be "self-healing" from tack penetration through the covering into the substrate. Acoustical wallcovering must be textured, woven or non-woven, Class A fire resistive material with an acrylic backing, a minimum of 1219 mm (48 inches) wide and a minimum of 454 g (16 ounces) per square yard. The material must have an NRC rating of .15 on gypsum board in accordance with ASTM C423. Do not install wall covering on interior face of exterior walls.

### C3020 FLOOR FINISHES

Provide new flooring materials as required. All flooring materials, adhesives, finish coats, sealers and mortar materials must meet or exceed EPA requirements for toxic substance content restrictions and air quality requirements; and meet or exceed fire protection requirements, such as

smoke and flame spread requirements. When laying broadloom carpets and resilient flooring, use the widest sheet materials available to avoid or minimize the number and extent of seams. When seams are required, locate seams at infrequent traffic areas. Contractor is required to submit seam layout to Contracting Officer for approval prior to installation.

1. **Ceramic Tile:** Provide ceramic tile floor systems as defined in the Tile Council of America (TCA) handbook for ceramic tile installation and materials for the service requirements listed. Provide installation and materials in accordance with ANSI A108/A118 series standards, except do not use organic adhesives. Provide manufacturer's full range of colors and styles. Tile must be a minimum of one grade above base grade. Provide ceramic or porcelain tile with a minimum breaking strength of 202kg (300 pounds), ASTM C648, and a maximum absorption rate of 0.5%, ASTM C373. Tile must have a minimum coefficient of friction (wet and dry) of 0.6, ASTM C1028.
2. **Resilient Flooring:** Meet or exceed applicable ABA Accessibility Standards horizontal requirements. Install flooring per manufacturer's recommended methods and adhesives. Provide manufacturers full line of color and pattern selections, including multi-color patterns. Linoleum Sheet or Tile Flooring must be 2.5 mm (0.10 inch) gage; minimum 250 psi static load limit, ASTM F970; and with multi-color pattern and color extending throughout thickness, ASTM F2034, Type I. Resilient homogeneous vinyl sheet flooring must be commercial quality, 2.0 mm (0.080 inch) overall gage, with minimum 1.6 mm (.066 inch) thick wear layer, protective urethane finish, ASTM F1303, Type II, Grade 1, Class A. Resilient vinyl composition tile must be commercial grade, 3 mm (.125 inch) gage, ASTM F1066, Comp. 1, Class 2, through pattern.
3. **Carpet:** Carpet manufacturer and installer must be experienced, established and in good standing with the industry. Carpet, broadloom or tile must be installed per the Carpet & Rug Institute's recommendations. Carpet must be tufted, textured loop, cut/loop or tip sheared, a minimum of 26 oz. face weight, minimum density of 6600, 100% premium branded yarn- or solution-dyed, Type 6 or 6.6 continuous hollow filament nylon. Carpet must be multi-color and patterned for soil and wear hiding properties. Carpet must have high performance backing warranted against zippering, edge raveling and delamination, be anti-static and anti-microbial. Carpet must meet Flammability ratings; generate less than a 450 rating, ASTM E662; meet the Critical Radiant Flux Classification of not less than 0.45 W/sq. cm., ASTM E648. Where indicated in the room requirements, provide attached polyurethane cushion or separate polyurethane cushion for double stick pad installations, ASTM 1667 and ASTM 3676.
4. **Wall Base:** Provide porcelain or ceramic tile base for porcelain or ceramic tile floor. Provide solid, through color preformed rubber or vinyl base for carpeted/resilient flooring areas. Provide a sealant between base and floor finish in all wet areas.

## C3030 CEILING FINISHES

Unless otherwise noted in the room requirements, acoustical ceiling panels must be 24 inch by 24 inch, with a minimum light reflectance of .75, Class A, flame spread 25 or less and smoke development of 50 or less, ASTM E84. Acoustical ceiling panels must have minimum 60% recycled content and conform to ASTM E1264. Panels must have a factory-applied standard washable painted finish or Type IV with factory-applied plastic membrane-faced vinyl, Form: 1, 2 or 3. Provide square edge except as noted.

Unless otherwise noted in the room requirements for entrance lobby, restrooms and showers, provide a painted, suspended gypsum board ceiling. Exposed structural systems shall be painted.

## C3040 PAINTING

All painting and coating materials must be low VOC, comply with local air quality control laws and regulations; and conform to the Master's Painters Institute's (MPI) *Architectural, Interior Systems Manual* and the MPI's *Maintenance and Repainting Manual* recommendations for paint systems, surface preparation and applications.

Provide minimum of one prime coat and two finish coats. The prime coat must not be combined with texture or other coatings. Seal and prime all surfaces to cover underlying stains or discoloration that may affect finish paint. Finish coats must provide full coverage of undercoats and substrates. All walls and ceilings in wet area must have semi-gloss paint. All wood or metal cased openings, door trims and casings, window trims and casing, and other finish trim must have semi-gloss paint. All interior walls and ceilings must have satin or eggshell finish. For previously painted surfaces, prime all surfaces to ensure compatibility of finish coats. Do not paint prefinished surfaces except as noted.

Provide Institutional Low Odor/Low VOC Latex paint or High Performance Architectural Latex systems as defined and approved by the MPI Systems Manual for the various substrates required to be painted.

**Paint/Color Selection:** Provide paint systems tested to "Detailed Performance Level" standard as defined by MPI. Paints must be readily available for purchase in standard colors.

## SECTION D. SERVICES

### D10 CONVEYING Elevators and Escalators - Not used

### D20 PLUMBING

Provide plumbing fixtures, appliances, and equipment complete and usable as required by Part 3. All plumbing fixtures, appliances and equipment, piping, valves, accessories, and appurtenances must comply with International Plumbing Code (IPC) and all other applicable codes and standards, including energy, water conservation, and local activity regulations and standards. Provide all plumbing fixtures to meet current criteria of EPA Watersense program <http://www.epa.gov/watersense>

1. **Domestic Water:** Provide ASTM B 88 Type K or L copper tubing and fittings for pipe sizes 4 inches or smaller. Provide Type L tubing above ground with solder fittings. For buried piping, use Type K tubing with solder fittings, or Chlorinated polyvinyl chloride (CPVC) Plastic pipe, fittings, and solvent cement per ASTM D 2846/D 2846M for sizes 4 inches and smaller.

Provide mineral fiber insulation with vapor barrier on domestic water (hot and cold) supply and recirculation piping. Provide re-circulating pumps or instantaneous water heaters for hot water systems with fixtures greater than 100 ft from hot water source. Provide water hammer arrestors per PDI STD WH-210 as required for rapid water shut off scenarios. All water valves except for fixture shut off valves must be ANSI B16.18 brass, full port ball type. All plumbing fixtures must have separate shut off valves. All piping must be concealed in walls, attic spaces, or in crawl spaces under floors. Provide access panels for valves behind walls. No under slab water piping is allowed. Fittings for annealed copper tubing must conform to ANSI B16.22. Solder and flux must be lead free. Exposed exterior piping is prohibited unless otherwise not practical. Provide

identification for piping and equipment.

2. **Wall Penetrations:** Piping which penetrates fire rated walls must be completely sealed to maintain fire resistance integrity as required by Code. Penetrations through walls that are not fire rated must be adequately supported and sealed. Pipe penetrations through exterior walls must be sleeved, caulked with weatherproof sealant and provided with finish trim.

## D2010 PLUMBING FIXTURES

Provide fixtures complete with fittings, and chromium-plated, or nickel-plated brass (polished bright or satin surface) trim. All fixtures, fittings, and trim, must be from the same manufacturer and must have the same finish. Access panels must be provided for all bathtubs and showers, except at exterior and party walls and where tub or showers are back to back. Provide cleanouts in accordance with the plumbing code. Rotate or extend cleanouts required to facilitate maintenance and clearing of blockage in waste piping.

1. **Faucets:** All faucets must be brass construction, washerless type, with seals and seats combined in one replaceable ceramic disk valve cartridge designed to be interchangeable with all lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as a part of a replaceable valve unit. Faucets provided must be of the same type and manufacturer throughout the facility, unless otherwise noted. Lavatory faucets must be U.S. Environmental Protection Agency (EPA) Watersense® certified and labeled bathroom sink faucets.
2. **Water Closets:** Water closets must be in accordance with ANSI A112.19.2, with trim conforming to A112.19.5. Water closets must be vitreous china and have an elongated bowl with trip lever, unlined tank, close coupled siphon jet, floor outlet with wax gasket, flange and an anti-siphon float valve. Provide white closed front seat and cover for private toilets and open front seat cover for public facilities. Water consumption must be no greater than 1.6 gallon maximum per complete flushing cycle. Provide self-closing metering type flush valve on flush valve type water closets, unless electronic control is specified in Part 3. Maximum flush volume must not exceed 1.28 gallon per flush (GPF) (4.8 Liter per flush (LPF)) for single function flush valves. Dual function flush valves must provide a flush of 0.8 to 1.6 GPF (3.0 to 6.0 LPF) or 1.28 GPF (4.8 LPF) average for 2 low volume flushes and one high volume flush. Tank type water closets must be U.S. Environmental Protection Agency (EPA) Watersense® certified and labeled toilets.
3. **Urinals:** Provide U.S. Environmental Protection Agency (EPA) Watersense® certified and labeled ceramic-type urinals.

**Non Water Use Urinals:** ASME A112.19.2, white vitreous china, wall-mounted, wall outlet, non-water using, integral drain line connection, with sealed replaceable cartridge or integral liquid seal trap insert. The urinal and trap assembly must maintain a sufficient barrier of a biodegradable immiscible liquid to provide the trap seal and inhibit the backflow of sewer gases. For urinals that use a replaceable cartridge, provide four additional cartridges for each urinal installed. Provide an additional quart of biodegradable liquid for each urinal installed. Provide ASME A112.6.1M concealed chair carriers. Installation and testing must be in accordance with the manufacturers' recommendations. Drain lines that connect to the urinal outlet must not be made of copper tube or pipe. Urinal design and installation must be ABA Accessibility Standards compliant. Slope the sanitary sewer branch line for non-water use urinals a minimum of 1/4-inch per foot. Manufacturer must provide an operating manual and on-site training for the proper care and maintenance of the urinal.

4. **Lavatories:** Unless otherwise specified by Part 3, lavatories must be integral to the vanity countertops. Each lavatory must be provided with hot and cold water tempered by means of a mixing valve or combination faucet.
5. **Sinks:** ASME/ANSI A112.19.3M sink, 20 gage stainless steel with integral mounting rim, minimum dimensions of 840 mm (33 inches) wide for two compartment or 560 mm (21 inches) wide for one compartment by 560 mm (21 inches) front to rear, with ledge back and undersides coated with sound dampening material.
6. **Water Coolers:** ARI 1010, wall-mounted, bubbler style, air-cooled condensing unit, 4.20 mL per second (4.0 gph) minimum capacity, stainless steel splash receptor, double wall heat exchanger, and all stainless steel cabinet. Install in accordance with the manufacturer's instructions.
7. **Showers:** Provide U.S. Environmental Protection Agency (EPA) Watersense® certified and labeled showerheads connected to concealed pipe connected to copper alloy single control type mixing valve with front access integral screwdriver stops. Anchor the mixing valves and the pipe to each showerhead in wall to prevent movement. Unless otherwise specified by Part 3, showers must be supplied with water at a temperature no more than 110°F by means of a pressure balance, tempering or mixing valve.
8. **Service sinks:** ASME A112.19.1M, white enameled cast-iron or ASME A112.19.2M white vitreous china, wall mounted and floor supported by wall outlet cast-iron P-trap, minimum dimensions of 560 mm (22 inches) wide by 457 mm (18 inches) front to rear with 230 mm (9 inch) splashback, and stainless steel rim guard. Provide ASME A112.18.1M copper alloy back-mounted combination faucets with vacuum breaker and 20 mm (0.75 inch) external hose threads
9. **Mop Sinks:** Pre-cast terrazzo or ASME A112.19.2M white vitreous china floor-mounted mop sink, 914 mm x 914 mm x 305 mm (36 inches x 36 inches x 12 inches). Terrazzo must be made of marble chips cast in white Portland cement to a compressive strength of not less than 25 mPa (3625 PSI) 7 days after casting. Provide brass body drains with nickel bronze strainers cast integral with mop sink. Provide stainless steel rim guard for mop sink. Provide chrome-plated exposed hot and cold water faucets ASME A112.15.M wall-mounted copper alloy faucets swing spout with 20 mm (3/4 inch) hose connection, vacuum breaker, and pail hook. Provide mop hanger on wall above sink suitable for four mops.
10. **Laundry Sinks:** ANSI Z124.1, plastic, two compartment, minimum dimensions of 1016 mm wide by 533 mm (40 inches wide by 21 inches) front to rear, with floor-supported steel mounting frame secured to wall. Provide ASME A112.18.1M copper alloy centerset faucets, swing spout with aerator, and stainless steel drain outlets with cup strainers, and 40 mm (1.5 inch) adjustable P-trap with drain piping to vertical vent stack.
11. **Emergency Eyewash:** ANSI Z358.1, wall-mounted self-cleaning, non-clogging eye and face wash with quick opening, full-flow valves, stainless steel eye and face wash receptor. Provide copper alloy control valves. Pressure-compensated tempering valve is required for emergency fixtures, with leaving water temperature setpoint adjustable throughout the range 15.5 and 35 degrees C (60 to 95 degrees F) unless cold water supply meets temperature criteria.

## D2020 DOMESTIC WATER DISTRIBUTION

1. **Natural Gas or Propane Fired Storage Water Heaters:** Provide high efficiency storage type natural gas or propane fired water heaters per ANSI Z21.10.1 or ANSI Z21.10.3 meeting AGA requirements. For California, unit efficiency must meet or exceed that listed in the Title-24 Standards. Equipment efficiency must be in accordance with Energy Star or FEMP designated products list, <http://energy.gov/eere/femp/find?product?categories?coveredefficiency?programs> For gas water heaters use Energy Star labeled products. For products not listed by Energy Star or FEMP provide products with efficiency rated in the top 25% of available products. Water heaters must be equipped with glass-lined steel tanks, minimum R-15 polyurethane foam insulation, replaceable anodes, and adjustable range thermostat to allow hot water settings between 43 and 71 degrees C (110 and 160 degrees F). Water heater warranty must be a minimum of 10 years. Provide vent in accordance with NFPA 54. Provide low NOx burners that meet SCAQMD requirements. Install in accordance with manufacturer's instructions and the code. Where earthquake loads are applicable, water heater supports must be designed and installed for seismic forces in accordance with the International Building Code.
2. **Electric Water Heaters:** Provide electric water heaters with double heating element per UL 174. Unit efficiency must meet or exceed that listed for FEMP or ENERGYSTAR, or as listed in ASHRAE 90.1, whichever is greatest. Water heaters must be equipped with glass-lined steel tanks, high efficiency type, insulated with polyurethane foam insulation, replaceable anodes, and adjustable range thermostat to allow hot water settings between 43 and 71 degrees C.
3. **Domestic Water Boilers:** Boilers must be designed, tested, and installed per ASME CSD-1 (Controls and Safety Devices) and ASME BPVC (Boiler and Pressure Vessel Code). The boiler must meet the requirements of the UL 795, NFPA 85, ANSI Z83.3, and ASME CSD. Boilers must be certified by Naval Personnel or a contractor approved by the Contracting Officer.

