

SAMPLE

TECHNICAL REQUIREMENTS TABLE OF CONTENTS

SECTION A10 – FOUNDATIONS	
SECTION A20 – BASEMENT CONSTRUCTION	NOT USED
SECTION B10 – SUPERSTRUCTURE	
SECTION B20 – EXTERIOR ENCLOSURE	
SECTION B30 – ROOFING	
SECTION C10 – INTERIOR CONSTRUCTION	
SECTION C20 – STAIRS	NOT USED
SECTION C30 – INTERIOR FINISHES	
SECTION D10 – CONVEYING	NOT USED
SECTION D20 – PLUMBING	
SECTION D30 – HVAC	
SECTION D40 – FIRE PROTECTION	
SECTION D50 – ELECTRICAL	
SECTION E10 – EQUIPMENT	
SECTION E20 – FURNISHING	NOT USED
SECTION F10 – SPECIAL CONSTRUCTION	NOT USED
SECTION F20 – SELCTIVE BUILDING DEMOLITION	
SECTION G10 – SITE PREPARATION	
SECTION G20 – SITE IMPROVEMENTS	
SECTION G30 – SITE CIVIL UTILITIES	
SECTION G40 – SITE ELECTRICAL UTILITIES	
SECTION Z10 – GENERAL PERFORMANCE TECHNICAL SPECIFICATION	

SECTION A10

FOUNDATIONS

A10 GENERAL

A10 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. The general requirements of this PTS section are located in PTS Section Z10, General Performance Technical Specification.

A10 1.2 GENERAL REQUIREMENTS

A10 1.2.1 Geotechnical Report

A10 1.2.1.1 Geotechnical Engineer

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

A10 1.2.1.2 Subsurface Soils Information

The Contractor shall perform, at his expense, a subsurface exploration, investigation, testing, and an Engineering analysis and Evaluation of the project site for the design and construction of the foundation system.

All work by the Geotechnical Engineer at the project location, shall be coordinated with the Contracting Officer and shall not interfere with normal base operations. A minimum of two weeks prior to the Foundation Work Design submittal provide a Contractor Geotechnical Report (an Adobe Acrobat PDF version on CD and two printed copies) for review and record keeping purposes. The report shall become the property of the Government. Geotechnical reports generated during construction, such as pile driving results and analysis, shall be provided to the Contracting Officer (an Adobe Acrobat PDF version on CD and two printed copies) for record keeping purposes.

A10 1.2.1.3 Geotechnical Report

Submit a written Geotechnical report based upon subsurface investigation, field and laboratory testing accomplished at the discretion of the Geotechnical Engineer. The Geotechnical Report shall include the following:

- a. The project site description, vicinity map and site map indicating the location of borings and any other sampling locations.
- b. Results of all the field and laboratory testing. Address existing subsurface conditions all underground construction including utility installation and all other site specific requirements.

- c. Engineering analysis, discussion and recommendations.
- d. Settlement Analysis.
- e. Foundation selection and construction considerations (shallow, deep, special); dimensions, and installation procedures.
- f. Bearing Capacity Analysis.
- g. Determine vertical and lateral load resisting capacity for the recommended foundation systems.
- h. Estimate pile lengths, tip elevation to obtain capacity of pile. Discuss required pile spacing to obtain capacity.
- i. Site preparation (earthwork procedures and equipment), compaction requirements, building slab preparation (as applicable), soil sensitivity to weather and equipment, and groundwater influence on construction, mitigation of expansive soils or liquefaction potential, dewatering requirements and other necessary instructions.
- j. Sheet piling and shoring considerations, as applicable.
- k. Pavement design parameters, actual or assumed, including recommended thicknesses and materials, are for design or for proposed modifications to the RFP provided pavement design only.
- l. Haul routes and stockpile locations for earthwork, as applicable.
- m. Calculations to support conclusions and recommendations.
- n. Recommendations shall be presented on a structure-by-structure basis.

The Geotechnical Report shall be signed by the Geotechnical Engineer.

The submitted report shall be accomplished 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.

A10 1.2.1.4 Geotechnical Site Data required in Design Drawings

The Geotechnical Engineer's final design drawings shall include any borings and laboratory test result data performed by the Geotechnical Engineer. The data provided shall also include:

- a. Logs of Borings and related summary of laboratory test results and groundwater observations. Provide 24 HR groundwater observations for at least 20 percent of borings, minimum one boring. Provide notes explaining any abbreviation or symbols used and describing any special site preparation requirements.
- b. The locations of all borings shall be indicated on the drawings. The applicable design drawings shall be revised to reference the Geotechnical Report as being a basis for design.

A10 1.2.2 Pile Driver Analyzer (PDA)

If deemed necessary by the geotechnical engineer, the dynamic wave equation method of analysis, pile driver analyzer, shall be used to validate pile and pile hammer compatibility, establish pile driving criteria, establish terminal penetration resistance, or verify as-driven capacity of the pile. The PDA shall be required for piles with required allowable design capacity equal to or greater than 40 tons.

A10 1.2.4 Foundations

Foundations are elements responsible for transferring dead loads, live loads and lateral loads of the completed building to the earth in such a way that the building is supported evenly and without movement. Where a substructure is integral with another element group, meet requirements of both element groups.

Provide designed foundation members as required by code and the Geotechnical Report to support the dead loads, live loads and lateral loads. The finished floor elevation shall be approximately 0.25 FT above finished grade or exterior pavement that extends around the building. See section "Standard Foundations" below for specific foundation information.

A10 1.2.4.1 Dead Loads

Accommodate loads from weights of building materials, construction itself and all fixed equipment.

A10 1.2.4.2 Live Loads

Accommodate loads from use of occupancy of the building, either uniformly distributed loads as prescribed by code and this RFP, roof snow loads or concentrated loads, whichever is more demanding.

A10 1.2.4.3 Lateral Loads

Wind and Seismic loads in accordance with requirements of PTS Section Z10, General Performance Technical Specification.

A10 1.2.4.4 Resistance to Lateral Loads

Foundation resistance to lateral loads shall be based off the recommendations of the Geotechnical Report.

A10 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory construction and system performance shall be via Performance Verification Testing, as detailed in this section of the RFP.

A10 1.3.1 Earthwork

Perform quality assurance for earthwork in accordance with IBC Chapter 17. If a registered Professional Engineer is required to provide inspection of excavations and soil/groundwater conditions throughout construction, the Engineer shall 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, shall update the excavation, sheeting, and shoring plans as construction progresses to reflect actual site conditions and shall 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 shall be available to meet with the Contracting Officer at any time throughout the contract duration.

A10 1.3.2 Piles

If piles are required, perform quality assurance for pile construction in accordance with Building Codes. Pile installation procedures and installed piles shall be inspected and found to be in compliance with these codes prior to acceptance of the work.

Install test piles as directed by the geotechnical/structural engineer. Pile load tests, if required, shall be performed in accordance with Building Codes and ASTM's, and shall be provided on a unit-price basis. Provide separate unit prices for compression pile load tests and tension pile load tests. Test pile installation procedures shall be directed by the geotechnical/structural engineer. Results of the pile test program and final pile installation criteria shall be submitted to the Contracting Officer prior to installation of the production piles. If deemed necessary by the Geotechnical Engineer, the dynamic wave equation method of analysis, pile driver analyzer, shall be used to validate pile and pile hammer compatibility, establish pile driving criteria, establish terminal penetration resistance, or verify as-driven capacity of the pile. The PDA or static pile load test (ASTM D 1143) shall be required for piles with an allowable design capacity equal to or greater than 40 tons. When required, perform PDA on all indicator or test piles. Perform CAPWAP analysis on at least one test (indicator) pile to determine capacity with a minimum three day set-up and develop pile installation criteria.

A10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with Part 2 of the RFP for the following:

Geotechnical report.

Controlled fill or backfill material tests.

Test pile and production pile installation records.

Pile load testing reports.

A1010 STANDARD FOUNDATIONS

A1010 1.1 SHEETING AND SHORING

Provide sheeting and shoring in accordance with OSHA 1926 Subpart P. Sheeting and shoring plans shall be signed by the Geotechnical Engineer/Structural Engineer.

A1010 1.2 TERMITE CONTROL

A1010 1.2.1 Termite Control Barrier System

Formulate and apply termiticide in accordance with the manufacturer's label directions. The termiticide label shall bear evidence of registration by the U.S. Environmental Protection Agency or appropriate requirements of the host country.

Apply termiticide to the soil that will be covered by or lie immediately adjacent to the building(s) and structure(s), providing a protective barrier against subterranean termites.

Applicator(s) shall be licensed or certified by the Federal government or the state or the host country, as applicable.

A1010 1.2.2 Warranty

Furnish a 3 year written warranty against infestations or reinfestation by subterranean termites of the buildings or building additions constructed under this contract. Perform annual inspections of the building(s) or building addition(s). If live subterranean termite infestation or subterranean termite damage is discovered during the warranty period, and building conditions have not been altered in the interim, the Contractor shall:

- a. Perform treatment as necessary for elimination of subterranean termite infestation;
- b. Repair damage caused by termite infestation;
- c. Reinspect the building approximately 180 calendar days after the repair.

