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NAVFAC PTS-A20 (December 2018)  
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Preparing Activity: NAVFAC SUPERSEDING PTS-A20 (February 2018)  
  
PERFORMANCE TECHNICAL SPECIFICATION  
  
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SECTION A20  
  
BASEMENT CONSTRUCTION  
12/18

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NOTE: This section is intended to be used as a guide and contains requirements that are common to many different types of facilities. In addition, there may be special requirements for a particular project that are not addressed at all. The RFP preparer will need to incorporate additional information to address these special requirements in this PTS and corresponding Part 3 ESR. If the RFP Preparer chooses to delete building elements that are not required for the project, do not change the remaining Uniformat paragraph designations (example A102001). Uniformat designations are unique to the products they are assigned to. However, the subparagraphs numerical extension (example – 1.2 or a,b,c of the Uniformat designations may change if subparagraphs are deleted).  
  
This guide specification is formatted utilizing Uniformat II, an industry recognized standard, ASTM E 1557. When the RFP preparer chooses to add a paragraph that does not apply to an existing building element already included in the specification, refer to the Uniformat/WBS located on the NAVFAC Design-Build Website for a listing of Uniformat II designations and definitions.  
  
NOTE: The RFP preparer may view or hide the criteria notes in this PTS section by modifying the WORD preferences for "Hidden text". To view the criteria notes, choose "File" then "Option". Click "Display" then check the "Hidden text" box under "Always show these formatting marks on the screen". In the same section, check the box for "Print hidden text" under "Printing options" to print the criteria notes.  
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**A20 GENERAL**

RFP Part 3 including the Engineering System Requirements (ESR) provide project specific requirements. The RFP Part 4, Performance Technical Sections (PTS) provide generalized technical requirements that apply to multiple facility types and include more requirements than are applicable to any one project. Therefore, only the RFP Part 4 requirements that apply to the project and further define the RFP Part 3 project specific requirements are required.

**A20 1.1 DESIGN GUIDANCE**

Provide the design and installation in accordance with the following references. This Performance Technical Specification (PTS) adds clarification to the fundamental requirements contained in the following Government Standards. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

**A20 1.1.1 Government Standards**

UNIFIED FACILITIES CRITERIA (UFC)

|  |  |
| --- | --- |
| UFC 1-200-01 | DoD Building Code (General Building Requirements)(A reference in this PTS section to UFC 1-200-01 requires compliance with the Tri-Service Core UFCs that are listed therein, which includes the following significant UFC(s): UFC 3-101-01, Architecture UFC 3-220-01, Geotechnical Engineering UFC 3-301-01, Structural Engineering) |

UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

|  |  |
| --- | --- |
| UFGS Section 31 00 00 | Earthwork |

**A20 1.2 GENERAL REQUIREMENTS**

**A20 1.2.1 Required Specifications**

The Designer of Record shall utilize the following UFGS Specifications for the project specification.

Section 31 00 00, *Earthwork*

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NOTE: Modify the paragraph below to correspond with the subsurface soils information that is being provided. If subsurface soils information is to be provided, assure that the information is included in Part 6 of the RFP.  
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**A20 1.2.2 Geotechnical Report**

**A20 1.2.2.1 Contractor-provided Geotechnical Engineer**

The Contractor-provided Geotechnical Engineer is required to be experienced with soil conditions in the region where the project site is located. The geotechnical engineer must evaluate the RFP data, obtain and evaluate all additional data as required to support the design and construction, and prepare a Geotechnical Report.

**A20 1.2.2.2 Subsurface Soils Information**

Subsurface soil information, if provided, is included for the Contractor’s information only, and is not guaranteed to fully represent all subsurface conditions. The data included in this RFP are intended for proposal preparation and preliminary design only. Perform subsurface exploration, investigation, testing, and analysis for the design and construction of the foundation system at no additional cost to the Government.

Coordinate all work by the Contractor-provided Geotechnical Engineer with the Contracting Officer and ensure that work does not conflict with Base operations. Prior to the Foundation Work Design submittal, provide a Contractor Geotechnical Report (an editable Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report becomes the property of the Government. Provide the Geotechnical reports generated during construction, such as pile driving results and analysis to the Contracting Officer. In addition, provide an editable Adobe Acrobat PDF version and two printed copies for record keeping purposes.