## D2030 SANITARY WASTE VENT

All new sewers below concrete slab must be solid core, minimum schedule 40 (DWV Type), ABS in accordance with ASTM 2661. New waste and vent piping above floor must be Schedule 40 PVC (DWV Type) ASTM 2665 or ABS ASTM 2661. Use of ABS plastic pipe must conform to the IBC and IPC. Provide pipe sizing, configurations, and cleanouts as required by the IPC. Cellular core plastic pipe is not allowed. SOVENT systems are not allowed.

## D2040 RAINWATER DRAINAGE

Below concrete slab must be solid core, minimum schedule 40 (DWV Type), ABS in accordance with ASTM 2661. Above floor must be cast iron hubless, or hub and spigot, or Schedule 40 PVC (DWV Type) ASTM 2665 or ABS ASTM 2661 as indicated in Part 3. Pipe materials must conform to the IBC and IPC. Provide pipe sizing, configurations, and cleanouts as required by applicable codes and standards.

## D2090 OTHER PLUMBING SYSTEMS

**Natural Gas Piping Systems:** Exterior above grade natural gas piping must be schedule 40 galvanized steel pipe with threaded fittings and joints. Underground exterior gas piping must be polyethylene pipe that satisfies the requirements of NFPA 54, ASTM D2513-01, and ASME B31-8. Provide warning tape at 12 inches below grade directly above buried gas pipes. Below grade

metal gas piping is prohibited. Interior gas piping must be ASTM A 53, schedule 40 black steel with ASME B16.3 threaded fittings and joints. The use of semi-rigid tubing and flexible connectors for gas equipment and appliances is prohibited except for final connections to the equipment and appliances where they must be provided. Provide flexible gas connections in accordance with ANSI Z21.45 and not more than 40 inches long. Provide accessible gas service with shutoff valve for all equipment. Gas piping must conform to NFPA 54 and must be pressure tested in accordance therewith. Gas piping is considered a fragile utility in the content of UFC 4-010-01, *DOD Minimum Antiterrorism Standards for Buildings*.

## **D30 HEATING, VENTILATION AND AIR CONDITIONING (HVAC) SYSTEMS**

The HVAC systems must comply with the latest edition of the International Mechanical Code, International Plumbing Code, ASHRAE Standards, National Electrical Code, National Fire Protection Association Publications, International Building Code, and California Title 24 or ASHRAE 90.1 energy efficiency standards (the more stringent of the two) unless otherwise specified in Part 3. All equipment, appliances, ductwork and accessories must comply with applicable codes and standards. For projects located in California, also comply with California Energy Commission (CEC) efficiency rating requirements as stated in Ca. AB 970 Title 24. The Contractor must certify that the installation is in conformance with the applicable codes and standards at the completion of the contract, prior to final invoice being processed and final acceptance. Provide Energy Star rated equipment where available. Provide equipment with performance in excess of Energy Star requirements where specified.

1. **Equipment Clearance:** Provide working space around all equipment. Provide all required fittings, connections and accessories required for a complete and usable system. All equipment shall be installed per the manufacturer's recommendations. Where the word "should" is used in manufacturer's instructions, substitute the word "shall".
2. **Material and Equipment Qualifications:** All materials and equipment must have been in satisfactory commercial or industrial use for 2 years prior to the bid opening. The 2-year use must include applications of equipment and materials under similar circumstances and of similar size. The product must have been for sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the 2-year period.
3. **Motors:** Single-phase fractional-horsepower alternating-current motors must be high efficiency types corresponding to the applications listed in NEMA MG 11. Select polyphase motors based on high efficiency characteristics relative to the applications as listed in NEMA MG 10. Additionally, all polyphase squirrel-cage medium induction motors with continuous ratings must meet or exceed energy efficient ratings per Table 12-10 of NEMA MG 1. Provide controllers for 3-phase motors rated 0.75 kW (1 hp) and above with phase voltage monitors designed to protect motors from phase loss and over/under-voltage. Provide means to prevent automatic restart by a time adjustable restart relay. For packaged equipment, the manufacturer must provide controllers including the required monitors and timed restart. Provide reduced voltage starters for all motors 25 hp and larger.
4. **Equipment Support:** Provide housekeeping pads and vibration isolators under all floor-mounted equipment.
5. **Coatings:** When required in Part 3, provide chiller and air handler coils with copper tube/copper fin coil construction or immersion applied, baked phenolic or other approved coating. Field applied coatings are not acceptable. Mechanical equipment casings must

have painted finishes that pass a salt-spray test conducted per ASTM B117 for duration of at least 500 hours.

6. **Equipment Insulation:** Provide insulation on all chilled water equipment. Insulate hot and chilled water pumps and equipment as suitable for the temperature and service in rigid block, semi-rigid board, or flexible unicellular insulation to fit as closely as possible to equipment. Provide vapor retarder for chilled water applications.
7. **Acoustical considerations:** Noise levels in all areas served (supply, return, and exhaust) by a mechanical system must comply with ASHRAE Design Guidelines for HVAC related background sound in rooms as indicated in the lasted ASHRAE Fundamentals Handbook. The RC-rating method must be utilized.

## D3020 HEAT GENERATING SYSTEMS

1. **Boilers:** Boilers must be designed, tested, and installed per ASME CSD-1 (Controls and Safety Devices) and ASME BPVC (Boiler and Pressure Vessel Code). The boiler must meet the requirements of the UL 795, NFPA 85, ANSI Z83.3, and ASME CSD. Do not provide watertube boiler(s) for hydronic heating when size permits otherwise. Provide insulated boiler stack in accordance with manufacturer's recommendations and conform to NFPA 211 or provide pre-manufactured, multi-wall stacks complying with NFPA 54 or NFPA 58 and UL-listed. Low pressure boilers must be equipped with one or more pressure relieving devices, adjusted and sealed to discharge at a pressure not to exceed the maximum allowable working pressure of the boiler. The combined capacity of these devices must be such that with the fuel burning equipment installed and operating at maximum capacity, the pressure cannot rise more than 5 psi for steam boilers or 10% for water boilers above the maximum allowable working pressure of the boiler. Pressure relieving devices must be installed as required by the referenced code, be ASME stamped and rated, and must be installed with the valve spindle in the vertical position. Provide with manual lifting device for periodic testing. Boilers must comply with the local air quality regulations. Boilers must be equipped with pressure and temperature gauges as required for proper maintenance and operation. Thermometers must also be provided at the inlet and exit of the boiler, and be visible to the operator from the operating area.
2. **Furnaces:** UL-listed, factory assembled, self-contained, forced circulation, furnace. Provide electronic ignition system. Unit must be design certified by AGA, GAMA efficiency rating certified, for gas furnaces and NFPA 31 for oil furnaces. Provide with cooling coil as necessary. Furnaces must comply with the local air quality regulations.

## D3030 COOLING GENERATING SYSTEMS

1. **Chillers:** Air-cooled chillers must be type indicated in Part 3 and meet the requirements of ARI 550/590-98. Provide control panel with the manufacturers' standard controls and protection circuits. If DDC system is required in project, provide a control interface for remote monitoring of the chiller's operating parameters, functions and alarms from the DDC control system central workstation. Provide complete start-up and operational testing of chiller equipment.
2. **Direct expansion systems:** Provide units factory assembled, designed, tested, with ducted air distribution and rated in accordance with ARI 210/240 or ARI 340/360. Refrigerant piping size must be per the manufacturer's recommendations. Insulate refrigerant piping suction lines and condensate drain.

3. **Refrigerants:** The use of Ozone Depleting Substances (ODS) as well as the qualifications and credentials of personnel servicing equipment that contains ODS is restricted. Refrigerants must have an Ozone Depletion Potential (ODP) of 0.0 with exception to R-123. The ODP must be in accordance with the "Montreal Protocol on Substances That Deplete the Ozone Layer", September 1987, as amended through 2000, sponsored by the United Nations Environment Programme.
4. **Coils:** If coatings are indicated in Part 3, provide with copper tube/copper fin construction or immersion applied, baked phenolic or other approved coating that passes the 3000 hour salt spray resistance test using ASTM B117 procedure. Field applied coatings are not acceptable.
5. **Variable Refrigerant Flow (VRF) systems:** The system must consist of VRF heat pump units, branch circuit controllers, VRF fan coil units, and associated controls. The system must be designed to provide the facility with simultaneous heating and cooling utilizing hot gas refrigerant or sub-cooled liquid. Provide system with heat recovery. The heat pump units must be inverter driven and must utilize R410A refrigerant. Total capacity of the branch controllers must be between 50% and 150% of the rated capacity. All refrigerant piping must be sized and installed in strict compliance with the manufacturer's requirements. Refrigerant piping must be clean, dry, and leak free. Prior to installation all refrigerant pipes must remain sealed. During installation and prior to filling, nitrogen must be used to maintain cleanliness and prevent oxidation and scaling while brazing.

## D3040 DISTRIBUTION SYSTEMS

1. **Ductwork:** All ductwork must be provided in accordance with the latest SMACNA guidelines. Flexible duct lengths must not exceed 5 feet. Provide galvanized sheet metal ducts except for special exhaust systems and the following:
  - a. For fume hood exhaust, kitchen hood exhaust, and dishwasher exhaust, provide stainless steel ductwork.
  - b. For shower area exhausts, provide aluminum or stainless steel ductwork and sloped to drain provisions. After the shower exhaust is mixed with a volume of general exhaust air equal to 200% of the shower exhaust rate, standard galvanized construction may be used.
  - c. Internal insulation-lined ductwork is prohibited in all areas. For ductwork located exterior to the building, provide externally insulated systems with sheet metal cladding. Provide external thermal insulation for all ductwork. Insulate ductwork in concealed spaces with blanket flexible mineral fiber. Insulate ductwork in Mechanical Rooms and exposed locations with rigid mineral fiber insulation. Provide insulation with factory applied all-purpose jacket with integral vapor retarder. In exposed locations, provide a jacket with white surface suitable for painting. Flame spread/smoke developed rating for all insulation shall not exceed 25/50. Minimum insulation thickness must be the minimum thickness required by ASHRAE 90.1. Insulate the backs of all supply air diffusers with blanket flexible mineral fiber insulation.
  - d. The ductwork must be sealed with an approved duct sealer and in accordance with SMACNA standards. If leakage testing is indicated in part 3, the duct leakage must not exceed 2%.
  - e. Provide manual volume dampers in each branch take-off from the main duct to control air quantity. Dampers must conform to SMACNA DCS. Dampers must be installed in accessible locations.

2. **Fire Dampers:** Fire dampers must be rated per UL 555. Fire dampers must be dynamic type rated for closure against a moving airstream. Provide fire dampers that do not intrude into the air stream when in the open position.
3. **Piping:**
  - a. Provide insulated, steel piping for sizes 4 inches and larger and insulated copper piping for sizes less than 4 inches for water supply and return piping to serve the HVAC equipment throughout the facility.
  - b. Provide system flushing and start-up for water systems.
  - c. Oil piping: ANSI/ASTM A53 or A106 piping with associated ASME fittings or ASTM B88, type L or M copper tubing with ASME B16.26 flared fittings or compression type fittings.
4. **Exhaust Fans And Ducts:**
  - a. **General:** Exhaust fans must be sized to move the volume of air required to comply with International Mechanical Code for the areas requiring exhaust.
  - b. **Bathroom, restrooms and Utility Room Exhaust Fans:** Exhaust fans must be sized to give not less than 10 air changes per hour in the space to be ventilated. Fans must have a maximum sound level of 3 sones and be separately switched from light.
  - c. **Flues:** When required, provide new Type B, U.L. listed, double wall flues. Flue installation must be in accordance with the International Mechanical Code.
5. **Air handling units:** Modular construction, double wall air handling units with minimum of 25 mm (1 inch) casing insulation. Provide ARI 430 certified fans and ARI certified coils. Provide stainless steel, positive draining condensate drain pan. For 100% outside air units provide capability for cooling, heating, dehumidification and reheat.

## D3050 TERMINAL AND PACKAGE UNITS

1. **Unit ventilators:** Unit must be factory assembled unit ventilator capable of up to 100% outdoor air ventilation and UL-listed.
2. **Unit heaters:** ANSI Z83.8 and AGA label. Equip each heater with individually adjustable package discharge louver. Provide with thermostat.
3. **Fan coil units:** UL-Listed, factory assembled and tested fan coils, ARI 440 and ARI certified.
4. **Packaged units:**

Factory packaged rooftop units in accordance with ARI 430 and suitable for outdoor installation. Provide with manufacturer's roof curb.

Packaged through wall units must be factory assembled air conditioner or heat pump and rated in accordance with ARI 310 or ARI 380 and ARI certified. Unit must include heat and operate under the standard unit controls. Units must be designed to allow ease of maintenance by use of a wall sleeve. Units must have internal condensate removal (condensate must not be externally drained).

## **D3060 CONTROLS AND INSTRUMENTATION**

1. **General:** Provide stand-alone or distributed direct digital controls, as required in Part 3.
2. **Distributed Direct Digital Controls (DDC):** DDC hardware must be UL-916 rated. Use controllers in a distributed control manner. Controllers must be stand alone with an internal clock and modem. The total number of I/O hardware points shall not exceed 48 in any controller. Provide sufficient memory for each controller to support required control, communication, trends, alarms, and messages. Provide communications ports for controller to controller interface and on-site interface. When providing a partial DDC system or connecting to an existing DDC system, provide a laptop computer with all necessary software for user interface.

## **D3070 SYSTEMS TESTING AND BALANCING**

All HVAC water and air systems, both new and retrofit, must be TABed in accordance with NEBB or AABC standards. As part of any TAB air balancing effort, acceptable air quantity variations must be 0 to -10% for exhaust systems and 0 to +10% for supply air systems.

## **D40 FIRE PROTECTION**

Provide new or extend existing Automatic Fire Sprinkler systems, Smoke and Heat detection systems, Fire Alarm and Mass Notification systems as required. The work for fire sprinklers, fire alarm, smoke detection, and heat detection must be provided by contractors licensed to perform such work.

**Project Requirements:** Prior to the start of design, the Designer of Record must meet with the Government's Fire Protection Engineer to determine the extent and types of fire protection required.

### **D4010 FIRE ALARM AND DETECTION**

Fire alarm system includes manual stations, system smoke detectors, duct smoke detectors, heat detectors, audio/visual alarms, connection to basewide fire alarm monitoring, electrical supervision of fire pump controllers, and electrical supervision of all sprinkler system alarm and supervisory devices as required.

### **D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT**

The water supply information is provided for bidding purposes. The design point of connection to existing water supply will require the approval of the Contracting Officer. The FPE DOR must conduct additional flow tests after contract award prior to any design submissions. Tests must be coordinated through the Contracting Officer.

### **D4040 SPRINKLERS**

Areas subject to freezing must be provided with a dry pipe system.

## **D50 ELECTRICAL**

## D5010 ELECTRICAL SERVICE & DISTRIBUTION

Provide interior electrical wiring, fixtures, switches, outlets, and apparatus in accordance with applicable codes and standards. The electrical system must conform to NFPA 70. Power and lighting circuits must be separate.