A1010 1.2.3 Visual Inspection Guide

To maintain resistance to termites, complete the system and do not disturb, penetrate or damage during the remaining contract time period. Provide Manufacturer's Guidance for performing a visual assessment of the installed system to ensure the system provides the designed termite physical barrier.

A101001 WALL FOUNDATIONS

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

A101002 COLUMN FOUNDATIONS AND PILE CAPS

Provide column foundations or pile caps and grade beams as required in accordance with the requirements of this section and other portions of this RFP.

A1020 SPECIAL FOUNDATIONS

A102001 PILE FOUNDATIONS

Where piles are required, design, install, and test piles in accordance with IBC, except as noted otherwise. Provide piles in accordance with the requirements of the Geotechnical Engineer, and the following paragraphs.

A102001 1.1 DRIVING EQUIPMENT

Install piles to the required tip elevation or capacity with the appropriate equipment as recommended by the Geotechnical Engineer. Pile hammer shall be of sufficient weight and energy to suitably install piles without damage.

Drive production piles with the same hammer, cap block, and cushion materials, and using the same operating conditions as test piles, including pre-augering and spudding.

Pile driving equipment shall match the equipment assumptions on which the pile driving formulae used to determine blow counts are based.

A102001 1.2 INSTALLATION TOLERANCES

Locate pile butts not more than four horizontal inches from the location indicated at cutoff elevation. Manipulation of the piles is not permitted. In addition to the stated tolerances, the clear distance between the heads of piles and the edges of pile caps shall be a minimum of five inches.

A variation of not more than 2 percent from the vertical for plumb piles, or not more than 4 percent from the required angle for batter piles will be permitted.

A102001 1.3 MISLOCATED AND DAMAGED PILES

Remove and replace with new piles those piles that are damaged, mislocated, or installed out of alignment tolerance or provide additional piles, installed as directed by the Geotechnical Engineer/Structural Engineer and approved by the Contracting Officer, at no additional cost to the Government.

A102001 1.4 PILE SPACING

For cast-in-place concrete or augercast piles, provide adequate distance, as determined by the Geotechnical Engineer, between freshly placed concrete and other pile installation operations to avoid damage to concrete.

A102001 1.5 COATED PILES

Handle treated or coated piles so as to protect the treatment or the coating. Repair damage or defects to treatment or coating.

A102002 CAISSONS

If required, provide caissons as required in accordance with the requirements of this section and other portions of this RFP.

A102003 DEWATERING

Dewater site for foundation construction as required by soil conditions and local subsurface and surface water, including rainfall, and considering any potential adverse impact on adjacent facilities, including settlement. Dewatering requirements and methods shall be established by the Geotechnical Engineer, based on his subsurface exploration and investigation.

A102004 RAFT FOUNDATIONS

If required, provide a raft foundation as required to achieve the requirements of this section and other portions of this RFP and as required by the Geotechnical Engineer.

A102005 PRESSURE INJECTED GROUTING

If required, pressure inject grout as required in accordance with the requirements of this section and other portions of this RFP.

A1030 SLAB ON GRADE

A103001 STANDARD SLAB ON GRADE

If allowed by site conditions and recommended by the Geotechnical Engineer, provide standard concrete slab on grade to meet the required loading requirement in accordance with the requirements of this section and other portions of this RFP.

Floor slab on grade shall be designed and constructed so that any settlement of the floor slab shall not result, nor vertical misalignment of the floor with other building components (such as doorways and trenches), building utilities or with pile-supported building elements. If these above conditions cannot be met, provide a pile supported slab. For slabs-on-grade where moisture sensitive floor coverings are planned or where a damp condition is otherwise undesirable, a 10-mil minimum vapor retarder should be placed beneath the supportive aggregate base layer. The thickness of the aggregate base layer shall be per the Contractor-provided Geotechnical Report.

A103003 TRENCHES

Trenches shall be constructed of reinforced concrete with water proof joints and seals to prevent ground water infiltration.

A103004 PITS AND BASES

Pits and bases shall be constructed of reinforced concrete with water proof joints and seals to prevent ground water infiltration.

A103005 FOUNDATION DRAINAGE

A103005 1.1 PERIMETER FOUNDATION DRAINAGE

Perimeter drainage system shall be provided to remove water away from the foundation of the facility and to be deposited in the storm sewerage system off the site. Pipe for the foundation drainage system shall be of the type specified, shall be perforated, and shall be of a size sufficient

to remove water from the foundation successfully. Provide one, or a combination of more than one, of the following types of pipe:

- a. Corrugated Polyethylene (PE) Drainage Pipe: ASTM F 405, heavy duty, for pipe 3 to 6 inches in diameter inclusive; ASTM F 667 for pipe 8 to 24 inches in diameter. Fittings shall be manufacturer's standard type and shall conform to the indicated specification.
- b. Acrylonitrile-Butadiene-Styrene (ABS) Pipe: ASTM D 2751, with a maximum SDR of 35.
- c. Polyvinyl Chloride (PVC) Pipe: ASTM F 758, Type PS 46, ASTM D 3034, or ASTM F 949 with a minimum pipe stiffness of 46 psi.

Installation shall include wrapping the pipe with filter fabric sock and careful bedding of the pipe with appropriate fill material to ensure that the pipe does not become filled with the bedding material.

A103090 OTHER

A103090 1.1 BLOCK OR BOARD PERIMETER INSULATION

Provide only thermal insulating materials recommended by manufacturer for perimeter insulation. 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

The thickness of insulation and thermal resistance value shall be sufficient to meet the applicable building code and energy budget for the facility.

-- End of Section --

SECTION B10

SUPERSTRUCTURE

B10 GENERAL

Provide the design and installation in accordance with this Performance Technical Specification (PTS), IBC 2006, IRC 2006 and ASCE7. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

B10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory construction and system performance shall be via Performance Verification Testing, as detailed in this section of the RFP.

B1010 FLOOR CONSTRUCTION

Floor construction shall be concrete slab on grade except for the mezzanine storage area above the Office Area. This shall be 3/4" exterior grade T&G plywood sheathing. Where the elements also function as elements defined within another element group, the elements must meet the requirements of both groups.

Fire Resistance- Design and select materials to provide fire resistance in accordance with the codes.

Design and select members to support all loads in accordance with the code. If a design method is not specifically prescribed by the code for special components, design in accordance with ASCE 7.

All wood materials shall be kiln-dried lumber complying with DOC PS 20. Installation shall be in accordance with AF&PA T11. System shall use preservative pressure treated lumber at all exposed lumber, sill plates and other members in contact with concrete.

Wood sections shall be as follows: Southern Pine, SPIB; Douglas-Fir, NLGA, WCLIB, or WWPA; or Spruce-Pine-Fir, NELMA, NLGA, WCLIB, or WWPA. The minimum following grade shall be used: Studs and blocking- stud, floor joists- No.2, Floor Beams-No. 2, Columns and Posts- Stud, Header and Ledgers- No.2.

Laminar Veneer Lumber (LVL) shall meet the minimum following grades: Flexural bending stress- 2850 psi, Modulus of elasticity-1800 ksi, shear stress perp (Fv) - 250 psi, Compression stress perp (Fc) - 450 psi.

Floor deflection shall meet the requirements of IBC 2006, table 1604.3. Lintel deflections shall be limited to 1/360 of the span.

See Section C1010 for Load-Bearing Cold Formed Metal Framing.

B101001 STRUCTURAL FRAME

The structural frame for the mezzanine storage level shall be constructed of metal or wood framing elements with wood APA rated sheathing. The framing elements shall be sized and spaced to support the required design

loads. The floor framing elements shall be pre-engineered wood floor trusses, wood I joists, wood 2X joists or cold formed metal floor joists. The floor framing elements shall be supported by interior load bearing stud walls and steel beam framing elements along the building perimeter. The load bearing stud wall system shall consist of metal cold formed load bearing stud walls, headers, lintels, top and bottom track, metal blocking, bridging, and strap bracing.

B101002 STRUCTURAL INTERIOR WALLS

Provide structural interior walls as required in accordance with the requirements of this section and other portions of this RFP. See Section C10, Interior Construction, for additional requirements.

B101003 FLOOR DECKS

The floor deck shall be tongue and groove, APA rated plywood, Structural I, C-C grade, exposure 1 durability classification, span rating sized to support the design loads based on the floor joist spacing and lateral loads with 48/24 or greater. If required, provide floor decks as required in accordance with the requirements of this section and other portions of this RFP.

B1020 ROOF CONSTRUCTION

Provide all elements forming roofs and the elements required for their support. Where elements also function as elements defined within another element group, meet the requirements of both groups.

Fire Resistance- Design and select materials to provide fire resistance in accordance with the codes.

Design and select members to support all loads without damage due to the loads in accordance with the code. If a design method is not specifically prescribed by the code for special components, design in accordance with ASCE 7, latest edition, and shall meet requirements of NRCA Roofing and Waterproofing Manual (Fifth Edition), and Factory Mutual (FM) performance rating.

The roof elements shall be constructed of pre-engineered metal building, standing seam metal roof, purlins and frame beams. Additional framing and purlins shall be provided to support photovoltaic panels located on the roof and the 1-ton capacity monorail hoist. The roof slope shall be 3:12 at main roof and canopies. Roof shall be continuous from ridge to eave.