**A20 1.2.2.3 Contractor-Provided Geotechnical Report**

Submit a written Geotechnical report based upon Government-provided subsurface investigation data and all additional field and laboratory testing accomplished at the discretion of the Contractor's Geotechnical Engineer. The Geotechnical Report must include all requirements listed in UFC 3-220-01, *Geotechnical Engineering*, paragraph entitled "Section 1803 Geotechnical Investigations"; in addition include the following:

a. The project site description, vicinity map and site map.

b. Results of all the field and laboratory testing, whether Government or Contractor-provided.

c. Engineering analysis, discussion and recommendations addressing:

d. Settlement

e. Bearing Capacity

f. Foundation selection and construction considerations (shallow, deep, special); dimensions, and installation procedures.

g. Site preparation (earthwork procedures and equipment), compaction requirements, building slab preparation (as applicable), soil sensitivity to weather and equipment, and groundwater influence on construction

h. Sheeting and shoring considerations, as applicable

i. Pavement design parameters, actual or assumed, including recommended thicknesses and materials, be for design or for proposed modifications to the RFP provided pavement design only

j. Haul routes and stockpile locations for earthwork, as applicable

k. Calculations to support conclusions and recommendations

l. Present recommendations on a structure-by-structure basis

Provide the Geotechnical Report signed by a registered Geotechnical Engineer.

Submit the report accompanied by a cover letter identifying any recommendations of the report proposed to be adopted into the design which are interpreted by the Contractor as either conflicting with or being modifications to the Geotechnical or Pavement related requirements of the RFP.

**A20 1.2.2.4 Geotechnical Site Data required in Design Drawings**

The Contractor's final design drawings must include the Government-provided subsurface data presented in the RFP as noted below, as well as any additional borings and laboratory test result data performed by the Contractor.

a. Logs of Borings and related summary of laboratory test results and groundwater observations.

b. Indicate locations of all borings on the drawings. Revise the applicable design drawings to reference the Contractor’s Geotechnical Report as being a basis for design.

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NOTE: Utilize this paragraph to list tests to be performed by the Contractor as required by the Designer of Record (DOR).  
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**A20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING**

Provide verification of satisfactory construction and system performance via Performance Verification Testing, as detailed in this section of the RFP. Provide special tests and special inspections in accordance with Part 2 Section 01 45 00, *Quality Control*.

**A20 1.3.1 Earthwork**

Perform quality assurance for earthwork in accordance with International Building Code (IBC) Chapter 17 and UFGS Section 31 00 00. If a registered Professional Engineer is required to provide inspection of excavations and soil/groundwater conditions throughout construction, the Engineer must perform 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 stamp) 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. Provide the services of the Engineer at no additional cost to the Government.

**A20 1.4 DESIGN SUBMITTALS**

Provide design submittals shall be in accordance with PTS Section Z10, *General Performance Technical Specifications*, Part 2 Section 01 33 10.05 20, *Design Submittal Procedures*, Facilities (FC) 1-300-09N, *Navy and Marine Corps Design Procedures*, UFC 3-301-01, *Structural Engineering*, and UFC 3-220-01, *Geotechnical Engineering*.

In addition, UFGS sections listed below or in the body of the PTS text are to be used by the Designer of Record (DOR) as a part of the design submittal. If the UFGS products or systems are applicable to the project, the DOR must edit these referenced UFGS sections and submit them as a part of the design submittal specification. Edit the specification sections in accordance with the limitations stated in PTS section Z10, *General Performance Technical Specifications*.

UFGS 31 00 00, *Earthwork*

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NOTE: NAVFAC has made every effort to use commercial standards in the PTS Sections. If project requirements dictate the use of a UFGS Section as a standard, add a paragraph here listing the required UFGS Section. State in the paragraph that the DOR must edit this UFGS Section in accordance with PTS Z10 and submit it as a part of the design submittal.  
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**A20 1.5 CONSTRUCTION SUBMITTALS**

Submit construction submittals in accordance with PTS Section Z10, *General Performance Technical Specifications*. In addition to the Z10 requirements, the Designer of Record (DOR) must approve the following submittals as a minimum:

Contractor-provided geotechnical report

Controlled fill or backfill material tests

All structural elements necessary for construction

**A2010 BASEMENT EXCAVATION**

**A201001 EXCAVATION FOR BASEMENTS**

Excavate for the basement as required in accordance with the requirements of this section and other portions of this RFP.