1. **Wiring:** All wiring must be in electrical metal conduits and must be concealed except in the industrial spaces and at locations indicated in Part 3. No conductors are permitted to be smaller than No. 12 AWG, copper wires. Wiring below slab or underground must be in Schedule 40 PVC with ground wire. Exposed conduits on the exterior of the building are prohibited. Provide a ground conductor for each circuit; conduits must not be used as the sole means of grounding. Cable assemblies Types AC, MC, or MI and flat conductors may only be used in locations allowed by UFC 3-520-01. Circuit breakers must be bolt-on type. Series rated circuit breakers and fusible panelboards must not be used.
2. **Outlet Circuits** Lighting and convenience outlets must be on separate circuits. Install GFI protected receptacles at all wet or damp areas. Location of outlets must be as required by applicable codes and standards. Provide extra outlets for maintenance and service staffs in spaces such as corridors, hallways and other public spaces as identified below. All exterior outlets must be on separate circuits, be GFI protected, and equipped with a cover to prevent accidental water infiltration into the devices.

In addition to the location requirements specified by NFPA 70, locate general purpose and dedicated outlets in accordance with the following:

- a. Mechanical equipment: Provide receptacle within 7.6 m (25 ft) of mechanical equipment on the interior and exterior of buildings.
- b. Office, staff support spaces, and other workstation locations: One receptacle for each workstation with a minimum of one for every 3050 mm (10 ft) of wall space. When less than 3500 mm (10 ft) of wall at the floor line, provide a minimum of two receptacles spaced appropriately to anticipate furniture relocations. Limit loads to a maximum of four workstations per 20 amp circuit. See Appendix C, Table C1 for workstation load data.
- c. Conference rooms and training rooms: One for every 3.6 m (12 ft) of wall space at the floor line. Ensure one receptacle is located next to each voice/data outlet. Provide one receptacle above the ceiling to support video projection device. Extend circuit to wall location for connection to motorized screen. When it is expected that a conference room table will be specifically dedicated to floor space in a conference room, locate a floor-mounted receptacle under the table. This receptacle may be part of combination power/communications outlet.
- d. Provide power outlets throughout the building to serve all proposed equipment, including government furnished equipment, and allow for future reconfiguration of equipment layout. Provide power connections to all ancillary office equipment such as printers, faxes, plotters, and shredders. Provide dedicated circuits where warranted.
- e. In each telecommunications room provide a dedicated 20 amp circuit with a receptacle adjacent to each rack or backboard for each of the following:
  - 1) CCTV for training systems
  - 2) CCSTV for security systems

- 3) CATV
  - 4) Voice systems
  - 5) Data systems.
  - f. Provide dedicated receptacles as required throughout the facility for television monitors. These outlets will typically be located at the ceiling level for wall mounted television monitors.
  - g. Provide dedicated receptacles as required throughout the facility for tape players and disc players.
  - h. Corridors: One every 15 m (50 ft) maximum with a minimum of one per corridor.
  - i. Janitor's closet and toilet rooms: One GFI receptacle per closet. Provide GFI receptacles at counter height for each counter in toilets such that there is a minimum of one outlet for each two sinks.
  - j. Space with counter tops: One for every 1.200 m (4 ft) of countertop, with a minimum of one outlet. Provide GFI protection of outlets when located within 1.8 m (6 ft) of plumbing fixtures.
  - k. Building exterior: One for each wall, GFI protected and weatherproof.
  - l. Kitchen non-residential: One for each 3.05 m (10 ft) of wall space at the floor line. Provide GFI protection when located within 1.8 m (6 ft) of plumbing fixture.
  - m. Child occupied spaces (including toilets): One for every 3.6 m (12 ft) of wall space. Use child safety type such as those that require rotating an integral surface cover plate to access current. Removable caps and plugs are not acceptable.
  - n. All other rooms: One for every 7.6 m (25 ft) of wall space at the floor line. When 7.6 m (25 ft) or less of wall at the floor line exists in a room, provide a minimum of two receptacles spaced appropriately to anticipate furniture relocations.
  - o. Special purpose receptacles: Designer of Record must coordinate with the user to provide any special purpose outlets required. Provide outlets to allow connection of equipment in special use rooms.
3. **Service Entrance Equipment:** When a switchboard or switchgear is required, the Designer of Record must utilize UFGS Section 26 23 00, *Low Voltage Switchgear or UFGS 26 24 13 Switchboards*, for the project specification, and must submit the edited specification section as a part of the design submittal for the project.

## D5020 LIGHTING & BRANCH WIRING

1. **Lighting Fixtures:** All lighting fixtures must be energy conservation compact fluorescent or Light Emitting Diode (LED) except where indicated by Part 3.
  - a. **Fixtures for Administrative and Commercial Spaces:** For offices, commercial and administrative spaces and facilities provide high efficiency ballast, and instant or rapid start recessed fluorescent fixtures or LED fixtures.
  - b. **Three-Way and Four-Way Switches:** Provide three-way or four-way switching of light fixtures as necessary to facilitate movement between adjacent spaces to allow efficient energy management.

2. **Exterior Lighting Fixtures for Large Open Areas:** Exterior lighting fixtures for large open areas such as parking lots, streets and playgrounds must be energy efficient High-Intensity Discharge (HID) or compact fluorescent fixtures and must comply with local regulations regarding low lighting levels to avoid light pollution.
  - a. Photocell Overriding Switch: Provide photocell-overriding switch for all outdoor light fixtures.

## D5030 COMMUNICATIONS & SECURITY

1. **Telecommunications Systems:** Provide a horizontal distribution system including, but not necessarily limited to, all wiring, pathway systems, connector blocks, protectors for all copper service entrance pairs, terminators for all fiber optic cables, outlet boxes, telephone jacks, and data jacks cover plates in accordance with EIA/TIA standards. Provide Category 6 UTP telephone premise wiring where telephones are required.
2. **Public Address Systems:** Provide a Public Address system with speakers in all locations identified in Part 3.
3. **Intercommunications Systems:** Provide an Intercommunication System to allow two-way communications between all locations identified in Part 3.
4. **Television Systems:** Provide television systems to the extent specified in Part 3. Coordinate with the local Cable Company, Local users and Local Authority at the Activity for other specific requirements. The interior cable outlets and wiring must be complete and ready for use. Wiring must not be run exposed on any surface of the building.
5. **Security Systems:** Provide an Intrusion Detection System (IDS) to sense all perimeter doors and windows and the interior volume in at least two locations. System must have a minimum 90-minute battery back-up and annunciate both locally and at the Base Security Office via a telephone dialer. System must have entry/exit timer. Provide wall mounted keypad control at two locations.

## D5090 OTHER ELECTRICAL SERVICES

1. **Surge Protective Device (SPD):** Provide SPD in accordance with UFC 3-501-01, *Electrical Engineering*.
2. **Variable Frequency Drives:** When variable frequency drives are required, the Designer of Record must utilize UFGS Section 26 29 23 for the project specification, and must submit the edited specification section as a part of the design submittal for the project.
3. **Emergency Generators:** When an emergency generator is required, the Designer of Record must utilize UFGS Section 26 32 15.00 for the project specification, and must submit the edited specification section as a part of the design submittal for the project.
4. **Automatic Transfer and Bypass/Isolation Switches:** When an Automatic Transfer Switch is required, the Designer of Record must utilize UFGS Section 26 36 23 for the project specification, and must submit the edited specification section as a part of the design submittal for the project.
5. **Uninterruptible Power Supply (UPS) System:** When a UPS system is required, the

Designer of Record must utilize UFGS Section 26 33 53 and must submit the edited specification section as a part of the design submittal for the project.

6. **400 Hertz Systems:** The Designer of Record must utilize UFGS Section 26 35 43 for the project specification, and must submit the edited specification section as a part of the design submittal for the project.
7. **Lightning Protection:** When lightning protection is required, the Designer of Record must utilize UFGS Section 26 41 00 for the project specification, and must submit the edited specification section as a part of the design submittal for the project.
8. **Building Photovoltaic System:** When a PV system is required, the Designer of Record must utilize UFGS Section 26 31 00 for the project specification, and must submit the edited specification section as part of the design submittal for the project.

## SECTION E. EQUIPMENT AND FURNISHINGS

### E10 EQUIPMENT

**Equipment and Appliances:** Provide appliances and equipment to fulfill the work for Part 3. Whenever possible, all appliances and equipment provided for the facilities in the contract must be by the same manufacturer and must be the current model available at the time of proposals. Discontinued makes and models are prohibited. All appliances and equipment must comply with applicable Energy Star efficiency rating requirements and must be rated as high efficiency models. Appliances and equipment on California projects must comply with California Title 24 and be rated as high efficiency. All appliances must be of the same manufacturer and shall be the same, or similar in color. Submit catalog information for approval by the Contracting Officer prior to purchasing, delivery and installation of the appliances at the job site. Equipment and appliances such as dishwashers, ice machines with drains, garbage disposers, and ovens/ranges are not considered FF&E.

### E20 FURNISHINGS

#### E20 1.1 FURNISHINGS

The Contractor must have an Interior Designer, certified by the National Council for Interior Design Qualification (NCIDQ) or a state and/or jurisdiction Certified, Registered, or Licensed Interior Designer prepare both the FF&E and the SID Package and participate in any design charrettes to develop the building floor plan. As required, the Contractor must obtain services of equipment specialists to specify the audiovisual, shop, or specialty equipment. The Interior Designer and any specialists must not be affiliated with any furniture dealership/vendor or manufacturer. The Government Interior Designer reserves the right to approve/disapprove the qualifications of the Contractor's Interior Designer.

Systems furnishings installers must be the systems furniture manufacturer's approved dealer of record. In addition, installation dealers must be located within a 100 mile radius of the project site unless approved by the government Interior Designer.

For renovation projects, contractor to re-purpose/recycle existing furniture if not relocated by the government. Contractor to provide verification that the existing furniture was not disposed of at the landfill.

## **WINDOW TREATMENTS**

Provide interior window coverings, associated hardware and controls at each exterior window and at any interior view window where privacy may be required. Refer to the Project Program for size, pattern and style of window treatments. At a minimum, functional window coverings are required on all projects.

Provide energy efficient solar shading systems for exterior windows. The system shall maintain visibility while reducing glare, solar heat gain during the summer and heat loss during the winter. Openness configuration shall be no more than 5% for most areas. The system fabrics and components must be dimensionally stable and must be manufactured to withstand fading, fire, mildew, and soiling. Product must have a minimum 10 year commercial warranty.

## **AUDITORIUM, LECTURE AND CLASSROOM SEATING**

The system must permit the standards to be installed on radial lines from a common center for which concentric circles are determined with each row of units utilizing common middle standards. Standards in each row must be placed laterally so the aisle-end standards will be in alignment as indicated on seating layout drawing. The angle of inclination of backs must be adjusted for variations in sightlines. Mechanical attachment of components must be of sufficient flexibility so that when permanently assembled they will compensate for the changing dimensions laterally between standards caused by convergence toward the center. Seat and back attachments must absorb inaccuracies in lateral spacing of standards at point of attachment caused by unevenness of floor. Varying lateral dimensions of backs and seats must be in accordance with approved seating layout. Minimum width of seating unit must be 20 inches and may be used only to complete a specific row dimension.

## **TABLES FOR AUDITORIUM, LECTURE AND CLASSROOMS**

Provide worksurfaces mounted to floor standards of tubular steel, sheet steel, or cast iron. The standards must be formed to fit the floor incline so that the standards will be vertical. The feet must be formed to eliminate tripping hazards and must have holes for bolt attachment to the floor. Provide riser standards, cantilevered standards and aisle and end standards as required. Provide communications, data and power routing as required. Provide a high-pressure plastic laminate over medium density particleboard for the worksurfaces with coordinating vinyl or resin edge detail.

## **MOVABLE FURNISHINGS**

Furnishings, Fixtures, and Equipment (FF&E) includes furniture, shop equipment, audiovisual equipment, and specialty equipment. Weapon racks, drying cages, and lockers are not considered FF&E. FF&E must be fully integrated with the building systems and finishes. FF&E may also include specialty items for which the customer activity will be responsible for specifying.

Design and provide as required FF&E for all areas as developed during client programming. Design an FF&E package and prepare supporting plans and procurement data in accordance with the general interior design requirements in UFC 3-120-10.

## **FF&E PACKAGE**

Design and provide a fully usable and complete facility to include a FF&E movable furnishings package from Government supply sources according to Federal Acquisition Regulations. The FF&E will include, but not limited to, systems and modular furniture, training and conference furniture, seating, tables, artwork, decorative window covering, specialty furniture and equipment, dormitory room furnishings, and accessories. NAVSUP Blanket Purchase Agreements (BPA) must

be used. The government will provide separate funding for the FF&E package. Construction funds will not be used. The FF&E Package must include shipping, freight, handling, installation and the HAR percentage as applied to the final FF&E total cost.

### **Authorization**

When the purchase of the FF&E is an upfront requirement as an option to award at a later date, the government will provide separate funding for procurement of the FF&E package. Upon receipt of required funding, the Contractor must be authorized by the Contracting Officer as a planned line item modification to procure all FF&E using predominately negotiated price schedules from GSA or other Federal contracts. The amount of the modification will be the actual cost of these items from the Federal price schedules or NAVSUP BPAs, including any freight and installation charges from the furniture supplier as well as the contractor's FF&E Handling and Administration Rate (HAR). The HAR includes all of the prime contractor's effort related to storage, project management, handling, administration of subcontractors, and all other associated costs and profit for the procurement of FF&E. The prime contractor will propose in the contract/task order solicitation the FF&E HAR. The contractor's proposed HAR may not exceed 5% of the total FF&E costs, as noted on the bid schedule. No other charges, expenses, fees, or markups will be authorized.

The government Interior Designer will approve the final FF&E submittal. The FF&E package will be presented to the Contracting Officer and the Contractor must provide the FF&E exactly as specified and approved.

The Contractor will receive a letter of authorization from the Contracting Officer citing the name of the furniture dealer and other information to use when accessing the government supply sources. FF&E items are subject to the Trade Agreement Act and Buy American Act.

### **PURCHASE AND INSTALLATION**

The Contractor must coordinate the building completion date with the installation dealer specified in the FF&E Package. The Contractor or contractor's representative is responsible for the following: issuing purchase orders, receiving acknowledgements, sending copies of purchase orders to the installation dealer(s) specified in the FF&E package, and providing necessary deposits to furniture manufacturers.

The FF&E installation dealer(s) is responsible for the following: Receiving and installing all FF&E specified in the FF&E package, coordinating delivery and installation with the Contractor, inspecting for damage, providing delivery receipts to the Contractor, filing necessary freight claims, hanging artwork, bulletin boards, etc., removing packaging material, cleaning up the site upon completion, and adhering to Contractor's safety requirements.

### **Use of GSA Schedules and Blanket Purchase Agreements (BPAs)**

The prime contractor or FF&E dealer will be authorized to purchase supplies or services from the Navy Furniture BPAs for FF&E requirements under the terms of the contract. The Contractor will receive a letter of authorization from the contracting officer citing the name of the furniture dealer and other information to use when accessing the government supply sources or BPAs.

### **Deposits**

The Contractor should anticipate providing a deposit of between 30% to 50% of the furniture costs when placing their order.

The Contractor must also anticipate possible manufacturer price increases. Recommend ordering FF&E product once funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to coincide with building completion dates. Any costs incurred due to manufacturer price increases will be the burden of the contractor.