B102001 STRUCTURAL FRAME

The primary structural frame elements shall be of pre-engineered metal building construction. The pre-engineered metal building shall consist of rigid frame beam and columns, x-bracing, portal frames and lean-to canopies with vertical walls and gable type roof. The x-bracing elements shall be provided in the sidewall perpendicular to the rigid frames except along the sidewall with the overhead door where a portal frame shall be used. The structural frame shall support a 1-ton monorail hoist.

The pre-engineered lean-to canopies shall consist of rigid frame beams and columns, roof purlins, diagonal roof bracing, angles, clips and standing seam metal roof panels.

B102002 STRUCTURAL INTERIOR WALLS

Provide structural interior walls to support mezzanine as required in accordance with the requirements of this section and other portions of this RFP. See Section C10, *Interior Construction*, for additional requirements.

B102003 CANOPIES

Provide two (2) attached canopies as required in accordance with the requirements of this Section and other portions of this RFP. The canopies shall consist of columns with steel framing structure as indicated under Paragraph B1020 - Roof Construction.

-- End of Section --

SECTION B20

EXTERIOR ENCLOSURE

GENERAL B20

B20 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*.

B20 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with Part 2 of the RFP for the following:

Doors
Door hardware
Windows
Glazing
Paint (GOV)

B2010 EXTERIOR WALLS

Exterior wall construction shall consist of exterior skin system of non-structural outside face elements with rain-screen back-up wall systems including; flashing (embedded and exposed), vapor barriers, and insulation systems with interior skin system materials to provide a protective finish on the inside face of exterior walls. Provide all components necessary to direct water that would leak through faulty caulk joints to the outside of wall. Provide flashing, window subsill, caulking, and water barriers around wall openings to direct any water that gets behind the outside surface of the exterior door, window or louver to the exterior of the wall.

B201001 EXTERIOR CLOSURE

B201001 1.2 METAL WALL PANEL EXTERIOR CLOSURE

B201001 1.2.1 General Wall Panel Requirements

- a. Factory Color Finish - Panels shall have factory applied, baked coating to the exterior and interior of metal wall panels and metal accessories. Exterior finish topcoat shall be of 70 percent polyvinylidene fluoride (PVDF) resin with not less than 0.8 mil dry film thickness (DFT). Exterior primer shall be standard with panel manufacturer with not less than 0.8 mil dry film thickness (DFT). Panels shall have factory applied 70 percent PVDF clear coating of 0.8 mil DFT over the color topcoat and edge coating. Field apply 70 percent PVDF clear coat to unfinished panel edges or field cut

- panels. Interior finish exposed to sun or rain shall be the same coating and DFT as the exterior coating. Interior finish shall be protected from sun or rain exposure.
- b. Wall system and attachments shall 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 shall be 1/60. Maximum deflection due to wind on steel wall panels and girts behind aluminum or steel wall panels shall be limited to 1/120 of their respective spans, except that when interior finishes are used the maximum allowable deflection shall be limited to 1/180 of their respective spans. The structural performance test methods and requirements of the wall system and attachments shall be in accordance with ASTM E 1592.
 - c. Conformations - Non-insulated steel or aluminum wall panels shall have configurations for overlapping adjacent sheets or interlocking ribs for securing adjacent sheets and shall be fastened to framework using exposed or concealed fasteners, as specified. Length of sheets shall be sufficient to cover the entire height of any unbroken wall surface when the length of run is 30 feet (9 meters) or less. Design provisions shall be made for expansion and contraction. Where required, provide series 305 stainless steel fasteners factory finished to match panels.
 - d. Shape - Standard V-beam or boxed beam type having 5 to 8 inch (125 mm to 200 mm) pitch for steel panels or 4 to 8 inch (100 mm to 200 mm) pitch for aluminum panels, and 1.5 inch (38 mm) overall depth, exclusive of coating. Other shapes may be considered if approved by the DOR.

B201001 1.2.2 Steel Wall Panels

- a. 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 shall 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.
- b. Gage - Minimum 22 U.S. Standard Gage for wall panels, but in no case lighter than required to meet maximum deflection requirements specified.

B201001 1.2.3 Aluminum Wall Panels

- a. Material and Coating - Form sheets of Alloy 3004 or Alclad 3004 conforming to ASTM B 209 having proper temper to suit respective forming operations.
- b. Thickness - Minimum 0.032 inch (0.81 mm) nominal, but in no case thinner than that required to meet maximum deflection requirements specified.

B201003 INSULATION & VAPOR RETARDER

Insulation and Vapor Retarders in or on Exterior Enclosure shall include: insulation, sheet or continuous film materials installed separately in or on wall assemblies to provide resistance to heat loss/gain, and vapor penetration.

B201003 1.1 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.

B201003 1.1.3 Polyethylene sheeting

ASTM 4397, minimum 6 mil thickness. Provide typically on the interior face of insulation.

B201003 1.3 INSULATION SYSTEMS

Mineral-fiber blanket insulation conforming to ASTM C 665 shall be provided. Wall insulating product shall have a minimum R-value to meet the code and the energy design of the facility.

B201005 EXTERIOR LOUVERS & SCREENS

Provide louvers, which are not an integral part of the mechanical equipment.

Louvers shall be selected in a color and design that is compatible with the fabric of the exterior architectural character as described below. For frame construction, install in accordance with ASTM E 2112.

B201005 1.1 WALL LOUVERS

Wall louvers shall be drainable blade type louver with blade slopes of 45 degrees minimum, but provide wind driven rain rated louvers for wall louvered rooms without a floor drain within the room. Louvers shall be made to withstand a wind load of not less than 30 psf (146 Kg/m²), .08 inch (2 mm) thick 6063-T5 or T52 extruded aluminum in a factory-finished color in accordance with AAMA 2605 with a minimum coating thickness of 1.2 mil to match the building facade. Wall louvers shall bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500 , 500L (wind driven rain), and AMCA 511. Provide sill flashing with sloped drain pan at base of louver to collect moisture that migrates down the interior face of the louver. This sill flashing shall drain water to the outside of the building. Louvers shall have bird screens.

B201007 EXTERIOR SOFFITS

Exterior soffit system assemblies shall include trim and necessary accessories including high performance coatings, if required. Installation shall be crisp, fit and trim with tight joinery to back-up framing. Soffits shall be designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching through panels to galvanized, non-load bearing framing conforming to ASTM A 653 (G60) and ASTM C 645,

using concealed fasteners. Provide trim accessories of the same material and finish as the soffit material where soffit abuts other materials.

Use adequate backing material to assure snug joints and even face planes. Provide sealed soffits to maintain the integrity of the air barrier and insulating envelope.

B201007 1.1 METAL SOFFIT PANELS

Metal soffit panels shall be painted aluminum. Metal soffit panels shall be factory-formed and factory-finished. Use factory-applied sealant in side laps.

B201008 WALL FLASHING

Flashing shall be aluminum. Aluminum shall conform to ASTM B 209/B 209M, 0.040 inches (1.27 mm) thick and shall be coated to match the item flashed.

B201009 EXTERIOR PAINTING AND SPECIAL COATINGS

B201009 1.1 GENERAL REQUIREMENTS

Painting practices shall 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 shall be in accordance with the Master Painter 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. The Contractor may choose to use a more current MPI "Approved Product List"; however, only one list may be used for the entire contract. All coats on a particular substrate, or a paint system, must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

MPI paint systems identified in the RFP take precedence over other MPI systems listed in the MPI literature. If the RFP does not identify a paint system applicable to all painting of the facility, utilize MPI tested systems listed in the MPI Architectural Painting, Exterior System manual to identify appropriate paint coatings. Utilize the "Detailed Performance Premium Grade" systems and comply with all limitations stated in the MPI "Approved Products List" for each system.

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

B201009 1.1.1 MPI Gloss Levels

Gloss levels shall comply with the MPI system of determining gloss as defined in the Evaluation sections of the MPI Manuals. Utilize the performance characteristics of the paint gloss and sheen to categorize paint rather than manufacturers' description of the product.

The MPI gloss Levels are indicated by the notation G1, G2, G3, G4, G5, G6, or G7. Use G2 "Velvet-like" flat for vertical surfaces and undersides of balconies and soffits. Use G3 "Eggshell-like" in high traffic areas for ceilings and walls, when a surface can be touched and a slightly more durable finish is desired, and for dark accent colors. Use G5 Semigloss for ceilings, walls, doors and trim for high durability and cleanability. Use G6 Gloss only in special situations such as for exterior wood and metal, piping identification, or special effects. The MPI gloss and sheen standard values are per ASTM D523, method D and are as follows:

<u>Gloss Level Number</u>	<u>Gloss@60 Degrees</u>	<u>Sheen@85 Degrees</u>
Gloss Level 1(G1) - Matte or Flat	Max.5 units	Max.10 units
Gloss Level 2(G2)- "Velvet-like" Flat	Max. 10 units	10-35 units
Gloss Level 3(G3) - "Eggshell-like"	Max. 10-25 units	10-35 units
Gloss Level 4(G4) - "Satin-like"	Max. 20-35 units	Min. 35 units
Gloss Level 5(G5) - Semi-Gloss	35-70 units	
Gloss Level 6(G6) - Gloss	70-85 units	
Gloss Level 7(G7) - High Gloss	More than 85 units	

B201009 1.1.2 MPI System Designations and Table Abbreviations

The MPI coating system number description is found in either the *MPI Architectural Painting Specification Manual* or the *Maintenance Repainting Manual* and defined as an exterior system.