**A201002 STRUCTURE BACKFILL AND COMPACTION**

Provide backfill and soil compaction as required in accordance with the requirements of this section and other portions of this RFP.

**A201003 SHORING**

Provide shoring and sheeting as required in accordance with the requirements of this section and other portions of this RFP. Provide shoring and sheeting plans signed by the Contractor's Geotechnical/Structural Engineer.

**A2020 BASEMENT WALLS**

**A202001 BASEMENT WALL CONSTRUCTION**

Provide basement walls as required in accordance with the requirements of this section and other portions of this RFP.

**A202002 MOISTURE PROTECTION**

**A202002 1.1 BUILT-UP BITUMINOUS WATERPROOFING**

**A202002 1.1.1 Environmental Conditions**

Apply the primers and waterproofing specified herein when the ambient temperature is above 40 degrees F.

**A202002 1.1.2 Liquid Asphalt**

Deliver bulk liquid asphalt in fully insulated, heated transport tanker vehicles with circulating pump devices. Maintain the temperature of the liquid asphalt between 400 and 450 degrees F during storage, provided the transport and storage time does not exceed 12 hours. If the transport and storage time exceeds 12 hours, lower the temperature to between 300 and 325 degrees F at the time the 12 hours are exceeded. Use liquid asphalt within 36 hours after loading in the transport tanker.

**A202002 1.1.3 Materials**

a. Bitumen - Asphalt; American Society for Testing and Materials (ASTM) D 449, Type I.

b. Bituminous Plastic Cement - ASTM D 4586, Type I for asphalt.

c. Membrane Fabric  
  
The following requirements apply:  
  
Felt or Fabric Saturant or  
Material Impregnant Specification  
  
Glass (felt) mat Asphalt ASTM D 2178, Type III  
Reinforcing glass Asphalt ASTM D 1668, Type I  
fabric

d. Nails - Galvanized roofing nails.

e. Primer - ASTM D 41 for asphalt.

f. Protection Board - ASTM D 517, plain, asphalt plank; ASTM C 208, construction grade building board, 1/2 inch thick, asphalt saturated or coated; ASTM C 726, 7/16 inch thick, covered on one side with waterproof paper or asphalt-saturated felt.

**A202002 1.2 ELASTOMERIC SHEET WATERPROOFING**

**A202002 1.2.1 Environmental Conditions**

Do not apply waterproofing during inclement weather or when there is ice, frost, surface moisture, or visible dampness on the surface to receive waterproofing and when ambient and surface temperatures are 40 degrees F or below. The restriction on the application of waterproofing materials when ambient and surface temperatures are below 40 degrees F will be waived if the Contractor devises a means, approved by the Contracting Officer, of maintaining the surface and ambient temperatures above 40 degrees F.

**A202002 1.2.2 Butyl Rubber Sheeting**

Not less than 60 mils minimum thickness.

**A202002 1.2.2.1 Butyl Rubber Sheeting Performance Requirements**

a. Thickness Tolerance, ASTM D 412: Plus or minus 10 percent;

b. Specific Gravity, ASTM D 297: 1.20, plus or minus 0.05;

c. Tensile Strength, ASTM D 412: 1200 psi minimum;

d. Tensile Stress at 300 percent elongation, ASTM D 412: 600 psi minimum;

e. Elongation, ASTM D 412: 300 percent minimum;

f. Tear Resistance, Die C, ASTM D 624: 125 pound force per inch (lbf/inch) minimum;

g. Shore A Hardness, ASTM D 2240: Five-second interval before reading; 60 plus or minus 10;

h. Ozone Resistance, ASTM D 1149: No cracks, 7 days - 50 pphm - 100 degrees F, 20 percent elongation;

i. Heating Aging-Accelerated, ASTM D 573: Tensile retention, 60 percent of minimum original elongation retention; 60 percent of minimum original requirement; 7 days, 240 degrees F.