### **Davis Bacon Wages**

Davis Bacon Wages do not apply to the FF&E installer from the government supply sources. The workforce for the FF&E installation and delivery shall be separate and distinct from the labor workforce performing under the construction contract.

### **Sales Tax**

Exemptions for certain State or Local taxes may be available to the contractor and/or its subcontractors. The contractor must take maximum advantage of all exemptions, including obtaining a resale permit, from State and Local taxation authorities whether available to it directly or available to the contractor based on an exemption afforded the government. The responsibility for paying applicable taxes rests with the contractor. State and local taxes applicable to the FF&E line will be included with the subcontractor's quote, if applicable. Any items purchased as building materials such as carpet are taxable.

### **Bonds**

FF&E line item is not considered construction and the prime contractor shall not be required to secure any additional bond for the award of the FF&E line item unless otherwise indicated in the RFP. If any additional bond is required for the FF&E line item it is to be included in the prime contractor's FF&E HAR.

Unique item identification and valuation is a system of marking and valuing items delivered to DoD that enhances logistics, contracting, and financial business transactions. The IUID policy is mandatory for all DoD contracts that require the delivery of items. An item is a single article or a single unit formed by a grouping of subassemblies, components or constituent parts. The contractor must provide DoD Unique item identification, valuation and delivery of data for all required FF&E items for which the government's unit acquisition cost is \$5,000 or more.

### **Buy American and Trade Agreement Acts**

All supplies under the FF&E line item are subject to the Buy American Act and Trade Agreement Act as indicated in the project contract. The GSA contracts and NAVSUP Blanket Purchase Agreements are required to comply with the Buy American Act and Trade Agreement Act.

### **Small Business Requirements**

The FF&E is subject to the Contractor's Small Business Goals however the government requires the furniture be purchased from NAVSUP Blanket Purchase Agreements (BPA). Most manufacturers on the Office Furniture BPA are large business and most manufacturers on the Dorm and Quarters BPA are small business. Installation dealers are small business. Under the terms of the BPA, the FF&E must be ordered directly through the GSA manufacturer. Using pass-through companies to achieve Small Business Goals

will not provide the Contractor credit unless they manufacturer 20% or provide 50% of the service purchased. The government will not incur additional costs to use small business.

### **Installation**

The FF&E package includes the installation of all furniture and furnishings as specified in the FF&E package. The installation dealer specified in the FF&E package will receive, store, if required, transport to the project site, off load, inside deliver, unpack, assemble, place/install, clean, if required, and dispose of all the trash for all furniture and furnishings. The Contractor's Interior Designer will be responsible for specifying installation services and warehousing, as required, for all collateral equipment. It is the Contractor's responsibility to coordinate the building completion, occupancy, and furniture installation dates with the installation dealer specified in the FF&E package. Any costs associated with storing or delaying furniture shipments is the responsibility of the construction contractor.

### **Installation Warranty**

All movable furnishings must be installed in accordance with the manufacturer's instructions and warranty requirements. All movable furnishings must be level and aligned and all doors, drawers and accessories must be level and aligned to open, close and otherwise operate smoothly and securely. All systems furniture must be installed by the systems furniture manufacturer's dealer of record and not the general Contractor. The Contractor must repair, to the customer's satisfaction, any/all damage to any facility finish that is a result of the furniture installation and correct all punch list items for the furniture/furnishings.

### **Ordering Documentation**

Two copies of all ordering documentation must be provided to the contracting officer including Factory Order number (FO) and warranty information.

### **Post Award Changes**

After award of the FF&E line item modification, any request to change the FF&E items must be submitted on the Contracting Officer. The FF&E modification has been accepted, priced, and negotiated based on specific line items as detailed in the final package. Those items have been agreed to considering color, specific type and quality of material, price, sustainability, life cycle, and dealership service. The Government will expect and require the contractor to provide exactly those items. Should changes become necessary, careful consideration is required to ensure that equivalent quality, price and other aspects of the item is maintained. Otherwise, price adjustments must be negotiated. The Contracting Officer will obtain approval from the Government Interior Designer/Collateral Equipment Manager in consultation with the client for any changes to the FF&E.

Post award FF&E manufacturer's price increases are the responsibility of the Contractor and must not be transferred to the government. Recommend ordering FF&E product once funds are received to avoid incurring additional costs. Delayed production and delivery dates can be noted at the time of order placement to coincide with building completion dates.

## **BEST VALUE DETERMINATION**

A best value determination (BVD) is required by FAR 8.404 when placing orders against Federal

Supply Schedules for the selection of furniture and furnishings. A BVD must also be provided for FF&E installation services. Best Value is defined in FAR 2.101 as ensuring that the order to be placed under a Federal Supply Schedule results in the lowest overall cost alternative (considering price, special features, administrative costs and client's needs) to meet the government's needs.

The Contractor's Interior Designer is responsible for the following written BVD justifications:

\$3,000 or less: For any procurement in the FF&E package with a value of \$3,000 or less, the interior designer may utilize any BPA holder. If the BPA holders cannot supply the item, then any other manufacturer may be utilized.

Greater than \$3,000 and \$150,000 or less: for any procurement in the FF&E package with a value greater than \$3,000 and \$150,000 or less, the contractor's interior designer shall always review pricing from at least three manufacturers as well as UNICOR. In addition to the review of published list prices, the contractor's interior designer must confirm the pricing with the vendor. Manufacturer's quotes are NOT required. The BVD form must be completed and submitted for all FF&E procurements greater than \$3,000 and \$150,000 or less.

Greater than \$150,000: The contractor's interior designer shall solicit proposals from all BPA holders under the applicable group for FF&E procurements greater than \$150,000. UNICOR must always be solicited. The contractor's interior designer shall develop performance criteria and project requirements based on a generic design for the BPA holders and UNICOR to develop a price and performance proposal. The BVD form must be completed and submitted for all FF&E procurements greater than \$150,000 and manufacturer's quotes and a summary of all proposals must be attached.

Federal Prison Industries (UNICOR) must be considered as part of all BVDs. This must be done by sending an email with the requirements and evaluation criteria if they are not comparable in one or more areas of price, quality, and time of delivery, the designer can specify product under NAVSUP BPA or GSA schedule.

The best value determination must address issues such as space planning; human factors data related to anthropometrics (reach, clearance, adjustability), space, and acoustics; ergonomics; product quality (including construction and materials); sustainability features, product warranties; history of the product and/or manufacturer; ability to service products through dealers or others within a certain geographical range of the project; price (including freight); aesthetics; appropriateness; and lighting, power and telecommunications systems management and/or coordination as related to the facility (when applicable); and other project specific factors as identified and/or required. Emphasis must be to create a fully integrated design solution by providing quality products to meet the functional needs of the customer. Customer preferences must be considered. The focus must be on the best overall value. Use the GSA Best Value Determination forms provided in Part 6 of this RFP as guidelines for information to be provided.

## **SECTION F. SPECIAL CONSTRUCTION AND DEMOLITION**

### **F10 SPECIAL CONSTRUCTION AND DEMOLITION**

#### **F1010 SPECIAL STRUCTURES**

1. Pre-Engineered Buildings

Provide the design and installation in accordance with the UFC 3-101-01, *Architecture*

and UFC 3-301-01, *Structural Engineering*.

- a. **Design Requirements** - The metal building manufacturer must be accredited by the International Accreditation Services (IAS) AC472. The Metal Building System design must be in accordance with the Metal Building Manufacturers Association (MBMA) *Metal Building Systems Manual*. All structural design must comply with the provisions of Section B10, "Superstructures", above.
- b. **Additional Roof Design Requirements - Roof Decking** - In addition to any other load requirements, roof decking must be designed to support a 91 kg (200-pound) concentrated load at mid-span on a 300 mm (12-inch) wide section of deck.
- c. **Deflection** - the maximum deflection for -
  - 1) Structural Members - main framing members must be L/240.
  - 2) Purlins and Roof Panels: The deflection due to live, snow, or wind must not exceed L/180.
  - 3) For buildings with masonry infill, limit frame sway to L/600th of building eave height.
  - 4) Wall Panels - Maximum deflection of wall panels due to wind loads must be limited to L/120th of their respective spans except that when interior finishes are used the maximum allowable deflection must be limited to L/180th of their respective spans.
- d. **Wall and Roof materials** -
  - 1) Alum/Zinc-Coated Steel Sheet: ASTM A792/ A792M, AZ 55.
  - 2) Aluminum Sheet: Alloy 3004 Alclad conforming to ASTM B209.
  - 3) Framing and Structural Members - Steel - ASTM A992 / A992M, ASTM A529/ A529M, ASTM A572/ A572M, or ASTM A588/ A588M.
  - 4) Framing and Structural Members, Aluminum: ASTM B221 or ASTM C308
- e. **Structural Tube**: ASTM A500 or ASTM B221.
- f. **Fasteners** - Must be compatible with the materials they are fastening to, be gasketed when exposed to weather to prevent leaks, and provide both shear and tensile strengths not less than 3,336 N (750 pounds) per fastener. The main fastening system must use concealed fasteners, however, when exposed fasteners are needed, color fasteners must be color coated to match wall/roof panels.
- g. **Light Transmitting Roof Panels (Non-Insulated)**: ASTM D3841, Type II, Grade 1.
- h. **Insulation**: Blanket-type fiberglass insulation with a factory applied facing on one side and having a permeance rating of 0.05 or less in accordance with ASTM E96. Flame Spread Rating 75 or less, and a Smoke Developed Rating of 150 or less when tested in accordance with ASTM E84.
- i. **Panel Finish** - Factory Color Finish - Provide factory applied baked coatings to the exterior and interior of metal wall panels and metal accessories. Provide exterior primer standard with panel manufacturer but not less than 0.8 mil dry film thickness (DFT). Provide PVDF exterior finish top coat of 70 percent inorganic pigments with 0.8 mil DFT. Provide factory-applied clear finish over the color

topcoat and edge coating for projects within 91 meters of a water shoreline or industrial environments. Field apply 70 percent PVDF clear coat to unfinished panel edges or field cut panels. Interior finish exposed to sun or rain must be the same coating and DFT as the exterior coating. Interior finish protected from sun or rain exposure must receive 1.0 mil DFT coating of siliconized polyester (SMP) resin coating with organic or blended pigments and manufacturer's standard primer.

## F20 SELECTIVE BUILDING DEMOLITION

In general terms, demolition work must include the removal and effective management and disposition of existing construction and or structures. Take care to prevent damage to existing utilities and construction that are not scheduled for demolition. If damage occurs, make repairs to the satisfaction of the Contracting Officer and at no cost to the Government. Comply with local Activity and Installation local requirements regarding demolition and removal. Unless otherwise specified in Part 3, all demolished materials and equipment must be removed from government property in accordance with applicable laws and regulations, including local Activity or Installation regulations. Selling of demolished or salvaged materials and equipment on government properties is prohibited.

**Demolition Plan:** No demolition work is permitted to take place until a Demolition Plan has been submitted to, and approved by, the Contracting Officer. The Plans must take into consideration, and indicate method of removal, disposition, and abatement of environmentally hazardous materials. Demolition, disposition, and abatement of hazardous materials must comply with all applicable Local, State, and Federal regulations and laws. If destructive investigation is to occur, the Contracting Officer shall approve a Destructive Investigation Plan.

When hazardous materials such as asbestos, lead paint, PCB and other hazardous materials are involved in the performance of the work, the contractor must abate, remove and manage the hazardous materials in construction and finish materials such as insulation, flooring, wall materials, ceiling materials, roofing materials, heating, plumbing, ventilation, air conditioning equipment and installations in accordance with National as well as local Environmental Protection Laws and Regulations.

## F2020 HAZARDOUS COMPONENT ABATEMENT

1. Asbestos in Schools and Child Occupied Facilities: For projects that require removal or disturbance of asbestos containing materials within schools and child occupied facilities, perform work in accordance with the edited UFGS 02 82 00, Asbestos Remediation.
2. Asbestos Materials: Asbestos must be removed, transported and managed in accordance with the edited UFGS 02 82 00, Asbestos Remediation.
3. Lead Based Paint in Target Housing and Child Occupied Facilities: Perform work for projects that require removal or disturbance of painted surfaces within target housing and a child occupied facilities in accordance with the edited UFGS 02 83 00, Lead Remediation.
4. Paint Related Work: Perform work which requires the disturbance of paint that have been determined to contain all or any of the following: lead, cadmium and chromium in accordance with the edited UFGS 02 83 00, Lead Remediation.
5. LLR Components: Perform work which requires removal of mercury and LLR

- components in accordance with the edited UFGS 01 57 19, Temporary Environmental Controls.
6. PCBs: Perform work which requires removal of PCB containing components or materials in accordance with the edited UFGS 02 84 33, Removal and Disposal of Polychlorinated Biphenyls (PCBs).]
  7. Animal Droppings: Perform work which requires removal of animal droppings in accordance with the edit UFGS 01 57 19, Temporary Environmental Controls.
  8. Mold and Spores: Perform work which requires removal, disposal and remediation of mold contaminated areas in accordance with the edit UFGS 02 85 00, Mold Remediation.
  9. Radon: Perform work which involves implementation of a radon mitigation system in accordance with the edited UFGS 31 21 13, Radon Mitigation.
  10. Mercury: Perform work which requires the removal of mercury containing equipment in accordance with the edited UFGS 02 84 16, Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury.
  11. Hazardous Materials Reporting:
    - a. Daily Report: Notify the Contracting Officer of work involving hazardous materials abatement and removal, including the quantities involved, on daily reports.
    - b. Hazardous Material Inventory Report: The Contractor must provide a list of all hazardous materials used on the site.

## SECTION G. BUILDING SITEWORK

### G10 SITE PREPARATIONS

1. **General Requirements:** Building site work includes site preparation, site improvements, site civil/mechanical utilities, site electrical utilities, exterior furnishings, landscaping, and irrigation. Provide site work in accordance with UFC 3-201-01, *Civil Engineering*.
2. **Project Limitations:** Prior to the start of design, determine the exact limit-of-work line for the project periphery, considering items such as, but not limited to, utility work, landscape re-vegetation of disturbed areas, and lay down areas. The Civil Engineer of Record in coordination with other design team disciplines must determine limit-of-work lines. Minimize the impact of construction activity on operations and neighboring facilities.
3. **Geotechnical Data:** A geotechnical engineer must conduct the subsurface exploration, investigation/evaluation, testing, and analysis that the Designer of Record deems necessary for the design and construction of the proposed facilities, including building pad, structure, pavement sections, repairs, overlays, stormwater management facilities, utility structure foundations, septic systems, and other features requiring soil support.
3. **Temporary Erosion & Sediment Control:** Develop and implement temporary erosion and sediment control measures and other Best Management Practices (BMPs) prior to or in conjunction with commencement of earthwork in accordance with the state Erosion and Sediment Control Laws and Regulations. Remove all non-permanent erosion control measures after vegetation is fully established. Maintain temporary erosion control measures in accordance with state Erosion and Sediment Control Laws and Regulations

throughout the project until areas are fully stabilized.

## **G1010 SITE CLEARING**

1. **Existing Utilities:** When the Contractor is to work at a site that has existing utilities, the contractor is responsible for coordination with Contracting Officer and utility companies for staking out, capping, connection and relocation of any existing utility systems or traffic interruption. Notify utility locator service for area where Project is located before site clearing.
2. **Interruption:** All interruption to the existing utilities and traffic must be coordinated with and approved by the Contracting Officer not less than 14 calendar days in advance of such interruption.