- a. EXT - MPI short-term designation for an exterior coating system on a new surface.
- b. REX - the MPI short term designation for an exterior coating system used in repainting projects or over existing coating systems.
- c. DSD - the MPI short-term designation for Degree of Surface Degradation as defined in the Assessment sections in the MPI Maintenance Repainting Manual. Degree of Surface Degradation designates the MPI Standard for description and appearance of existing condition of surfaces to be painted. This DSD classification is used to determine the proper surface preparation necessary for painting.
- d. DFT - The short-term designation for dry film thickness. DFT is the minimum acceptable depth or thickness of a coating or system in the dry state. The maximum acceptable DFT is not more than 50% greater than the minimum acceptable DFT (example... DFT = 2 mils, maximum DFT = 3 mils). The DFT indicated in the paint systems below relate

to new coatings - MPI INT. MPI RIN will be less than the indicated DFT.

- e. Paint Systems Abbreviations: BF - block filler; C - clear coat; SP - spot primer; P - primer coat; I - intermediate coat; T - topcoat.

B201009 1.1.3 Surface Preparation

Comply with the "Exterior Surface Preparation" section of the *MPI Architectural Painting Specification Manual* or the Exterior Surface Preparation" section of the *MPI Maintenance Repainting Manual*. All suggestive language such as "may" or "should" are deleted from the standard and "must" or "shall" inserted in its place. Suggestive language such as "recommended" or "advisable" is deleted from the standard and "require" or "required" inserted in its place. The results of these wording substitutions change this document to required procedures. For surface preparation, determine a MPI DSD Assessment of each surface and comply with the MPI Surface Preparation Requirements relating to the assessments.

B201009 1.4 EXTERIOR METAL FINISHES

B201009 1.4.1 New Steel that has been hand or power tool cleaned to SSPC SP 2 or SP 3:

- a. Alkyd, System DFT: 5.25 mils

- 1. MPI EXT 5.1Q-G5 (Semigloss)/REX 5.1D-G5; P:MPI 23, I:MPI 94, T:MPI 94

B201009 1.4.2 New Steel that has been blast cleaned to SSPC SP 6:

- a. Alkyd, System DFT: 5.25 mils

- 1. MPI EXT/ REX 5.1D-G5 (Semigloss); P:MPI 79, I:MPI 94, T:MPI 94

B201009 1.4.3 New and existing steel that has been blast cleaned to SSPC SP 10:

- a. Waterborne Light Industrial, System DFT: 8.5 mils

- 1. MPI EXT 5.1R-G5 (Semigloss); P:MPI 101, I:MPI 108, T:MPI 163

B201009 1.4.4 New Galvanized surfaces:

- a. Epoxy P/Waterborne Light Industrial, System DFT: 4.5 mils

- 1. MPI EXT 5.3K-G5 (Semigloss); C:MPI 25, P:MPI 101, I:MPI 161, T:MPI 161

B201010 EXTERIOR JOINT SEALANT

Sealant joint design, priming, tooling, masking, cleaning and application shall be in accordance with the general requirements of *Sealants: A Professionals' Guide* from the Sealant, Waterproofing & Restoration Institute (SWRI). All sealant shall conform to ASTM C 920.

Joints shall include proper backing material for sealant support during application, control of sealant depth, and to act as a bond breaker. Use filler boards, backer rods and bond breaker tapes. Provide priming unless specifically not recommended by the sealant manufacturer. Applied sealant shall be tooled. Tooling shall not compact sealant too less than the minimum sealant thickness required. Mask adjacent surfaces to control sealant boundaries during sealant application.

B2020 EXTERIOR WINDOWS

Standard windows shall be in compliance with ANSI/AAMA/WDMA 101, SWI SWS, and the design criteria of ASCE 7 for glazed windows to meet the Building Code.

If required, provide windows that meet the requirements of AAMA/WDMA 101/I.S.2. Utilize windows that comply with AAMA designation HC-40 (60 psf - 293 Kg/m²) for windows. Determine the wind pressure on the building by converting the ASCE-7 basic wind speed to wind pressure and find the corresponding structural test pressure in the AAMA specific requirements or optional performance tables. If the window wind pressure exceeds 60 psf (293 Kg/m²) or exceeds 90 psf (439 Kg/m²), utilize a higher AAMA designated window complying with the calculated wind pressure.

Comply with ASTM E 2112 and with flashing and weather-resistive barrier manufacturers' recommendations to install windows in metal building framed wall construction. Provide anchors in accordance with OSHA standard 29 CFR Section 1910.66.

Windows shall be provided with sills on the exterior and stools on the interior of the opening. Sills shall be special shape formed aluminum. Positively slope sills away from windows. Window stools shall be solid polymer.

B202001 WINDOWS

Exterior windows shall 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 and non-corroding framed metal screens for operable sash. Provide jamb support for larger windows where recommended by manufacturer. Metal windows with insulating glass shall have thermally broken frames and sash.

Provide glazing in exterior windows in accordance with section B202004 EXTERIOR GLAZING.

B202001 1.1 STANDARD WINDOW SYSTEMS

B202001 1.1.2 Aluminum Windows

Conform to ANSI/AAMA/WDMA 101. Factory finish aluminum windows and provide with aluminum frame screens with aluminum mesh at operable sash, hardware and locks, and tinted glazing. Aluminum screens shall comply with ANSI/SMA 1004.

Exposed aluminum surfaces shall be factory finished with an AA 45 anodic coating or an AAMA organic coating. Provide a minimum of architectural Class I anodized coating or a high-performance organic

coating conforming to AAMA 2605. AAMA coatings shall have a total dry film thickness of 1.2 mils.

B202004 1.1 GLASS

B202004 1.1.1 Clear Glass

Type I, Class 1 (clear), Quality q4 (A).

B202004 1.1.5 Insulating Glass Units

Insulating glass units shall have 1/2 inch (13 mm) airspace. Provide low emissivity coating. The inner light shall be one of the following:

- a. Typically ASTM C 1036, Type I, Class 1, Quality q4, minimum 1/4 inch (6 mm) thick;
- b. ASTM C 1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 1 (transparent), Quality q4, minimum 1/4 inch (6 mm) thick when required by 16 CFR 1201 or possible glazing impact is anticipated;

The outer light shall be one of the following:

- a. Typically ASTM C 1036, Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick;
- b. ASTM C 1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 2 (tinted heat absorbing or reflective), Quality q4, minimum 1/4 inch (6 mm) thick when required by 16 CFR 1201 or possible glazing impact is anticipated.

B202004 1.1.6 Tempered Glass

ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (transparent) or 2 (tinted heat absorbing, Quality q3, 1/4 inch (6 mm) thick.

B2030 EXTERIOR DOORS

Exterior doors shall be heavy duty insulated steel doors and frames for service access. Door frames shall be welded. Corner knockdown door frames are not permitted.

Use heavy-duty overhead holder and closer to protect doors from wind damage. Provide kick plates on the inside face of all exterior doors.

Weather-protect all exterior doors and related construction with low infiltration weather-stripping and sealants. Provide threshold with offset to stop water penetration while maintaining accessibility compliance.

Conform to the design criteria of ASCE 7.

See section B203008, EXTERIOR DOOR HARDWARE, for door hardware requirements. For all installations, provide a recessed key box (Knox Box) approximately 7 inches x 7 inches (175 mm x 175 mm) with 4-3/4 inches (120 mm) solid steel door at primary exterior entry for storage of keys and access cards accessible by the fire department.

B203001 SOLID DOORS

B203001 1.1 STEEL DOORS

Hardware preparation shall be in accordance with ANSI A250.6. Doors shall be hung in accordance with ANSI A115.16.

B203001 1.1.1 Steel Doors

Steel doors shall be ANSI A250.8, Level 4, exterior, main entry doors, with a physical performance level of, Model 1 or 2.

Doors may be specified to be insulated. Door selection shall be specified in the project program according to the following:

- a. Heavy Duty Doors - physical performance Level B, Model 1

B203001 1.1.3 Insulation Cores

Insulated cores shall be of type specified, and provide an apparent U-factor of .48 in accordance with SDI 113 and shall conform to:

- a. Rigid Polyurethane Foam: ASTM C591, Type 1 or 2, foamed-in-place or in board form, with oxygen index of not less than 22 percent when tested in accordance with ASTM D2863; or
- b. Rigid Polystyrene Foam Board: ASTM C578, Type I or II; or
- c. Mineral board: ASTM C612, Type I.

B203001 1.1.4 Accessories

- a. Astragals: For pairs of exterior steel doors that will not have aluminum astragals or removable mullions, provide overlapping steel astragals with the doors.
- b. Moldings: Provide moldings around glass of exterior doors and louvers. Provide non-removable moldings on outside of exterior doors. Secure inside moldings to stationary moldings, or provide snap-on moldings. Muntins shall interlock at intersections and shall be fitted and welded to stationary moldings.