j. Butyl Identification, ASTM D 471, Tricresyl Phosphate Immersion: Maximum volume swell 10 percent, 70 hrs, 212 degrees F;

k. Low Temperature Flexibility, ASTM D 746: No failure at -40 degrees F;

l. Water Absorption, ASTM D 471: +1 percent maximum. 7 days, 158 degrees F;

m. Exposure to Fungi and Bacteria in Soil, Minimum 16 Weeks: Unaffected; and

n. Water Vapor Transmission, 80 Degrees F Permeance, ASTM E 96, Procedure B or BW: 0.15 perms maximum.

**A202002 1.2.2.2 Adhesive, Cement, and Tape for Use with Butyl Rubber**

Provide as recommended by the butyl rubber waterproofing membrane manufacturer.

**A202002 1.2.3 Composite, Self-Adhering Membrane Sheeting**

Cold applied composite sheet consisting of rubberized asphalt and cross laminated, high-density polyethylene film. Not less than 60 mils minimum thickness is required.

**A202002 1.2.3.1 Composite, Self-Adhering Sheeting Performance Requirements**

a. Tensile Strength, ASTM D 412, Die C: 250 psi minimum;

b. Ultimate Elongation, ASTM D 412, Die C: 200 percent minimum;

c. Water Vapor Transmission, ASTM E 96 80 Degrees F Permeance, Procedure B: 0.1 perm maximum;

d. Pliability Degrees F, ASTM D 146: (180 Degrees Bend Over One Inch Mandrel): No cracks at minus -25 degrees F;

e. Cycling Over Crack at Minus 15 Degrees F: Membrane is applied and rolled across two primed concrete blocks with no separation between blocks. Crack opened and closed from zero to 1/4 inch. No effect at 100 cycles;

f. Puncture Resistance, ASTM E 154: 40 lb. minimum;

g. Lap Adhesion at Minimum Application Temperature, ASTM D1876 Modified, 5 lbs/in.(880 N/m);

h. Peel Strength, ASTM D 903: Modified, 9 lbs/in;

i. Resistance to Hydrostatic Head, ASTM D 5385: 231 ft of water

j. Water Absorption, ASTM D 570; 0.1% maximum.

**A202002 1.2.3.2 Primer**

Asphalt composition, ASTM D 41, or synthetic polymer in solvent as recommended by the membrane manufacturer.

**A202002 1.2.3.3 Mastic**

Polymer modified asphalt in suitable solvent of trowel-grade consistency and as recommended by the membrane manufacturer.

**A202002 1.2.4 Protection Board**

Three-dimensional, high impact resistant polymeric grid with woven monofilament drainage fabric bonded to the grid.

**A202003 BASEMENT WALL INSULATION**

**A202003 1.1 BLOCK OR BOARD INSULATION**

Provide only thermal insulating materials recommended by manufacturer for the indicated application. Provide one of the board or block thermal insulations listed below conforming to the following standards:

a. Cellular Glass: ASTM C 552

b. Extruded Preformed Cellular Polystyrene: ASTM C 578

c. Unfaced Preformed Rigid Polyurethane and Polyisocyanurate Board: ASTM C 591

d. Faced Rigid Cellular Polyisocyanurate and Polyurethane Insulation: ASTM C 1289

e. Type I Aluminum Foil on both major surfaces. Class 1 - Non-reinforced core foam.

**A202003 1.2 BLANKET INSULATION**

ASTM C 665, Type I, blankets without membrane coverings; with a thermal resistance value, which will be sufficient to meet the applicable building code and energy budget for the facility. The insulation material must not contain asbestos materials.

**A202003 1.2.1 Recycled Materials**

Provide Thermal Insulation containing recycled materials to the extent practicable, provided the material meets all other requirements of this section. The minimum required recycled materials content by weight are:

Rock Wool: 75 percent slag

Fiberglass: 20 to 25 percent glass cullet

**A202004 INTERIOR SKIN**

Comply with Section C30, *Interior Finishes*.

-- End of Section --