## **G1020 SITE DEMOLITION & RELOCATIONS**

Abandon utility systems in-place conforming to applicable codes and regulations, removing their presence from the ground surface and clearly indicating that they have been abandoned. Remove utilities underneath or within 3.0 m (10 feet) of any new facilities. Fill abandoned gravity systems with flowable fill. Fill abandoned utility system piping under pavements subject to potential vehicle loading with flowable fill.

Remove existing utility structures to 900 mm (3 feet) below existing or new adjacent grade, whichever is greater. Break up bases to permit drainage. Fill with clean sand.

Comply with the requirements of the utility provider concerning utility relocation.

## **G1030 SITE EARTHWORK**

The DOR must utilize UFGS Section 31 23 00.00 20 for the project specification and must submit the edited section as a part of the design submittal. Perform quality assurance for earthwork in accordance with UFGS Section 31 23 00.00 20. If sheeting/shoring or dewatering is required, the Contractor must provide a registered Professional Engineer to provide excavation, sheeting, shoring, and dewatering plans and inspection of excavations and soil/groundwater conditions throughout construction. The Engineer must be responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Engineer, with the concurrence of the contractor and the Contracting Officer, must update the excavation, sheeting, shoring, and dewatering plans as construction progresses to reflect actual site conditions and must submit the updated plan and a written report (with professional seal) at least monthly informing the Contractor and the Contracting Officer of the status of the plan and an accounting of Contractor adherence to the plan; specifically addressing any present or potential problems. The Engineer must be available to meet with the Contracting Officer at any time throughout the contract duration.

## **G20 SITE IMPROVEMENTS**

Provide site improvements as required to make a useable facility that meets functional and operational requirements, incorporates all applicable anti-terrorism, force protection and physical security requirements and blends into the existing environment.

Provide site improvements in conformance with applicable requirements of the Uniform Federal Accessibility Standards.

1. **Pavements:** For work in and adjacent to existing pavements, the Contractor is required to match the existing adjacent finish elevation, materials, paving section and texture, and pavement markings, unless otherwise indicated in Part 3 or directed by the Contracting Officer.

Provide pavement design and pavement section materials in accordance with UFC 3-201-01, *Civil Engineering*. Provide pavement markings in accordance with the SHS. Design materials for life expectancy of at least 3 years under an average daily traffic count per lane of approximately 9000 vehicles. Water based paints must have durability rating of at least 4 when determined in the wheel path area. Provide a half-rate initial marking application on bituminous pavements. Provide the remaining application at the end of the normal curing period.

2. **Traffic Control:** If the site work involves interference with normal vehicular and or pedestrian traffic, the Contractor must coordinate with the authority having jurisdiction, propose and obtain approval for traffic control measures that may be required in performance of the work required by the contract.
3. **Performance Verification And Acceptance Testing:**
  - a. **Subgrade Preparation:** If required by the Designer of Record, perform proof rolling. Proof rolling must be performed in the presence of the Contracting Officer. Rutting or pumping of material must be undercut as directed by the Contracting Officer and replaced with satisfactory soil materials as defined by the Geotechnical Engineer.
  - b. **Base Course Performance Verification:** At a minimum, Contractor must perform visual performance verification. Surface must be smooth with no ruts, sloped or crowned to not pond water.
  - c. **Bituminous Concrete Pavement Performance Verification:** At a minimum, Contractor must perform visual performance verification. Finished surface must be uniform in texture and appearance, free of defects such as cracks and creases, and be sloped or crowned so as to not pond water.
  - d. **Portland Cement Concrete Pavement Performance Verification:** At a minimum, Contractor must perform visual performance verification. Finished surface must be uniform in texture and appearance, free of defects such as cracks and spalls, and be sloped or crowned so as to not pond water.
  - e. **Concrete Joint Performance Verification:** Joint sealer that fails to cure properly, or fails to bond to joint walls, or reverts to uncured state or fails in cohesion, or shows excessive air voids, blisters, or has surface defects, swells, or other deficiencies, or is not recessed within indicated tolerances will be rejected. Remove rejected sealer, re-clean and reseal joints.
4. **Bases and Subbases:**
  - a. Prepare subgrade in accordance with Section G10, *Site Preparation*. Geotextiles may be used for separation or reinforcement in accordance with manufacturer's instructions. Provide base course under paved areas in accordance with the State Highway specifications (SHS) in the state where the project is located.
  - b. Place base course in accordance with the SHS for that particular base course and in layers of equal thickness with no compacted layer more than 6 inches (150 mm) thick. Compact base course at optimum moisture content to 100

- percent ASTM D 1557 maximum dry density.
- c. Where SHS are not available or applicable, the Designer of Record must utilize the applicable UFGS Specification Sections referenced under paragraph 1.1.2 entitled "Government Standards" for the project specification. Submit these specifications in edited form as a part of the design submittal for the project.
5. **Curbs and Gutters:** Provide concrete curbs and gutters in accordance with the SHS and standards or as specified in UFC 3-201-01, *Civil Engineering*, whichever is more stringent. Where the SHS do not include concrete materials for curbs and gutters, provide concrete in accordance with the applicable standard mix of the SHS for a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete.
  6. **Paved Surfaces:** Where SHS are not available or applicable, the Designer of Record must utilize the applicable UFGS Specification Sections for the project specification. Submit these specifications in edited form as a part of the design submittal for the project.
  7. **Pavement Mix:**
    - a. **Bituminous Concrete Pavement:** Provide bituminous concrete pavement in accordance with the applicable standard mix of the SHS based on the pavement design and vehicle loading indicated in this RFP.
    - b. **Bituminous Concrete Placement:** Provide bituminous concrete placement, including minimum temperature during placement, joints, and maximum lift thickness in accordance with the SHS. Compact bituminous concrete in accordance with the SHS, modified to 96 percent of maximum laboratory density.
    - c. **Portland Cement Concrete Pavement:** If reinforced, provide the welded wire fabric in conformance to ASTM A185. Provide bar reinforcement in conformance to ASTM A615/A615M, Grade 400 (Grade 60). Provide concrete in accordance with the applicable standard mix of the SHS for the design strength required by UFC 3-201-01, *Civil Engineering*, plus any allowable deviations. Unless noted otherwise in Part 3 or Part 6, provide a minimum compressive strength at 28 days of 3500 psi (25 MPa) concrete. If required for applicable sustainability goal, provide Portland cement concrete pavement with a Solar Reflectance Index (SRI) greater than or equal to 29.
  8. **Joints for Portland Cement Concrete Pavement:** Provide joints in accordance with SHS and the applicable portions of UFC 3-250-01, *Pavement Design for Roads and Parking Areas*. Install joints in a manner and at such time to prevent random or uncontrolled cracking. Joints must form a regular rectangular pattern. Wherever curved pavement edges occur, make joints to intersect tangents to curve at right angles.
    - a. **Expansion Joints:** Provide thickened edge expansion joints at the intersection of two rigid pavements. Use preformed joint filler, ASTM D1751. Filler must be compatible with joint sealer material. Securely hold preformed joint filler in position during concreting operations.
    - b. **Isolation Joints:** Provide thickened edge isolation joints by placing a 1/2-inch (12 mm) preformed joint filler (ASTM D 1751) around each structure that extends into or through the pavement before concrete is placed at that location.
    - c. **Contraction Joints:** Saw joint lines within specified tolerance, straight, and extend for width of transverse joint, and for entire length of longitudinal joint.
    - d. **Construction Joints:** If an emergency stop occurs remove the concrete back to location of transverse joint and install a construction joint.
    - e. **Joint Sealants:** ASTM D5893/D5893M; provide single component cold-applied

- silicone. Silicone sealant must be self-leveling and non-acid curing.
- f. **Preformed Compression Seals:** Use preformed compression seals in areas where silicone joint sealant does not perform, such as areas subject to water inundation, blasts, or constant/repeated fuel spillage. ASTM D 2628. ASTM D 2835, for lubricant.
9. **Prime Coat:** Use prime coat in accordance with the SHS. Prime coat must be emulsified asphalt materials.
  10. **Tack Coat:** Tack coat is required for bituminous pavement overlays and on vertical cut faces of pavement patches. Provide tack coat in accordance with the SHS.
  11. **Pavement Patches:** Provide pavement patches for existing pavements where required for installation of utility trenches. Sawcut 12 inches beyond edge of trench. Provide thicknesses of pavement materials equal to or greater than the existing pavement section. For spalls or repairs of existing concrete pavement, perform repairs in conformance with UFC 3-270-03, *Concrete Crack and Partial Depth Spall Repair*, and UFC 3-270-04, *Concrete Repair*. Spall repair materials must be either Rapid Setting Cementitious Concrete (RSCC), epoxy concrete, or polymer-modified Portland Cement (non-sag mortar) products specially formulated for spall repairs, with a proven record (in service at least three years) of satisfactory use under loading and environmental conditions similar to those at the location of intended use. Provide a manufacturer's data sheet and certificate supporting the satisfactory use to the Contracting Officer with the design. A product manufacturer's representative is required to be present during the initial two days of product application to verify that manufacturer's instructions for use are adhered to by the contractor. Give the Contracting Officer 7 days notice prior to the initial application in order to be present.
  12. **Markings and Signage:** Provide pavement markings in accordance with the SHS. Design materials for life expectancy of at least 3 years under an average daily traffic count per lane of approximately 9000 vehicles. Water based paints must have durability rating of at least 4 when determined in the wheel path area. Provide a half-rate initial marking application on bituminous pavements. Provide the remaining application at the end of the normal curing period. Provide signage in accordance with the MUTCD.
  13. **Guardrails and Barriers:** Provide guard (guide) rails in accordance with the SHS. Where the SHS do not include materials for guardrails, provide guardrails in accordance with the applicable portions of the *AASHTO Roadside Design Guide*.
  14. **Bollards:** For bollards to prevent damage, provide minimum 4 feet height, 4 inch diameter steel pipe filled with concrete, painted, and embedded in a portland cement concrete foundation. For bollards located at building entries or other high-visibility areas provide decorative bollards matching the design of the facility or consistent with the Base Exterior Architecture Plan (BEAP) and the Installation Appearance Plan.
  15. **Resurfacing:** Adjust rims of existing utility structures to match proposed grades after resurfacing.
    - a. **Slurry Seal:** ASTM D 3910 and in accordance with the SHS.
    - b. **Bituminous Concrete Overlay:** Remove old pavement by cold milling to depths required to provide new surface and leave underlying materials intact. Clean the pavement of excessive dirt, clay or other foreign matter with power brooms and hand brooms immediately prior to the milling operation. Repair or replace damaged utility structures, valve boxes, or pavement that is torn, cracked, gouged, rutted, broken or undercut at no addition expense to the government.

Provide bituminous concrete overlay produced from hot or cold recycling of the milled material or from virgin materials in accordance with the applicable provisions of UFC 3-201-01, *Civil Engineering*, and the standard mix of the SHS based on the pavement design and vehicle loading as indicated in this RFP.

- c. **Crack Sealing:** Use fiber reinforced crack sealer for sealing cracks in asphalt pavement after milling and prior to resurfacing. Provide crack sealing conforming to the following requirements in UFC 3-270-01, *Asphalt Maintenance and Repair*, and UFC 3-270-02, *Asphalt Crack Repair*.
16. **Parking Lots:** Refer to Pavements above.
  17. **Permeable Pavements:** Provide permeable concrete pavers of solid interlocking paving units complying with ASTM C936, resistant to freezing and thawing when tested according to ASTM C67, and made from normal-weight aggregates. If required for applicable sustainability goal, provide permeable concrete pavers with a Solar Reflectance Index (SRI) greater than or equal to 29. Provide pervious concrete in accordance with UFGS Specification Section 32 13 43, *Pervious Concrete Paving*. Do not use asphalt-surfaced porous pavement.
    - a. **Bases and Subbases:** Refer to Bases and Subbases paragraph above.
    - b. **Curbs and Gutters:** Refer to Curbs and Gutters paragraph above.
    - c. **Paved Surfaces:** Refer to Paved Surfaces paragraph above.
    - d. **Markings and Signage:** Refer to Markings and Signage paragraph above. Provide water-based paints only. Mark neatly to denote traffic lanes and parking spaces; mark in accordance with the requirements of UFC 3-201-01, *Civil Engineering*.
    - e. **Guardrails and Barriers:** Refer to Guardrails and Barriers paragraph above.
    - f. **Wheelstops:** Provide precast concrete wheelstops.
  18. **Pedestrian Paving:** Locate new sidewalks such that they maintain continuity of pedestrian traffic to and from the existing sidewalks adjacent to the site(s).
    - a. **Bases & Subbases:** Provide as required by local standards or geotechnical report; refer to Bases and Subbases paragraph above.
    - b. **Paved Surfaces:**
    - c. **Concrete Sidewalks:** Provide sidewalks of Portland cement concrete pavement with 4 inches (100 mm) thick minimum or permeable pavement. Provide concrete and permeable pavement in accordance with Section G201003 and G2020, respectively. For PCC sidewalks, provide a broomed finish. Provide sidewalks of at least 5 feet (1.5 meters) wide, except that sidewalks connecting entry points of housing units to the housing unit's parking are required to be at least 36 inches (900 mm) wide. In housing areas, offset sidewalks paralleling streets to maintain a minimum grassed separation of 5 feet (1.5 meters) from the back face of the curb to the closest edge of the sidewalk Unless indicated otherwise, provide a transverse slope of 1/48. Limit variation in cross section to 0.25 inch in 5 feet (6 mm in 1.50 m). Submit samples boards per ESR G2050 and PTS G2050 and finish schedule on final plans. Provide contraction joints spaced at intervals equivalent to the width of the sidewalk. Provide 0.5 inch (13 mm) thick transverse expansion joints at changes in direction where sidewalk abuts curb, steps, rigid pavement, or other similar structures; space expansion joints every 50 feet (15 m) maximum. Provide isolation joints by placing a 1/2-inch (12 mm) preformed expansion joint filler around each structure that extends into or through the sidewalk before concrete is placed at that location.