B203001 1.1.5 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 shall be set in accordance with ASTM A250.11.

B203001 1.1.6 Anchors

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.

B203001 1.1.7 Finishes

- a. Exterior Doors, Factory-Primed and Field Painted Finish - Doors and frames shall be factory primed with a rust inhibitive coating as specified in ANSI A250.8. Factory prime doors on six sides of the

door. Manufacturer's primer and field painting shall be compatible with finish system in the paragraph "EXTERIOR PAINTING AND SPECIAL COATINGS".

B203004 OVERHEAD DOORS

Large exterior overhead and roll-up doors system shall consist of automatic exterior doors and door assemblies. Do not use roll-up doors on exterior walls of conditioned spaces.

B203004 1.2 SECTIONAL OVERHEAD DOORS

Sectional overhead doors shall conform to NAGDM 102, Commercial door standards. Metal door shall be horizontal sections hinged together which operate in a system of tracks to completely close the door opening in the closed position and make the full width and height of the door opening available for use in the open position. Door shall be of the standard lift type designed to slide up and back into a horizontal overhead position and requiring a maximum of 16 inches (400 mm) of headroom for 2 inch (50 mm) tracks and 21 inches (525 mm) of headroom for 3 inch (75 mm) tracks, unless a low headroom type is required due to limited headroom. The door is electrically operated, pushbuttons shall 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 shall be readily adjustable.

The door shall be capable of withstanding the design wind loading of ASCE 7. The door shall remain operable and undamaged after conclusion of tests conducted in accordance with ASTM E 330 using the design wind load. Form door sections of hot-dipped galvanized steel not lighter than 16 gage with flush surface without ribs or grooves. Sections shall be not less than 2 inches (50 mm) in thickness. Insulate door sections with fibrous glass or plastic foam to provide a "U" factor of 0.14 or less when tested in accordance with ASTM C 236. Cover interior of door sections with steel sheets of not lighter than 24 gage to completely enclose the insulating material. Provide galvanized steel tracks not lighter than 14 gage for 2 inch (50 mm) tracks and not lighter than 12 gage for 3 inch (75 mm) track. The door shall have vision lites on one panel at a minimum of 6 FT-0 IN AFF.

B203008 EXTERIOR DOOR HARDWARE

Provide door hardware of one manufacturer's make to match existing in the park. All hardware shall be clearly and permanently marked by the manufacturer where it will be visible after installation.

B203008 1.1 HINGES

BHMA A156.1, size to match door size, but in no case less than 4-1/2 x 4-1/2 inches (114 mm x 114 mm), with non-removable pin and anti-friction bearing hinges. Use two hinges for doors 60 inches (1500 mm) or less in height and one additional hinge for each additional 30 inches (750 mm), or fraction thereof, in door height.

B203008 1.3 LOCKS AND LATCHES

Commercial buildings locks and latches shall be BHMA A 156.13, Series 1000, Operational Grade 1, Security Grade 2 for exterior building

entrances and other high-use doors not requiring exit devices. Use BHMA A 156.2, Series 4000, Grade 1 for all Commercial buildings locks and latches not using Series 1000 hardware.

B203008 1.5 EXIT DEVICES

BHMA A 156.3, Grade 1. Provide on shop door to exterior.

B203008 1.7 CYLINDERS AND CORES

If required, provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores shall have seven pin tumblers. Cylinders shall be products of one manufacturer, and cores shall be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets shall have interchangeable cores, which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

B203008 1.8 KEYING SYSTEM

Keying system shall be a master key system for the facility. The keying system shall be an extension of the existing keying system for additions to existing facilities. The keying system shall allow for construction interchangeable cores when subcontractors require keys during construction.

The Contractor shall coordinate a keying system meeting. The Contractor's Project Manager, Superintendent, Hardware Subcontractor, Contracting Officer shall attend this meeting to establish the keying system for the project. This meeting is intended to identify base limitations, the necessary security, and access control within the facility. The meeting shall produce a marked up copy of the floor plan indicating the doors to receive locks and the doors to be keyed together, and any master keying.

B203008 1.9 KEYS

Furnish one file key, one duplicate key and one working key for each key exchange and for each master.

B203008 1.10 LOCK TRIM

Cast, forged or heavy wrought construction and commercial plain in design.

B203008 1.10.1 Knobs and Roses

Knobs and roses shall meet test requirements of BHMA A 156.2 and BHMA A 156.13.

B203008 1.10.2 Lever Handles

Provide lever handles in lieu of knobs as required by ABAAS. Lever handles shall meet the test requirements of ANSI/BHMA A156.13 for mortise locks. All lever handles (mortise or cylinder) shall be the freewheeling type.

B203008 1.11 DOOR BOLTS

BHMA A 156.16, Grade 1. Provide two flush bolts for each inactive leaf of a pair of doors.

B203008 1.12 CLOSERS

BHMA A 156.4, Series C02000, Grade 1, with PT 4C, full size case. Provide closers for all exterior doors.

B203008 1.13 OVERHEAD HOLDERS

BHMA A 156.8, Grade 1. Provide for exterior doors.

B203008 1.14 DOOR PROTECTION PLATES

Kick plates shall conform to BHMA A 156.6. Provide kick plates on all doors with closers. Provide armor plates on all doors to receive cart traffic.

B203008 1.15 DOOR STOPS AND SILENCERS

BHMA A 156.16. Provide silencers, Type L03011, three per single door and four per double door, for doors in hollow metal frames.

B203008 1.16 THRESHOLDS

BHMA A 156.21. Provide thresholds with offset to stop water infiltration, while maintaining accessibility requirements.

B203008 1.17 WEATHERSTRIPPING

BHMA A 156.22. Air leakage of weather-stripped doors shall not exceed 1.25 CFM.

B203008 1.18 RAIN DRIPS

For all exterior doors that open to the outside, where the door swing area is not covered by an overhang, provide top and bottom rain drips complying with ANSI R3Y535 as a minimum. Greater weather sealing may be required by the geographic location of the project.

B203008 1.19 FINISHES

One of the following hardware finish systems shall be provided, and match the interior door hardware:

BHMA A156.18. Hardware shall have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except surface door closers which shall have aluminum paint finish, and except steel hinges which shall have BHMA 652 finish (satin chromium plated). Hinges for exterior doors shall be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish. Exposed parts of concealed closers shall have finish to match lock and door trim. Hardware for aluminum doors shall be finished to match the doors.

-- End of Section --

SECTION B30

ROOFING

B30 GENERAL

B30 1.1 DESIGN GUIDANCE

Provide the design and installation in accordance with the following references. The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*.

B30 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory roofing system performance shall be via Performance Verification Testing, and by field inspection as detailed in this section of the RFP.

B30 1.2.1 Pre-Roofing Conference

Prior to beginning roofing work, the Contractor shall hold a Pre-Roofing Conference with the personnel directly responsible for the roofing systems work, as well as the roofing manufacturer's technical representative.

B30 1.2.4 Quality Control Program

Contractor shall establish a quality control program to assure adherence to NRCA recommended Quality Control Guidelines for the Application of Roofing Systems and other specified application requirements.

B3010 ROOF COVERINGS

Roof coverings shall comply with the requirements of the NRCA and Factory Mutual (FM). Determine wind uplift using wind speed in accordance with ASCE-7.

B301001 ROOF SYSTEMS

B301001 1.1 STRUCTURAL METAL ROOFING SYSTEM

B301001 1.1.1 Structural Standing Seam Metal Roof (SSSMR) System

The SSSMR system covered under this specification shall include the entire roofing system; the standing seam metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with ASTM E 1592. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, exterior gutters and downspouts; eaves, ridge, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weather tight roof system.

B301001 1.1.2 Design Requirements

The design of the SSSMR system shall be provided by the Contractor as a complete system, in accordance with ASCE 7. Framing members and connections not indicated on the drawings shall be designed by the Contractor. Roof panels, components, transitions, accessories, and assemblies shall be supplied by the same roofing system manufacturer. Provide to the Contracting Officer a design analysis signed by a Registered Professional Engineer employed by the SSSMR manufacturer. The design analysis shall include a list of the design loads, and complete calculations for the support system (when provided by the Contractor), roofing system and its components; valley designs, gutter/downspout calculations, screw pullout test results, and shall indicate how expected thermal movements are accommodated.

- a. Dead Loads - The dead load shall be the weight of the SSSMR system. Collateral loads such as mechanical and electrical systems and ceilings shall not be attached to the panels.
- b. Concentrated Loads - The panels and anchor clips shall be capable of supporting a 300 pound concentrated load. The concentrated load shall be applied at the panel mid-span and will be resisted by a single standing seam metal roof panel assumed to be acting as a beam. The un-deformed shape of the panel shall be used to determine the section properties.
- c. Uniform Loads - The panels and concealed anchor clips shall be capable of supporting the minimum uniform live load specified in the project program.
- d. Roof Snow Loads - The design roof snow loads shall be shown on the contract drawings.
- e. Wind Loads - The design wind uplift pressure for the roof system shall be shown on the contract drawings. The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly. The safety factor listed below shall be applied to the design force and compared against the ultimate capacity. Prying shall be considered when figuring fastener design loads.
 - 1. Single fastener in each connection.....3.0
 - 2. Two or more fasteners in each connection...2.25
- f. Framing Members Supporting the SSSMR System - New or revised framing members and their connections shall be designed in accordance with AISC 335, AISI SG-973, or SJI Specs & Tables. Maximum deflection under applied live load, snow, or wind load shall not exceed 1/180 of the span length.
- g. Roof Panels Design - Deflections shall be based on panels being continuous across three or more supports. Deflection shall be calculated and measured along the major ribs of the panels.
 - 1. Steel panels shall be designed in accordance with AISI SG-973.

2. Aluminum panels shall be designed in accordance with AA ADM. The panel deflection from concentrated loads shall not exceed 1/180 of the span length. The panel deflection under applied live load, snow, or wind load shall not exceed 1/180 times the span length.

B301001 1.1.3 Performance Requirements

- a. The SSSMR shall be tested for wind uplift resistance in accordance with ASTM E 1592; SSSMR systems previously tested and approved may be acceptable.
- b. SSSMRS Warranty Certificate -- At the completion of the project the Contractor shall furnish signed copies of the 5-year Warranty for Structural Standing Seam Metal Roof (SSSMR) System, a sample copy of which is attached to this section, and the 20-year Manufacturer's Material Warranties, and the manufacturer's 20-year system weather-tightness warranty.

1. Contractor's Weather-tightness Warranty

The SSSMR system shall be warranted by the Contractor on a no penal sum basis for a period of five years against material and workmanship deficiencies; system deterioration caused by exposure to the elements or inadequate resistance to specified service design loads, water leaks, and wind uplift damage.

2. Manufacturer's Material Warranties

The Contractor shall furnish, in writing, the following manufacturer's material warranties which cover all SSSMR system components such as roof panels, anchor clips and fasteners, flashing, accessories, and trim, fabricated from coil material:

- a. A manufacturer's 20 year material warranty warranting that the aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel as specified herein will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed coil material.

B301001 1.1.3 Materials

Roof Panels: Prefinished Galvalume® sheet, ASTM AZ50 made of 55% aluminum, 1.6% silicon and the balance zinc as described in ASTM specification A792, 22 GA.

Panel Finish: Panels shall have a 3 coat system having a minimum of .8 mil exposed primer coat on both sides of panel with a 0.8 mil PVDF resin coat and a 0.8 mil PVDF resin clear top coat on the exterior side of the panel. Finish shall be equivalent Kynar 500 and shall meet or exceed requirements of AAMA 621-02.

Prefinished Galvalume® sheet, ASTM AZ50 made of 55% aluminum, 1.6% silicon and the balance zinc as described in ASTM specification A792. Galvalume coated steel conforming to ASTM A792, Grade 50B.

Provide AZ50 coating for painted surfaces and AZ55 coating for unpainted surfaces.

Perimeter Trim, Panel Closures, Flashing and Counterflashing: Material and factory applied finish to match roof panels.

Concealed Anchor Clips: Concealed anchor clips shall be the same as the tested roofing system.

Fasteners: 300 series stainless steel, ASTM F593. Exposed fasteners to match roof panels.

Intermediate Support System: Galvanized steel: ASTM A653, SQ, Grade 50, G90 coating.

Sealant: Manufacturer's standard.

B301001 1.1.4 Reinforced Polyethylene Sheeting

Vapor Barrier (Non-Fire Rated) shall have water vapor permeance of 0.3 maximum; tensile strength per ASTM D 882: 100lbs/2,200 psi; and puncture resistance per ASTM D 4833: 42 lbs. Material shall be equivalent to Griffolyn Vaporguard.

B301001 1.1.5 Roof Penetration Flashing

Round penetrations: Premolded EPDM boot with metal collar similar to "DEK-TITE" by Buildex.

B301001 1.1.6 Sheet Metal Flashing And Trim

Fabricate sheet metal flashing and trim of 20 oz. Copper, lead-coated copper or stainless steel to comply with SMACNA Architectural Sheet Metal Manual.

B301002 ROOF INSULATION & FILL

See Section B20 - Exterior Closure.

B301003 FLASHINGS & TRIM

B301003 1.1 FLASHING AND SHEET METAL

This paragraph covers the requirements for flashing and sheet metal work. Flashing and sheet metal shall be provided in accordance with roof manufacturer's printed installation instructions and in compliance with NRCA and SMACNA recommendations.

B301003 1.1.1 Materials

FURNISH sheet metal items in 2.44 to 3.05 meter (8 to 10 foot) lengths. Sheet metal items include the following: gutters, including hangers; downspouts; counter-flashings; gravel stops and fascias; base and eave flashings and related accessories.

- a. Steel Sheet, Zinc-Coated (Galvanized) - ASTM A 653/ A 653M.
Galvanized steel items shall have a baked-on, factory applied finish of polyvinylidene fluoride or an equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.

- b. Pre-Finished Aluminum - Provide trim, gravel stops and fascias of Pre-finished aluminum. Finish shall be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.
- c. Fasteners - Fasteners shall be of the same or compatible metal with the item being fastened. Stainless steel fasteners shall be used to fasten dissimilar materials.

B301004 GUTTERS AND DOWNSPOUTS

Provide gutters and downspouts compatible with roofing material and finish. Concealed (interior) gutters and downspouts are prohibited. The primary and secondary drainage systems shall be sized per applicable Plumbing and Building Codes. Finish shall be baked-on factory applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating with a minimum thickness of 0.8 to 1.3 mils.

-- End of Section --

SECTION C10

INTERIOR CONSTRUCTION

C10 GENERAL

C10 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*.

C10 1.1.1 Industry Standards and Codes

Sealant, Waterproofing & Restoration Institute

C10 1.2 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory interior construction assemblies' performance shall be via Performance Verification Testing, as detailed in this section of the RFP. The Contractor shall pay the cost of all testing.

C10 1.2.1 Slump and Compressive Strength Tests for Grout

Slump between 200 and 275 mm (8 and 11 inches). Provide minimum grout strength of 2000 PSI in 28 days, as tested per ASTM C 1019.

C10 1.2.3 Field Test for Sprayed Fire-Resistive Materials

A qualified testing and inspection agency shall be engaged to prepare testing and adhesion reports to test for bond strength. Bond strength shall be tested per ASTM E 736 and be found to meet the requirements in UL's *Fire Resistance Directory* for coating materials.

C1010 PARTITIONS

For general use, use 4" structural metal studs and 5/8" Gypsum Board unless shown otherwise in the Design Build Project Scope. Provide backing where doorknobs can strike a wall and anchorage points for wall mounted equipment and cabinets.

C101001 FIXED PARTITIONS

C101001 1.1 COLD-FORMED METAL FRAMING

Load-Bearing Cold-Formed Metal Framing shall be designed in accordance with ASTM C 955. Install in accordance with ASTM C 1007.

C101001 1.1.1 Studs

Galvanized steel, ASTM A 653 / A 653M, SS Grade 50, G60

C101001 1.1.2 Framing Accessories

Fabricate steel-framing accessories of the same material and finish used for framing members, with minimum yield strength of 33,000 psi (230 Mpa). Accessories include, but are not limited to, the following: bracing, bridging, blocking, web stiffeners, end and foundation clips, gusset plates, stud kickers, knee braces, girts, joist hangers, reinforcing and backer plates.

Provide permanent metal-to-metal contact separation from stud to electrical conduits, plumbing pipes, and other internal wall system components, such as electrical wires.

C101001 1.2 METAL SUPPORT ASSEMBLIES

Provide steel materials for metal support systems with galvanized coating per ASTM A 653/ A 653M, G60; aluminum coating ASTM A 463/ A 463M, T1-25; or a 55% aluminum-zinc coating ASTM A 792.

C101001 1.2.1 Wall Furring

ASTM C 645.

C101001 1.2.2 Non-load-Bearing Wall Framing / Furring

ASTM C 645, but not thinner than 0.0179 inch (0.4547 mm) thickness. Provide 0.0329 inch (0.8357 mm) minimum thickness for supporting wall hung items such as cabinetwork, equipment and fixtures and for GWB.

C101001 1.3 ROUGH CARPENTRY

Unless otherwise noted, all rough carpentry shall be concealed from view. All framing and board lumber shall be graded and marked by a recognized association or independent inspection agency. Certification of grade is acceptable in lieu of grade markings. Framing lumber such as plates, caps, bucks and nailers shall be of the minimum grade for the application in accordance with the grading rules for the local species of framing and board lumber.

C101001 1.3.1 Moisture Content

Air-dry or kiln dry lumber as follows:

Framing lumber and boards - 19% maximum

C101001 1.3.2 Fire-retardant Treatment

Comply with AWPA C20 or AWPA C27.

C101001 1.3.3 Preservative Treated Lumber

Preservative treated lumber shall be in accordance with AWPA Standards.