- d. **Concrete Pavers as Sidewalk:** Concrete pavers shall meet ASTM C936. Install in accordance with manufacturers recommendations.
19. **Chain Link Fencing and Gates:** Chain link fence fabric must be at least 9 gauge (3 mm) steel wire mesh material (before any coating) with mesh openings not larger than 2 inches (51 mm). Do not use aluminum fabric, posts or accessories. Install fence in accordance with ASTM F567 and the manufacturer's written installation instructions. Provide rails in accordance with FS RR-F-191/3, Class 1, steel pipe, Grade A. Provide gates in accordance with FS RR-F-191/2 with posts and fabric as specified for fence. Provide posts and braces in accordance with FS RR-F-191/3, Class 1, steel pipe, Grade A. Each gate, terminal and end post will be braced with truss rods. Provide fencing accessories in accordance with FS RR-F-191/4. If PVC coating is required, provide accessories with PVC color coating similar to that specified for chain-link fabric or framework.
20. **Security Fencing:** Provide security fencing systems in accordance with UFC 4-022-03, *Security Fences and Gates*, and this RFP. Provide chain link fence in accordance with paragraphs above, except as noted otherwise. Ensure that the fabric has twisted and barbed selvage at the top and bottom. Do not provide top rails. Locate all posts and structural supports on the inner side of the fencing. Install outriggers facing outward except when the fence must be mounted directly on the property line. Provide signage at a minimum of 200 foot (61 m) intervals along the entire perimeter. Provide protective measures to prevent access through culverts, storm drains, sewers, air intakes, exhaust tunnels and utility openings or across drainage ditches or swales as required in UFC 4-022-03. Do not cover, block or lace openings in perimeter fencing and security fencing with material which would prevent a clear view of personnel, vehicles or material in the outer or inner vicinity of the fence line.
21. **Fence Grounding:** Grounding and bonding of the fencing must be in accordance with the National Electric Safety Code (NESC) - IEEE C2 and UFC 4-022-03. Ground fencing on either side of every gate and at other locations when the fencing is near and parallel to high tension power lines. Grounding is also required at intervals of 1000 feet (305 meters) to 1500 feet (457 meters) when the fencing runs through isolated areas and at lesser distances depending on the proximity of the fencing to public roads, highways and buildings where the fencing is around or within any explosive storage, production, operating or handling areas.
22. **Enclosures for Utility Equipment:** Where fencing is used to provide an enclosure for utility equipment, ensure a minimum clearance is provided no less than 3 feet (900 mm) around the equipment to permit maintenance access and ventilation. Provide stone, gravel or concrete paving within the enclosure.

## G2040 EXTERIOR FURNISHINGS

All site furnishings must be permanently attached to concrete pads. Site furnishings must conform to the Base Exterior Architecture Plan (BEAP) or Installation Appearance Plan (IAP) for each Activity. If no product guidance is given, coordinate material, finish and color with architecture (fiberglass and aluminum are not acceptable) and provide to the greatest extent possible, materials with industrial recycled content, preferably from regionally local manufacturers. At a minimum, provide a trash and ash receptacle at each entry and gathering/smoking area.

## G2050 LANDSCAPING

## G30 SITE CIVIL/MECHANICAL UTILITIES

Develop the site to provide water, fire protection, sanitary sewer, storm drainage, heating, cooling and fuel distribution services that meet the requirements of each utility provider and each applicable regulatory agency that governs and issues permits for the construction and operation of these systems. Site design must also comply with Department of Defense requirements concerning Low Impact Development (LID) per UFC 3-210-10, *Low Impact Development*, as well as state or local stormwater management regulations, and applicable project sustainability goals. Submit sealed calculations with narrative to the Government for civil and environmental review documenting all assumptions and which criteria governs the design.

Coordinate with the local utility providers and pay any fees or charges required to connect to their utility. Identify and obtain all permits to comply with all federal, state, and local regulatory requirements associated with this work. Coordinate all reports, submittals, and permit applications through the Contracting Officer. Perform work in accordance with the obtained permits.

Provide all required fittings, connections and accessories required for a complete and usable system. All equipment must be installed per the criteria indicated in this RFP and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

### G3010 WATER SUPPLY

1. **Water System Design and Construction:** Provide the new water system and connections to the existing water system in accordance with UFC 3-230-01, *Water Storage, Distribution, and Transmission*; the utility provider's requirements; or the state waterworks' regulations; whichever is more stringent.
2. **Notifications:** Notify the utility provider of the additional demand generated by the proposed facility. Provide a copy of all correspondence with the utility provider to the Government's Civil/Mechanical Reviewer.
3. **Performance Verification And Acceptance Testing:** Provide testing on water mains and service lines in accordance with the state waterworks' regulations and the following:
  - a. Ductile iron and other materials: AWWA C600.
  - b. PVC: AWWA C605.

Whichever is more stringent. Do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete.
4. **Disinfection:** Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with the state waterworks' regulations and AWWA C651.
5. **Water Distribution Mains:** For underground applications, water mains 12 inches (300 mm) in diameter and less must be ductile iron or PVC. Water mains deeper than 10 feet (3.0 m) or larger than 12 inches (300 mm) in diameter must be ductile iron. For aboveground applications, water mains shall be flanged ductile iron pipe.
  - a. Ductile Iron Pressure Pipe:
    - 1) Pipe: AWWA C151, Pressure Class 350.
    - 2) Fittings: AWWA C110 or AWWA C153.
    - 3) Interior Lining: AWWA C104.
    - 4) Exterior Protection (if required): AWWA C105, polyethylene encasement.

- b. PVC Pressure Pipe:
    - 1) Pipe: AWWA C900, Pressure Class 150.
    - 2) Fittings: Ductile Iron (AWWA C110 or AWWA C153).
  - c. Flanged Ductile Iron Pipe:
    - 1) Pipe: AWWA C115 and its appendices.
    - 2) Fittings: AWWA C110 or AWWA C153.
    - 3) Lining: AWWA C104.
6. **Installation of Water Distribution Mains:**
- a. Ductile Iron: AWWA C600.
  - b. PVC: AWWA C605.
  - c. Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be blue for potable water systems and purple for nonpotable, reclaimed water, and irrigation lines. Terminate tracer wire above grade at valve boxes and at exterior of building.
7. **Connections to Existing Water Lines:** Make connections to existing water lines after approval from the system owner is obtained and with a minimum interruption of service on the existing line. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.
8. **Water Service Lines:** Water service lines less than 4 inches (100 mm) in diameter must be copper tubing or PVC. Water service lines 4 inches (100 mm) and 6 inches (150 mm) in diameter must be ductile iron pipe and PVC pressure pipe; see paragraph "Water Distribution Mains" for additional requirements for ductile iron and PVC piping.
- a. Copper Tubing
    - 1) Pipe: ASTM B 88/B 88M, Type K.
    - 2) Fittings for Solder-Type Joint: ANSI B16.8 or ASME B16.22.
    - 3) Fittings for Compression-Type Joint: ASME B16.26, flared tube type.
  - b. PVC Pressure Pipe
    - 1) Pipe: ASTM D1785, Schedule 40 or ASTM D 2241, with SDR rating for 160 psi (1.1 MPa) pressure rating.
    - 2) Fittings: ASTM D 2466.
    - 3) Joints: Elastomeric gaskets for pressure rating; solvent cement joints, ASTM D 2564.
  - c. Service Connections: Connect service lines 2-inch (50 mm) diameter or less to the main by a corporation stop and install a gate valve on service line below the frostline.
    - 1) Ductile-iron water mains: AWWA C600.
    - 2) PVC water mains: UBPPA UNI-PUB-8 and the recommendations of AWWA M23, Chapter 9, "Service Connections."
9. **Installation of Water Service Lines:** Install pipe, fittings and accessories in accordance with manufacturer's instructions.
- a. Metallic Piping: applicable requirements of AWWA C600.
  - b. PVC: ASTM D 2774 and ASTM D 2855.

10. **Corrosion Protection:** Provide insulating joints to prevent contact between dissimilar metals at the joint between adjacent sections of piping in accordance with the pipe manufacturer's recommendations. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled. To prevent the possibility of bi-metallic corrosion, service lines of dissimilar metal to the water mains and the attendant corporation stops must be wrapped with polyethylene or suitable dielectric tape for a minimum clear distance of 3 feet (900 mm) from the main.
11. **Valves:** Install valves with the same diameter and have the same joint ends as the mains to which they are installed. Each type of valve must be of one manufacturer.
  - a. **Gate Valves:** Install valves at all new points of connection. At a minimum, locate valves to ensure that no more than two fire hydrants will be out of service in the event of a single break in a water main. Locate valves outside of pavement and heavy traffic areas whenever possible.
  - b. **Gate Valves 3-inch (75 mm) and Larger in Diameter:**
    - 1) Valves (20-inch and smaller in diameter): AWWA C509 or AWWA C515, nonrising stem and of one manufacturer.
    - 2) Valves (greater than 20-inch in diameter): AWWA C500.
    - 3) Valves for Indicator Post: AWWA C509 or AWWA C500, as indicated above, with indicator post flange in accordance with applicable requirements of UL 262.
    - 4) Interior Coating: AWWA C550.
  - c. **Gate Valves Smaller than 3-inch (75 mm) in Diameter:** MSS SP-80, Class 150, solid wedge. Provide valves with flanged or threaded end connections, with unions on both sides of the valve and a handwheel operator.
  - d. **Valve Box:** Provide a cast iron, adjustable, valve box for each gate valve on buried piping. Provide valve boxes of a size suitable for the valve on which it is to be used with a minimum diameter of 5-1/4 inches (130 mm). Provide a round head and cast the word "WATER" on the lid.
  - e. **Check Valves:** Provide check valves sized 2-inches (50 mm) to 24-inches (600 mm) as swing-check type (AWWA C508) and with a protective epoxy interior coating conforming to AWWA C550. For underground applications, provide check valve in a valve vault.
  - f. **Air Release, Air/Vacuum, and Combination Air Valves:** AWWA C512 and AWWA M51.
  - g. **Corporation Stops:** If service lines 2-inch diameter or less are tapping water mains, provide corporation stops. The corporation stops must be ground key type, bronze, ASTM B61 or ASTM B62.
  - h. **Installation of Valves:** Make and assemble joints to valves as specified for making and assembling the same type of joints between pipe and fittings.
12. **Water Meters:** Provide water meter and remote reading as required by the utility provider and in accordance with AWWA standards.
13. **Backflow Prevention:** Provide backflow prevention and cross connection control in accordance with AWWA M-14 and governing local/state plumbing codes and waterworks' regulations.
14. **Fire Hydrants:** Fire hydrants must be of one manufacturer and in accordance with UFC 3-600-01, *Fire Protection Engineering*. Coordinate with the project's fire protection designer of record. Provide protection for fire hydrants located in areas subject to vehicle damage. Fire hydrants must have National Standard threads on hose and pumper

connections. Provide a 6 inch (150 mm) inlet, two 2.5 inch (62 mm) hose connections and one pumper connection sized to accommodate local fire department equipment requirements. Paint hydrants with at least one coat of primer and two coats of enamel paint. Barrel and bonnet colors shall be in accordance with UFC 3-600-01. Stencil hydrant number and main size on the hydrant barrel using black stencil paint.

- a. Dry Barrel Fire Hydrants: AWWA C502 with frangible sections.
  - b. Wet Barrel Fire Hydrants AWWA C503 or UL 246, "Wet Barrel" design, with breakable features.
  - c. Installation: Install hydrants with the pumper connection facing the adjacent paved surface. If there are two, paved adjacent surfaces, contact the Contracting Officer for further direction.
15. **Thrust Restraint:** Provide thrust restraint for all piping, valves, fittings, and other appurtenances of the water distribution system. Provide thrust restraint using restrained joints in accordance with pipe manufacturer's recommendations, AWWA C600 and if for fire service main, NFPA 24.
16. **Fire Protection Water Distribution:** Refer to applicable portions of this Section and Section D40, *Fire Protection Systems*. Water main piping, service lines, fittings, valves, accessories and all other materials must meet the American Water Works Association (AWWA) standards for a minimum system working pressure of 200 psi (1380 kPa).
- a. **Detector Checks:** UL 312; detector check includes bypass meter, piping, gate valves, check valve and connections to detector check valve. Set valve to allow minimal water flow through bypass meter when major water flow is required.
  - b. **Fire Department Connections:** UL 405.
  - c. **Indicator Posts:** UL 789.

## G3020 SANITARY SEWER

1. **Sanitary System Design and Construction:** Provide the new sanitary sewer system and connections to the existing sanitary sewer collection system in accordance with UFC 3-240-01, *Wastewater Collection*; the utility provider's requirements; or the state sewerage regulations; whichever is more stringent.
2. **Notifications:** Notify the utility provider of the additional wastewater flow generated by the proposed facility. Provide a copy of all correspondence with the utility provider to the Government Civil Reviewer.
3. **Wastewater Pump Station:** Where required, provide a duplex, grinder pump station in accordance with the utility provider's requirements. Provide pump station wet well of fiberglass construction. Provide adjacent valve vault of precast concrete construction.

Provide automatic control to start and stop the pump system. Provide automatic level control by floats in accordance with the preferences of the system owner to fill and prevent overflow of the wet well. Provide an emergency pump connection.

Provide a telephone dialer in the control panel capable of accepting up to 8 telephone numbers. At the control panel provide an alarm horn and light with battery backup. Alarms shall include high liquid wet well level; loss of main power; no flow as sensed by current sensor; and pump failure via overload or motor heat sensor trip. Provide seal failure indicator lights and elapsed time meters.

Provide electrical connections for a portable emergency generator hook-up sized to start up and maintain the total rated running capacity of the station, including the pumps, controls, lighting, and other auxiliary equipment.

**4. Performance Verification And Acceptance Testing:**

- a. Sanitary Sewer Distribution System Performance Verification: Provide testing on sewer mains and laterals in accordance with the state sewerage regulations. At a minimum, perform the following:
  - 1) Visual Test: Remove manhole covers and conducts a visual inspection as follows:
    - a) Inspect for visible leaks in lines or manholes.
    - b) Inspect condition of grout in the interior joints of the manholes.
    - c) Inspect manhole frames and covers for proper type and installation.
    - d) Inspect to see if lines are free of debris.
    - e) Inspect manhole benches and inverts.
    - f) Check alignment and grade of gravity lines by laser or by introducing sufficient water into the line to verify the absence of sags, as directed by the Contracting Officer.
    - g) Mirror test: Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a full circle of light through the pipeline when viewed from the adjoining end of line.
  - 2) Leakage Tests: Test lines for leakage by either infiltration tests or exfiltration tests, or by low-pressure air tests in accordance with the following:
    - a) Exfiltration Tests: ASTM C 969M (ASTM C 969) and perform calculations in accordance with its Appendix.
    - b) Low-pressure Air Tests: Pipelines: ASTM C 924M (ASTM C 924) and perform calculations in accordance with its Appendix. PVC plastic pipelines: UBPPA UNI-B-6 and perform calculations in accordance with its Appendix.
  - 3) Cross Connection Tests: Cross connection tests must be observed by the Contracting Officer and the utility provider's inspector.
    - a) Perform a tracer study from the project sewer connection to the first manhole downstream on the active sewer system. Use a nontoxic, non-staining sewer tracing dye. Testing must continue until the dye visually confirms the design connection is appropriate. During the test, the contractor must monitor the storm drainage system (structures and outfalls) downstream from the project for any sign of cross connection.
    - b) Perform a smoke test on the project sewer to verify that project storm drainage inlets or drains have not been connected to the sanitary sewer.
- b. Sanitary Sewer Manholes Verification Testing: Provide testing on sanitary sewer manholes in accordance with the state sewerage regulations. At minimum, perform hydraulic testing in accordance with ASTM C 969M (ASTM C 969).
- c. Wastewater Pump Station Verification Testing: Test the wastewater pump station in accordance with the state sewerage regulations. Conduct testing on discharge piping and force main in accordance with tests for water distribution mains; see G30, paragraph 1.3.2. Test pumps, controls, and alarms, in

operation, under design conditions to ensure proper operation of all equipment.