C101001 1.3.4 Structural Lumber

Provide a species and grade as listed in AF&PA 101 that have the following minimum allowable unit stresses: 1050 Fb, 700 Fc with 1,200,000 E (for engineered uses) but not less than required by structural calculations.

C101001 1.3.5 Plywood, Structural

PS-1, PS-2.

- a. Plywood (Concealed) - Tongue and groove APA rated, Structural I, C-C grade, exposure 1 durability classification, span rating of 48/24 or greater.

C101002 INTERIOR WINDOWS

For fixed interior windows, assemblies include frames, glazing, caulking, and other associated work. For other window types, see PTS Section B20, *Exterior Enclosure*

C101002 1.1 ALUMINUM WINDOWS

Each window unit shall be a complete factory assembled unit with or without glass installed. Fabrication of window units shall comply with AAMA 101.

- a. Fixed Windows - HC40 for commercial.

C101003 INTERIOR GLAZING

ASTM C 1036, unless specified otherwise.

Provide setting and sealing materials, stops and gaskets as recommended by the glass manufacturer.

Glazing thickness indicated in the following paragraphs is the minimum acceptable thickness. Provide thicker glazing if required by the code or the manufacturer for the given application.

C101003 1.1 GLASS

C101003 1.1.1 Clear Glass

Type I, class I (clear), quality q4 or q5 for patterned glass.

C101003 1.1.2 Laminated Glass (Shop window)

Fabricate from two pieces of Type I, Class 1, quality q3 glass laminated together with a clear, 0.030 inch (0.75 mm) thick polyvinyl butyral interlayer. Total thickness shall be nominally 1/4 inch (6.35 mm).

C101004 INTERIOR JOINT SEALANT

Sealant joint design and application shall be in accordance with the general requirements of Sealants: A Professionals' Guide from the Sealant, Waterproofing & Restoration Institute. Refer to manufacturers' recommendations for chemical resistance.

C101004 1.1 JOINT SEALANT TYPES FOR INTERIOR WORK

Sealants shall be paintable, and shall match the color of adjacent surfaces.

- a. Vertical Surfaces - ASTM C 920, Type M, Grade NS, Class 25, Use NT.

- b. Horizontal Surfaces - ASTM C 920, ASTM D 1190 for traffic surfaces, Type M, Class 25, Use T.

C1020 INTERIOR DOORS

Door hardware shall be as specified in "Interior Door Hardware" in this section.

C102001 1.1 STEEL DOORS (storage, toilet, breakroom/shop)

Hardware preparation shall be in accordance with SDI 17, ANSI/DHI A115 and ANSI/SDI 100. Doors shall be hung in accordance with ANSI/SDI 100.

C102001 1.1.1 Standard Steel Doors

ANSI A 250.8, Level 4, (high use), with a physical performance level of 'A'. Maximum door undercut shall not exceed 3/4 inch (19 mm).

C102001 1.2 STANDARD STEEL FRAMES (ALL INTERIOR DOORS)

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. Frames shall be set 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.

C102001 1.3 FINISHES

Factory-Primed Finish. Doors and frames in non-humid, non-corrosive environments shall be factory primed with a rust inhibitive coating as specified in ANSI A 250.8. Factory prime doors on six sides of the door.

Zinc-Iron Alloy Coating (Galvanealed) and Factory Primed Finish

Fabricate interior doors and frames from zinc coated steel, alloyed type, complying with ASTM A 653/ A 653M. Factory prime doors and frames as specified in ANSI A 250.8.

Manufacturer's primer shall be compatible with door finish system in C30, Interior Coatings.

C102001 2.1 WOOD DOORS

C102001 2.1.1 Wood Doors (Office)

Install wood doors according to workmanship requirements of the Architectural Woodwork Institute Quality Standard 900-T-4 Custom Grade.

Wood doors shall be solid wood doors with wood core and solid wood edge bands. Vertical edge bands shall be one piece or laminated two-piece solid lumber to match face veneer species for natural finish wood doors. Reinforce door at all hardware attachments to door with sound grade hardwood. Horizontal edge bands shall be solid wood or structural composite lumber.

Interior Flush Doors - Flush doors shall conform to WDMA I.S.6A-01. Doors shall be premium grade, heavy duty, or otherwise as required by the project program.

Provide WDMA I.S. 1A-04 SCLC-5 structural composite lumber core, or staved lumber core, or PC-5 particleboard core construction. Do not use particleboard cores where it is anticipated that hardware may be screw mounted to the doors. Provide hardwood or softwood veneers cut for the best presentation for natural finishing of doors. Set match veneers of all components of a door opening. Face veneers shall be 1/20" thick before sanding.

C102001 2.1.3 Fabrication

- a. Marking - Each door shall bear a stamp, brand or other identifying mark indicating quality and construction of the door.
- b. Adhesives and Bonds - WDMA I.S. 1-A. Use Type I (water-proof) adhesive for assembly of interior doors and for the fabrication of stiles, rails, crossbands, and veneers. Adhesive for doors to receive a natural finish shall be non-staining. Type II (water resistant) is allowed for fabrication of core parts.

C102001 2.1.4 Finishes

Unless required otherwise by the project program, typically provide natural finish wood doors. Factory prime and or seal on all six sides of doors.

- a. Factory Finish - Provide doors finished at the factory as follows: AWI Quality Standards Section 1500, specification for Conversion varnish, alkyd urea catalyzed polyurethane, or acrylated UV curable epoxy. The coating shall be AWI Quality Standards premium, medium rubbed sheen, with an open or closed grain effect. Poly-wrap prefinished wood doors at factory for shipping.
- b. Field Finish - Prepare doors in accordance with WDMA I.S.1-A-2004. Factory prime or seal doors. Manufacturer's primer or sealer shall be compatible with door finish system in Section C30, *Interior Finishes*.

C102002 INTERIOR DOOR HARDWARE

C102002 1.1 DOOR HARDWARE

Provide the services of an Architectural Hardware Consultant (AHC). Provide, as far as feasible, locks, hinges, pivots, and closers from one lock, hinge, pivot, or closer manufacturer's make. All door hardware shall be clearly and permanently marked by the manufacturer, on a location to be visible after installation. Modify hardware as necessary to provide features indicated or specified. For necessary hardware items not indicated in these specification sections, provide ANSI/BHMA grade 1 rated hardware.

C102002 1.1.2 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.

C102002 1.1.3 Locks and Latches

Use Series 9000, 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.

C102002 1.1.4 Cylinders and Cores

Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores shall have seven pin tumblers. Cylinders shall be products of one manufacturer, and cores shall be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets shall have interchangeable cores, which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

C102002 1.1.5 Keying System

Provide a master key system for the facility. Provide a grand master keying system, or great, grand master keying system if required. Provide an extension of the existing keying system for existing facility additions. Name the manufacturer of the existing locks, and indicate if they have interchangeable cores. Provide construction interchangeable cores when subcontractors require keys during construction.

C102002 1.1.6 Keys

Furnish one file key, one duplicate key and one working key for each key exchange and for each master and grand master keying system.

C102002 1.1.7 Lock Trim

Cast, forged or heavy wrought construction and commercial plain in design.

- a. Knobs and Roses - Knobs and roses shall meet test requirements of BHMA A 156.2 and BHMA A 156.13.
- b. Lever Handles - Provide lever handles in lieu of knobs, as required by ABAAS. All lever handles shall have the freewheeling feature.

C102002 1.1.8 Door Stops and Silencers

BHMA A 156.16, Type L03011, three per single door and four per double door.

C102002 1.1.9 Thresholds

BHMA A 156.21.

C102002 1.1.10 Finishes

Provide one of the following hardware finish systems, matching the exterior hardware finish system.

BHMA A156.18. All door hardware shall have BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except surface door closers which shall have aluminum paint finish, and except steel hinges which shall have BHMA 652 finish (satin chromium plated). Hinges for exterior doors shall be stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Exit devices may be provided in BHMA 626 finish in lieu of BHMA 630 finish except where BHMA 630 is specified under paragraph entitled "Hardware Sets". Exposed parts of concealed closers shall have finish to match lock and door trim. Hardware for aluminum doors shall be finished to match the doors.

C103001 TOILET AND BATH ACCESSORIES

This paragraph covers toilet and bath accessories.

C103001 1.1 TOILET AND BATH ACCESSORIES

C103001 1.1.1 Toilet Tissue Dispensers

FS A-A-2524. Provide units, Type I, II, or III, of stainless steel. Provide one double-roll dispenser per toilet compartment, unless otherwise indicated.

C103001 1.1.2 Combination Paper Towel Dispenser / Waste Receptacle

Provide a recessed or semi-recessed type and be constructed of 22-gage stainless steel. Provide one per pair of sinks, unless otherwise indicated.

C103001 1.1.3 Soap Dispensers

Provide one soap dispenser per two sinks, with mechanical action dispensing valve. Do not mount soap dispenser on mirror.

C103001 1.1.4 Grab Bars

Provide stainless steel grab bars per UBAAS.

C103001 1.1.5 Robe Hooks

Provide stainless steel two-hook shape with integral wall flange, with a projection not less than 41 mm (1 5/8 inches).

C103001 1.1.6 Mirrors

Class 2, Style E, Grade 1, electro-copper plated. Provide one manufactured framed mirror per sink.