- d. TV Inspection for Sanitary Sewer: Post-installation TV inspection will be performed on all segments of the installed system when the total footage of sanitary sewer mains installed in the contract is in excess of 300 feet. Complete the post-installation TV inspection to confirm that the completed lines are free of defects. For video recordings include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected. The minimum information to be included is the pipe material, pipe size, starting and stopping manholes and descriptions of any features as they occur. Video recording playback must be at the same speed that it was recorded. Permanently label CDs / DVDs according to their contents; CDs / DVDs will become the property of the Government. Provide all TV inspections of sanitary sewer mains in accordance with the Pipeline Assessment and Certification Program as sponsored by the National Association of Sewer Service Companies (NASSCO). Prior to initiating CCTV inspection, provide copies of PACP Certification of the operators that will be performing the work. Complete pipe segments and manhole work, including pipe penetrations, manhole benches, main line and manhole visual inspection, pressure testing, deflection and leakage tests on a section of line (manhole to manhole) prior to performing TV. Complete post-installation TV inspection in the presence of the Contracting Officer or his designated representative. The importance of accurate measurements is emphasized. The meter device must be accurate to one tenth of a foot. Utilize the full capabilities of the camera equipment to document the completion and the conformance of the work to the Contract Documents. Provide a full 360° view of the pipe, joints and service connections. Move the camera through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. The maximum speed must be no greater than 30 feet per minute. Use manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with the proper documentation of the sewer conditions to move the camera through the sewer line. Once video recording has commenced, the recording must be continuous, without interruption, until the termination manhole is reached. Provide a color video showing the completed work. Prepare and submit Television Inspection Logs providing location of service connections along with the location of any discrepancies. Keep computer printed location records (Television Inspection Logs) and clearly show the location and orientation in relation to an adjacent manhole for each point observed during the TV inspection. Record features of significance such as locations and orientations of service connections, pipe deflections, leaks, rolled or dislodged gaskets, sags or bellies in the line, or wide joints. Document noted defects and lateral connections as color digital files and color hard copy prints. Photo logs must accompany each photo submitted. Prior to submission of the TV inspection video, Television Inspection Logs, and digital photographs to the Contracting Officer, review the submittal items to ensure that they meet the quality criteria set forth in this specification. A copy of such video along with the Television Inspection Logs and Digital photographs must be supplied to the Contracting Officer within five (5) business days of completion of the video-inspection. In the event that the video, Television Inspection Logs or digital photographs are deemed of poor quality or substandard by the Contracting Officer, the videos, and / or Television Logs, or digital photographs will be returned and a re-inspection provided by the Contractor, at no additional cost to the Government.
5. **Gravity Sewer Piping:** Gravity sanitary sewer mains and laterals must be Ductile Iron, PVC or Polypropylene sewer pipe and fittings. Use Ductile Iron under roadways or at depths greater than 10 feet (3.0 m). PVC and Polypropylene may only be used under

roadways or at depths greater than 10 feet (3.0 m) when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP.

- a. PVC Gravity Sewer Pipe
    - 1) Piping and Fittings: ASTM D3034 or ASTM F679, SDR 35.
    - 2) Joints: ASTM D3212 and ASTM F477.
  - b. Ductile Iron Gravity Sewer Pipe
    - 1) Piping: ASTM A746. Provide required Thickness Class based on design information and methods in ASTM A746.
    - 2) Fittings: AWWA C110 or AWWA C153.
    - 3) Joints: AWWA C111.
    - 4) Interior Coating: AWWA C104.
    - 5) Exterior Protection (if required): AWWA C105, polyethylene encasement.
  - c. Dual Wall and Triple Wall Polypropylene Sewer Pipe 12" to 60"
    - 1) Piping and Fittings: ASTM F2736 and ASTM F2764/F2764M.
    - 2) Joints: ASTM D3212 and ASTM F477.
6. **Connections to Existing Lines:** Obtain approval from the Contracting Officer before making a connection to an existing line. Conduct work so that there is minimum interruption of service on existing line and provide a new manhole at the connection point.
7. **Gravity Sewer Installation:** Install pipe, fittings and accessories in accordance with manufacturer's instructions.
- a. PVC and Dual and Triple Wall Polypropylene: ASTM D2321. Do not use ASTM D2321 Class IV or V materials for bedding, haunching or initial backfill materials.
  - b. Ductile Iron: AWWA C600.
  - c. Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be green for sewer systems. Terminate tracer wire above grade at valve boxes and at exterior of building.
8. **Piping for Gravity Sewer Cleanouts:** Install cast iron pipe and fittings in accordance with the recommendations of the pipe manufacturer.
- a. Cast-Iron Soil Pipe for Cleanouts
    - 1) Pipe: ASTM A 74, service.
    - 2) Joints: ASTM C 564 compression-type rubber gaskets.
    - 3) Exterior Protection (if required): AWWA C105, polyethylene encasement.
9. **Sanitary Sewer Manholes and Cleanouts:** Provide all materials, equipment, labor, testing, and miscellaneous related items for the sanitary manholes in accordance with the following:
- a. Set manhole rim elevations flush with finished surface of paved areas or 1 inch (25 mm) above finished grade in unpaved areas.
  - b. Resilient connectors for making joints between manhole and pipes entering manhole must conform to ASTM C 923/C 923M.
  - c. Provide drop manholes when a gravity sewer pipe enters a manhole at an elevation of 24 inches (610 mm) or more above the manhole invert.

- d. **Precast Concrete Manholes:** ASTM C 478/C 478M; base and first riser must be monolithic. Precast manhole sections must have:
    - 1) ASTM C 990/C 990M butyl gaskets;
    - 2) ASTM C 443/C 443M rubber O-ring joints; or
    - 3) ASTM C 443, Type B gaskets.
  - e. **Cast-in-Place Concrete Manholes:** Reinforced concrete; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading. Provide concrete work in accordance with ACI 301/301M and ACI 350-01; provide a minimum compressive strength of 4000 psi (28 MPa).
  - f. **Manhole Frames and Covers:** Frame and cover must be cast gray iron, ASTM A48/A48M, Class 35B, cast ductile iron, ASTM A536, Grade 65-45-12, or reinforced concrete, ASTM C478 ASTM C478M. Frame and cover must be designed to accommodate the imposed live load. Stamp or cast the words "Sanitary Sewer" into covers so that it is plainly visible.
  - g. **Manhole Steps:**
    - 1) Zinc-coated steel: 29 CFR 1910.27.
    - 2) Plastic or rubber coating pressure molded to steel: ASTM D 4101, copolymer polypropylene; or ASTM C 443/C 443M, except shore A durometer hardness must be 70 plus or minus 5.
    - 3) Aluminum steps or rungs will not be permitted. Steps are not required in manholes less than 4 feet (1.2 m) deep.
10. **Manhole Construction:** Where a new manhole is constructed on an existing line, remove existing pipe as necessary to construct the manhole. Cut existing pipe so that pipe ends are approximately flush with the interior face of manhole wall, but not protruding into the manhole. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert of as large a radius as manhole size will permit. For cast-in-place concrete, no parging will be permitted on interior manhole walls.
11. **Connections to Existing Manholes:** Center pipe connections to existing manholes on the manhole. Holes for the new pipe must be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cut the manhole in a manner that will cause the least damage to the walls.
12. **Cleanouts:** Construct cleanouts of cast iron soil pipe and fittings; see paragraph, "Piping for Gravity Sewer Cleanouts" above.
13. **Lift Stations and Pumping Stations:** If a pump station is allowed, provide all materials, equipment, labor, testing and miscellaneous related items for a packaged lift or pump station system for the facility in compliance with the UFC 3-240-01, *Wastewater Collection*; the state sewerage regulations; and the utility provider's requirements.
- a. **Submersible Pumps:** Provide pumps capable of handling raw wastewater and passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings must be at least 4 inches (100 mm) in diameter. Provide submersible type sewage pumps, with guide rail system. Include ASTM A48/A48M, Class 25, nonclog, cast-iron impeller; and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable. Construct the guide rail system of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.
  - b. **Grinder Pumps:** Provide grinder-type sewage pumps, with guide rail system. Include stainless steel or bronze impeller and hermetically sealed motor with

moisture-sensing probe, mechanical seals, and waterproof power cable. Construct the guide rail system of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

- c. **Suction Lift Pumps:** Provide pumps capable of handling raw wastewater and passing spheres of at least 3 inches (75 mm) in diameter. The pump's suction and discharge openings must be at least 4 inches (100 mm) in diameter. Provide dry-chamber-mounting, vacuum-primed, nonclog sewage pumps located in dry compartment above wet pit. Include ASTM A48/A48M, Class 25, nonclog, cast iron impeller; mechanical or stuffing box seals; pedestal mounted motor; and suction piping extending to bottom of wet pit. Provide suction-lift pumps capable of automatic rapid self priming and re-priming at the "lead pump on" elevation. Suction piping must not exceed 25 feet (7.6 meters) in total length. Priming lift at the "lead pump on" elevation must include a safety factor of at least 4 feet (1.2 meters) from the maximum allowable priming lift for the specific equipment at design operating conditions. The combined total of dynamic suction-lift at the "pump off" elevation and the required net positive suction head at design operating conditions must not exceed 22 feet (6.7 meters).

- d. **Pump Motors:** Provide pump motor sized to accommodate pump operation along the entire impeller curve.

- e. **Station Piping Within Wet Well and Valve Vault:**

**Piping Less than 4-Inch (100 mm) in Diameter**

- 1) PVC Pressure Pipe
  - a. Pipe: ASTM D 1785, Schedule 80.
  - b. Fittings: Schedule 80 socket fittings, ASTM D 2467; Schedule 80 threaded fittings, ASTM D 2464.

**Piping 4 inch (100 mm) Diameter and Larger**

- 2) Flanged Ductile Iron Pipe
  - a. Pipe: AWWA C115 and its appendices.
  - b. Fittings: AWWA C110 or AWWA C153.
  - c. Lining: AWWA C104.

14. **Force Mains:**

- a. **Force Mains for Submersible and Suction Lift Pumps:** Force mains must be at least 4 inches (100 mm) in diameter and must be either ductile iron or PVC pressure pipe.

- 1) Ductile Iron Pressure Pipe
  - a. Pipe: AWWA C151, Pressure Class 350.
  - b. Fittings: AWWA C110 or AWWA C153.
  - c. Interior Lining: AWWA C104.
  - d. Exterior Protection (if required): AWWA C105, polyethylene encasement.
- 2) PVC Pressure Pipe
  - a. Pipe: AWWA C900, Pressure Class 150. AWWA C905.
  - b. Fittings: Ductile Iron (AWWA C110 or AWWA C153).

- b. **Force Mains for Grinder Pumps:** Force mains less than 4 inches (100 mm) in diameter must be PVC pressure pipe:
    - 1) PVC Pressure Pipe
      - a. Pipe: ASTM D 1785, Schedule 40 or ASTM D 2241, with SDR rating for 160 psi (1.1 MPa) pressure rating.
      - b. Fittings: ASTM D 2466.
      - c. Joints: Elastomeric gaskets for pressure rating; solvent cement joints, ASTM D 2564.
15. **Piping Accessories:**
- a. **Insulating Joints:** Provide between pipes of dissimilar metals a rubber gasket or other approved type of insulating joint or dielectric coupling to effectively prevent metal-to-metal contact between adjacent sections of piping.
  - b. **Accessories:** Provide flanges, connecting pieces, transition glands, transition sleeves, and other adapters as required.
  - c. **Flexible Flanged Coupling:** Provide flexible flanged coupling applicable for sewage as indicated. Use flexible flanged coupling designed for a working pressure of 350 psi (2400 kPa).
16. **Valves:** Provide suitable shutoff and check valves on the discharge line of each pump. Locate the check valve between the shutoff valve and the pump. Locate valves in accordance with state sewerage regulations. Check valves must be suitable for the material being handled and placed on the horizontal portion of the discharge piping except for ball check valves, which may be placed in the vertical run. Provide valves capable of withstanding normal pressure and water hammer. Use valves from one manufacturer.
- a. **Shut Off Valves**
    - Shut Off Valves Less than 4 Inch (100 mm) in Diameter**  
PVC ball valves.
      - 1) **Shut Off Valves 4 Inch (100 mm) and Larger in Diameter**  
AWWA C509 or AWWA C515, nonrising stem, and flanged. Provide valves with handwheels that open by counterclockwise rotation of the valve stem. Provide epoxy coating in accordance with AWWA C550.
  - b. **Check Valves**
    - 1) **Check Valves Less than 4-Inch (100 mm) in Diameter**  
Neoprene ball check valve with integral hydraulic sealing flange, designed for a hydraulic working pressure of 175 psi (1200 kPa).
    - Check Valves 4-Inch (100 mm) and Larger in Diameter**  
AWWA C508, flanged. Provide a nonclog, swing check valve rated for not less than 175 psig (1200 kPa) working pressure capable of passing 3-inch (75 mm) diameter solids.
    - 2) **Air Relief Valves:** Provide air relief valves at high points in the force main to prevent air locking in accordance with AWWA M51. Provide vacuum relief valves, where required, to relieve negative pressures on force mains.
17. **Identification Tags and Plates:** Provide valves with tags or plates numbered and stamped for their usage. Use plates and tags of brass or nonferrous material and mounted or attached to the valve.

18. **Thrust Restraint:** Provide thrust restraint for force mains, valves and other features of the wastewater distribution system. Provide thrust restraint using restrained joints in accordance with pipe manufacturer's recommendations, AWWA C600 and if for fire service main, NFPA 24.
19. **Station Control System:** Provide alarms for all pumping and lift stations; at minimum provide alarms for high level, power failure, pump failure, unauthorized entry or any cause of station malfunction. Provide alarms as required by the pump manufacturer to obtain warranty. If required, provide a telemetry system in accordance with state sewer collection and treatment regulations and system owner's requirements to relay alarms to a facility that is manned 24 hours a day.
20. **Station Accessories:**
  - a. **Ventilation:** Provide covered wet wells with provisions for air displacement venting to the outside. Provide galvanized ASTM A 53/A 53M pipe with insect screening. Provide adequate ventilation for all pump stations.
  - b. **Metering:** Provide devices for measuring wastewater flow at all pumping stations. Provide indicating, totalizing and recording flow measurement at pumping stations with a 1200 gpm (76 l/s) or greater design peak hourly flow. For smaller stations, provide elapsed time meters in conjunction with pumping rate tests.
  - c. **Pipe and Valve Supports:** Use schedule 40 galvanized steel piping conforming to ASTM A 53/A 53M for pipe and valve supports. Provide either ANSI B16.3 or ANSI B16.11 galvanized threaded fittings.
  - d. **Miscellaneous Metals:** Use stainless steel bolts, nuts, washers, anchors, and supports for installation of equipment.

## G3030 STORM SEWER

1. **Storm System Design and Construction:** Provide the new storm sewer system and connections to the existing storm sewer system in accordance with UFC 3-201-01, *Civil Engineering*; the utility provider's requirements; UFC 3-210-10, *Low Impact Development*; the state stormwater management laws and regulations; and applicable sustainability requirements; whichever is more stringent.

The Contractor must make necessary adjustments to the drainage design in order to avoid disruption to existing utilities and to protect existing trees to remain.

Confirm that the existing receiving system has adequate capacity to receive the additional stormwater flow generated by the project.

2. **Storm Sewer System Performance Verification:** At a minimum, perform the following:
  - a. Visual Test: Remove drainage structure covers and conduct a visual inspection as follows:
    - 1) Inspect for visible leaks in lines or structures.
    - 2) Inspect condition of grout in the interior joints of the structures.
    - 3) Inspect structure frames and covers for proper type and installation.
    - 4) Inspect to see if lines are free of debris.
    - 5) Inspect structure inverts.
    - 6) Check alignment and grade of gravity lines by laser or by introducing sufficient water into the line to verify the absence of sags, as directed by the Contracting Officer.

7) Mirror test: Check each straight run of pipeline for gross deficiencies by holding a light in a structure; it must show a full circle of light through the pipeline when viewed from the adjoining end of the line.

8) TV Inspection for Storm Sewer Under Pavements: Post-installation TV inspection will be performed on all segments of the installed system when the total footage of storm sewer lines installed in the contract is in excess of 300 feet. Complete the post-installation TV inspection to confirm that the completed lines are free of defects. For video recordings include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected. The minimum information to be included is the pipe material, pipe size, starting and stopping manholes and descriptions of any features as they occur. Video recording playback must be at the same speed that it was recorded. Permanently label CDs / DVDs according to their contents; CDs / DVDs will become the property of the Government. Provide all TV inspections of storm sewer lines in accordance with the Pipeline Assessment and Certification Program as sponsored by the National Association of Sewer Service Companies (NASSCO). Prior to initiating CCTV inspection, provide copies of PACP Certification of the operators that will be performing the work. Complete pipe segments and manhole work, including pipe penetrations, manhole benches, main line and manhole visual inspection, pressure testing, and deflection test on a section of line (manhole to manhole) prior to performing TV. Complete post-installation TV inspection in the presence of the Contracting Officer or his designated representative. The importance of accurate measurements is emphasized. The meter device must be accurate to one tenth of a foot. Utilize the full capabilities of the camera equipment to document the completion and the conformance of the work to the Contract Documents. Provide a full 360° view of the pipe, joints and service connections. Move the camera through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. The maximum speed must be no greater than 30 feet per minute. Use manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with the proper documentation of the sewer conditions to move the camera through the sewer line. Once video recording has commenced, the recording must be continuous, without interruption, until the termination manhole is reached. Provide a color video showing the completed work. Prepare and submit Television Inspection Logs providing location of service connections along with the location of any discrepancies. Keep computer printed location records (Television Inspection Logs) and clearly show the location and orientation in relation to an adjacent manhole for each point observed during the TV inspection. Record features of significance such as locations and orientations of service connections, pipe deflections, leaks, rolled or dislodged gaskets, sags or bellies in the line, or wide joints. Document noted defects and lateral connections as color digital files and color hard copy prints. Photo logs must accompany each photo submitted. Prior to submission of the TV inspection video, Television Inspection Logs, and digital photographs to the Contracting Officer, review the submittal items to insure that they meet the quality criteria set forth in this specification. A copy of such video along with the Television Inspection Logs and Digital photographs must be supplied to the Contracting Officer within five (5) business days of completion of the video inspection. In the event that the video, Television Inspection Logs or digital photographs are deemed of poor quality or substandard by the Contracting Officer, the videos, and / or Television Logs, or digital photographs will be returned and a re-inspection provided by the Contractor, at no additional cost to the Government.

3. **Piping:** Storm sewer piping 12 inches (300 mm) and larger in diameter shall be

reinforced concrete, ductile iron or corrugated steel; PVC, corrugated aluminum, polyethylene and polypropylene pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP. Subsurface drainage piping shall be perforated PVC or HDPE.

**4. Piping Materials:**

- a. PVC Pipe
  - 1) Piping and Fittings: ASTM D3034, SDR 35.
  - 2) Joints: ASTM D3212 and ASTM F477.
- b. Ductile Iron Pipe
  - 1) Piping: ASTM A746. Provide required Thickness Class based on design information and methods in ASTM A746.
  - 2) Fittings: AWWA C110 or AWWA C153.
  - 3) Joints: AWWA C111.
  - 4) Interior Coating: AWWA C104.
  - 5) Exterior Protection (if required): AWWA C105, polyethylene encasement.
- c. Reinforced Concrete Pipe:
  - 1) Circular Pipe: ASTM C76/C76M. Provide required Class based on design information and methods in ASTM C76/C76M. Class III minimum.
  - 2) Elliptical Pipe: ASTM C507/C507M. Provide required Class based on design information and methods in ASTM C76/C76M.
  - 3) Joints:
    - a) ASTM C990/C990M butyl gaskets;
    - b) ASTM C 443/C 443M rubber O-ring joints; or
    - c) AASHTO M 198, Type B preformed plastic gaskets.
- d. Corrugated Aluminum Pipe:
  - 1) Piping: ASTM B745/B745M.
  - 2) Joints: Coupling bands conforming to ASTM B745/B745M.
  - 3) Coating: Fully bituminous coated for all applications in accordance with ASTM A849. For applications where piping is part of a piped storm sewer system (not a culvert), provide pipe fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A849.
- e. Corrugated Steel Pipe:
  - 1) Piping: ASTM A760/A760M.
  - 2) Joints: Coupling bands conforming to ASTM A760/A760M.
  - 3) Coating: Fully bituminous coated for all applications in accordance with ASTM A849. For applications where piping is part of a piped storm sewer system (not a culvert), provide pipe fully bituminous coated, invert (half) paved with concrete lining in accordance with ASTM A849.
- f. Polyethylene (PE) Pipe
  - 1) Piping 12" to 60" and Fittings: ASTM 2648/F2648M and AASHTO M 294 Type S, corrugated.
  - 2) Joints: ASTM F477 and ASTM D3212
- g. Dual and Triple Wall Polypropylene (PP) Pipe
  - 1) Piping 12" to 60" and Fittings: ASTM F2736, ASTM F2764/F2764M, ASTM F2881 and AASHTO M 330 Type S or D
  - 2) Joints: ASTM F477 and ASTM D3212
- h. Perforated PVC Pipe: ASTM D 2729.
- i. Perforated PE Pipe
  - 1) Piping and Fittings: AASHTO M 294, Type SP, corrugated.
  - 2) Joints: AASHTO M 294, Soiltight.

5. **Installation:** Install piping in accordance with manufacturer's recommendations and the following standards:
  - a. PVC, PE and Dual and Triple Wall PP: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.
  - b. Ductile Iron: AWWA C600.
  - c. Reinforced Concrete: ACPA 01-102 and 01-103.
  - d. Corrugated Aluminum: ASTM B 788/B 788M.
  - e. Corrugated Steel: ASTM A 798/A 798M.
  - f. Perforated PVC and Perforated PE: ASTM D 2321. Do not use ASTM D 2321 Class IV or V materials for bedding, haunching or initial backfill materials.

Provide nondetectable warning tape and a continuous length of tracer wire for the full length of each run of nonmetallic piping below grade. Warning tape to be color coded with warning and identification of utility type imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (utility type) LINE BELOW" or similar wording. Color to be green for sewer systems. Terminate tracer wire above grade at valve boxes and at exterior of building.

6. **Piping for Cleanouts: Materials**
  - a. Cast-Iron Soil Pipe for Cleanouts
    - 1) Pipe: ASTM A 74, service.
    - 2) Joints: ASTM C 564 compression-type rubber gaskets.
    - 3) Exterior Protection (if required): AWWA C105, polyethylene encasement.
  - b. Installation: Install cast iron pipe and fittings in accordance with the recommendations of the pipe manufacturer.
7. **Storm Sewer Structures:** Provide all materials, equipment, labor, testing, and miscellaneous related items for the drainage structures in accordance with the following:
  - a. Set structure rim elevations flush with finished surface of paved areas or 1 inch (25 mm) above finished grade in unpaved areas.
  - b. Provide resilient connectors for making joints between manhole and pipes entering manhole in conformance with ASTM C 923/C 923M.
  - c. Provide precast or cast-in-place concrete drainage structures, except cast-in-place concrete is required for airfield drainage structures, headwalls and gutters.
8. **Precast Concrete Inlets:** Provide work and materials in accordance with applicable requirements of the State Highway Specifications (SHS) and standards where the project is located.
9. **Cast-In-Place Concrete Drainage Structures:** Provide work and materials in accordance with drainage structures indicated in the State Highway Specifications (SHS) and standards where the project is located. For airfield drainage structures, provide work and materials in accordance with FAA ACA 150/5370-10B.
10. **Drainage Structure Frames And Covers:** Frame and cover for gratings shall be cast gray iron, ASTM A48/A48M, Class 35B; cast ductile iron, ASTM A536, Grade 65-45-12; or cast aluminum, ASTM B26/B26M, Alloy 356.OT6. Frame and cover must be designed to accommodate the imposed live loads. Stamp or cast the words "Storm Sewer" into

covers so that it is plainly visible. For airfield drainage structures, fabricate frames and covers of standard commercial grade steel welded by qualified welders in accordance with AWS D1.1/D1.1M. Provide covers of rolled steel floor plate having an approved anti-slip surface. Steel frames and covers must be hot dipped galvanized after fabrication. At the contractor's option, ductile iron covers and frames may be used for airfield drainage structures if designed for a minimum proof load of 100,000 pounds (45,000 kg) in lieu of the steel frames and covers. Covers must be of the same material as the frames (i.e. ductile iron frame with ductile iron cover, galvanized steel frame with galvanized steel cover). Perform proof loading in accordance with ASTM A 48/A 48M. Physically stamp proof loads into the cover. Provide the Contracting Officer copies of previous proof load test results performed on the same frames and covers as proposed for this contract. Modify the top of the structure to accept the ductile iron structure in lieu of the steel structure indicated. The finished structure must be level and non-rocking, with the top flush with the surrounding pavement.

11. **Drainage Structure Steps:**
  - a. Zinc-coated steel: 29 CFR 1910.27.
  - b. Plastic or rubber coating pressure molded to steel: ASTM D 4101, copolymer polypropylene; or ASTM C 443/C 443M, except shore A durometer hardness shall be 70 plus or minus 5.
  - c. Aluminum steps or rungs will not be permitted. Steps are not required in structures less than 4 feet (1.2 m) deep.
12. **Drainage Structure Construction:** Where a new structure is constructed on an existing line, remove existing pipe as necessary to construct the structure. Cut existing pipe so that pipe ends are approximately flush with the interior face of structure wall, but not protruding into the structure.
13. **Connections to Existing Structures:** Center pipe connections to existing structures on the structure. Holes for the new pipe must be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cut the structure in a manner that will cause the least damage to the walls.
14. **Cleanouts:** Construct cleanouts of cast iron soil pipe and fittings; see paragraph 6 above.
15. **Lift Stations:** A stormwater pump station(s) will not be allowed.
16. **Culverts:** Culverts 12 inches (300 mm) and larger in diameter shall be reinforced concrete or corrugated steel; PVC, corrugated aluminum, polyethylene and polypropylene pipe may only be used when written approval is received by the Government's Civil Reviewer or indicated in another part of the RFP. See G303001, paragraphs above for material and installation requirements. Flared end sections must be the same material as pipe material. Provide erosion control in accordance with the State Erosion and Sedimentation Control Standards or EPA guidance where State Standards are unavailable.
17. **Headwalls:** Provide cast-in-place concrete headwalls in accordance with the State Highway Specification (SHS) and standards where the project is located.
18. **Erosion & Sediment Control Measures:** Refer to Section G10.
19. **Stormwater Management:**

- a. **Stormwater Collection And Storage:** Provide permanent stormwater management (i.e., detention and retention ponds, LID and other drainage features) to control stormwater runoff in accordance with UFC 3-201-01, *Civil Engineering*, UFC 3-210-10, *Low Impact Development*, FC 1-300-09N Navy and Marine Corps Design Procedures, State and local stormwater management Laws and Regulations and applicable project sustainability goals. Integrate permanent stormwater management features into the site design in accordance with UFC 3-201-01, *Civil Engineering*. Parking areas, roads, walks, courtyards, training areas and similar site features may not be used to detain or retain stormwater. Manage stormwater within detention or retention ponds and the LID features indicated in Part 3 of this RFP. Prevent upstream and downstream property damage.
20. **OIL/WATER SEPARATOR:** Provide an oil/water separator to remove free oil from oil-in-water mixtures originating from proposed facility operations. Provide grit protection upstream of the oil/water separator. Provide an oil/water separator utilizing coalescing media and conforming to the applicable guidelines of the American Petroleum Institute (API). Provide materials or a coating system which will protect the separator from the oil-in-water mixture, atmosphere, and in-situ soil conditions. Use a separator with a completely removable cover.

## G3060 FUEL DISTRIBUTION

**Gas Distribution System:** Refer to Section D20 for requirements.

## G40 SITE ELECTRICAL UTILITIES

### G4010 ELECTRICAL DISTRIBUTION

1. **Electrical Utilities Design and Construction:** Site electrical utilities include all exterior electrical work, including the connection to the primary distribution system. This also includes telephone and cable television supplies.  
  
Provide electrical overhead and underground, distribution systems in accordance with IEEE C2 (National Electrical Safety Code), NFPA 70, local utilities company requirements, and local Activity guidelines.
2. **Coordination With Local Utilities Company and Local Activity:** Service meters for electrical services must be provided and installed in conformance with the local utilities company requirements and local activity guidelines.
3. **Substations:** When secondary unit substations are required, the Designer of Record must utilize UFGS Section 26 11 16, *Secondary Unit Substations*, and UFGS Section 26 23 00, *Low-Voltage Switchgear*, or UFGS 26 24 13, *Switchboards*, for the project specification, and must submit the edited specification section as a part of the design submittal for the project.
4. **Transformers:** When transformers are required, the Designer of Record must utilize UFGS Section 26 12 19.10, *Three-Phase, Liquid-Filled Pad-Mounted Transformers*, UFGS Section 26 12 21, *Single-Phase Pad-Mounted Transformers*, or UFGS Section 33 71 01, *Overhead Transmission and Distribution*, for the project specification, and must submit the edited specification section as a part of the design submittal for the project.

5. **Switches, Controls and Devices:** When switches or control devices are required, the Designer of Record must utilize UFGS Section 26 13 00, *SF6/High-Firepoint Fluids Insulated Pad-Mounted Switchgear*, or UFGS Section 33 71 01, *Overhead Transmission and Distribution*, for the project specification, and must submit the edited specification section as a part of the design submittal for the project.

## **G4020 EXTERIOR LIGHTING FIXTURES AND CONTROLS**

1. Utilize broad spectrum (white light) sources such as metal halide, induction, Light Emitting Diode (LED), and fluorescent to provide good visibility at low light levels, unless lighting is required to match existing sources. The IESNA 10th Edition Handbook has developed a methodology to apply white light.
2. Comply with ANSI/ASHRAE/IES 90.1 for all exterior lighting applications and controls.
3. Comply with EPACK 2005, the exterior lighting power density must be below ASHRAE by 30% if considered a building load and 20% if considered a non-building load.
4. Provide surge protective device (SPD) at panelboards that include circuits feeding exterior lighting systems.
5. Coordinate the design and luminaire selection with the landscape designer. Such coordination should include the location of poles which may conflict with tree locations.
6. When exterior lighting is required the designer of record must utilize UFGS Section 26 51 00 for the project specification section as part of the design submittal for the project and must submit the edited specification section as a part of the design submittal for the project. Provide "dark-sky" compliant exterior light fixtures and design to minimize light trespass and light pollution.

## **G4030 SITE COMMUNICATION & SECURITY**

1. **Telephone Distribution System:** Provide all telephone distribution systems in accordance with EIA/TIA Standards, NFPA 70, and the cognizant telephone company requirements.
2. **Cable Television System:** Provide all cable television systems in accordance with NFPA 70, and the cognizant cable television company requirements and BICSI recommendations.