C103002 SHELVING

Assemblies include all types of shelving with brackets and all supporting materials and finish, if required.

C103003 FIRE EXTINGUISHER

Size and location as required by NFPA 10 & 101.

C103004 COUNTERS

C103005 1.1 LAMINATE COVERED COUNTER TOPS

Fabricate with lumber and a core of exterior grade plywood (A-C Grade) glued and screwed to form an integral unit. Bond laminated plastic under pressure to exposed surfaces using manufacturer's recommended glue.

- a. Countertops shall be constructed to meet "Custom" quality grade as defined in AWI Quality Standards.
- b. Finish shall meet NEMA LD 3, Grade PF 42 for plastic laminate.

C103006 CABINETS

This paragraph includes casework items that are permanently fixed in-place. Included are all cabinetry and millwork items with their associated accessories and anchoring devices.

C103007 1.1 WALL AND BASE CABINETS

Wall and base cabinets shall be of the same construction and appearance, with solid ends and frame fronts, or with frames all around. Frames shall be not less than 19 mm by 38 mm (3/4 inch by 1 1/2 inches) hardwood. All ends, bottoms, backs, and partitions shall be hardwood plywood. Cabinet doors and drawer fronts shall be either medium density particleboard or medium density fiberboard cores with like materials both faces. Construction of cabinets shall be by mortise and tenon, dovetail, or dowel and glue joints. Edges of exposed plywood shall be covered with hardwood strips.

C103007 1.1.1 Quality Standards

Wall and base cabinets shall be constructed to meet "Custom" quality grade as defined in AWI Quality Standards.

C103007 1.1.2 Hardware

Provide cabinet hardware including two self-closing hinges for each door and two side-mounted metal drawer slides for each drawer and pulls for all doors and drawers as follows. All cabinet hardware exposed to view shall be ANSI/BHMA 156.9, Grade 1, and comply with the following requirements:

- a. Concealed Euro-Style, back mounted hinges with opening to 165 degrees and a self-closing feature at less than 90 degrees.
- b. Drawer slides shall have a static rating capacity of 100 lbs. (444N).
- c. Provide adjustable shelving standards with shelf support hardware for wall cabinets.
- d. Provide heavy-duty magnetic latch and door and drawer catch

C103007 1.1.3 Finish

Provide plastic laminate (NEMA LD3) or transparent finish with sealer and varnish.

C103090 1.2 OTHER INTERIOR SPECIALTIES

See PTS Section C30 for additional interior specialties not specified here.

-- End of Section --

SAMPLE

SECTION C30
INTERIOR FINISHES

C30 General

C30 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*.

C30 1.1.1 Industry Standards And Codes

FLOOR COVERING INSTALLATION CONTRACTOR'S ASSOCIATION (FCICA)

FLOOR COVERING INSTALLATION BOARD (FCIB)

C30 1.2 QUALITY ASSURANCE

NOT USED

C30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Verification of satisfactory interior finish assemblies' performance shall be via Performance Verification Testing, as detailed in this section of the RFP.

C30 1.3.1 Provide sample of textured ceiling application for Government (GOV) approval before resuming work. Sample shall be used as a reference for remaining application.

C3010 WALL FINISHES

Interior wall finishes shall be moisture and mildew resistant, easily maintained, and suitable in accordance with industry standards for the architectural surface being finished. For painted wall finishes, refer to C3040 "INTERIOR PAINTING AND SPECIAL COATINGS".

C301001 PLYWOOD WALL FINISH

Interior wall finish of the Maintenance Shop shall be ¾" exterior grade T&G plywood. Install Texture 1-11 with brass screws at 12" on center. Position panels for installation so that fasteners occur within routs. Texture 1-11 to be installed after wood base installation so that wall panels sit on top of base to provide closure to the routs.

C3020 FLOOR FINISHES

Refer to C3040 "INTERIOR PAINTING AND SPECIAL FINISHES" for painted floor coatings.

C302004 RESILIENT FLOOR FINISHES

All resilient flooring shall meet or exceed applicable ADA horizontal requirements. Each type of flooring shall be installed with recommended adhesive in accordance with the manufacturers' written instructions. Installers shall be approved by the manufacturer in writing and shall have a minimum of 3 yrs experience for each type of flooring to be installed. A minimum of 2% total quantity for each type flooring, color and pattern shall be provided and stored within each building for future replacement and patching. Provide manufacturers full line of color and pattern selections, including multi-color patterns.

C302004 1.1 RESILIENT SHEET FLOORING SYSTEMS

C302004 1.1.3 Resilient vinyl flooring shall be commercial quality, 2.0 mm (0.080 inch) overall nominal gauge with a minimum wear layer thickness of 1.6 mm (.066 inch). It shall be non-layered, non-backed and include a protective urethane finish for ease of maintenance and conform to ASTM F1303, Type II Grade 1 Class A. Resilient vinyl flooring shall require no wax maintenance.

C302007 WALL BASE FINISHES

C302007 1.3 WOOD BASE FINISHES

Wall base shall be a minimum of 90 mm (6") high and 20 mm (¾") wide. Wood base shall be installed after installation of plywood wall panels in the Maintenance Shop.

C302009 FLOOR TOPPINGS AND TRAFFIC MEMBRANES

Assemblies include floor toppings and membrane systems. Provide seamless epoxy flooring suitable for installation over plywood floor decking. System thickness shall be no less than ¼".

C3030 CEILING FINISHES

Ceiling finish shall be 5/8" textured gypsum board. Install gypsum board with drywall screws at 8" on center. Refer to C3040 "INTERIOR PAINTING AND SPECIAL COATINGS" for painted ceiling finishes.

C3040 INTERIOR PAINTING AND SPECIAL FINISHES

C304001 PAINTING GENERAL REQUIREMENTS

All paint shall be suitable in accordance with the Master Painter Institute (MPI) standards for the interior architectural surface being finished. The Contractor may choose to use a more current MPI "Approved Product List"; however, only one list may be used for the entire contract. All coats on a particular substrate, or a paint system, must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

MPI Paint systems identified in the RFP take precedence over other MPI systems. If the RFP does not identify a paint system applicable to all painting of the facility, utilize the MPI *Architectural Painting, Interior System* manual to identify appropriate paint systems. Utilize the "Premium

Grade" systems and comply with all limitations stated in the MPI "Approved Products List" for each system. Products having an MPI EPR 3 rating shall be given preferential consideration over lower ratings. The higher performing systems shall be used unless the lower performing systems can be justified based on life cycle costs to include surface preparation, application, disposal, environmental impact, and recoating cycles based on exposure requirements. Only use paint products that have been tested for the MPI's "Detailed Performance". Do not use products that have been tested only for "Intended Use".

C304001 1.1 MPI GLOSS LEVELS

Gloss levels shall comply with the MPI system of determining gloss as defined in the Evaluation sections of the MPI Manuals. Utilize the performance characteristics of the paint gloss and sheen to categorize paint rather than manufactures' description of his product.

The MPI Gloss Levels are indicated by the notation G1, G2, G3, G4, G5, G6, or G7. Use G2 "Velvet-like" Flat for ceilings, residential walls away from human contact and low traffic areas. Use G3 "Eggshell-like" in high traffic areas for ceilings and walls, when a surface can be touched by human contact and a slightly more durable finish is needed and for dark accent colors. Use G5 Semigloss for ceilings, walls, doors and trim for high durability and cleanability. Use G6 Gloss only in special situations such as for piping identification or special effects. The MPI Gloss and Sheen Standard values are measured per ASTM D523, method D and are as follows:

<u>Gloss Level Number</u>	<u>Gloss@60 Degrees</u>	<u>Sheen@85 Degrees</u>
Gloss Level 1(G1) - Matte or Flat	Max.5 units	Max.10 units
Gloss Level 2(G2)- "Velvet-like" Flat	Max. 10 units	10-35 units
Gloss Level 3(G3) - "Eggshell-like"	Max. 10-25 units	10-35 units
Gloss Level 4(G4) - "Satin-like"	Max. 20-35 units	Min. 35 units
Gloss Level 5(G5) - Semi-Gloss	35-70 units	
Gloss Level 6(G6) - Gloss	70-85 units	
Gloss Level 7(G7) - High Gloss	More than 85 units	

C304001 1.2 MPI SYSTEM DESIGNATIONS AND ABBREVIATIONS

The MPI coating system number in each Division is found in either the *MPI Architectural Painting Specification Manual* or the *Maintenance Repainting Manual* and defined as an interior system (INT/RIN).

- a. INT designates an interior coating system for new surfaces.
- b. RIN designates an interior coating system used in repainting projects or over existing coating systems.
- c. DSD - the MPI short-term designation for Degree of Surface Degradation as defined in the Assessment sections in the *MPI Maintenance Repainting Manual*. Degree of Surface Degradation designates the MPI Standard for description and appearance of existing condition of surfaces to be

painted. This DSD classification is used to determine the proper surface preparation necessary for painting.

- d. DFT - The short-term designation for dry film thickness. DFT is the minimum acceptable depth or thickness of a coating or system in the dry state. The maximum acceptable DFT is not more than 50% greater than the minimum acceptable DFT (example... DFT = 2 mils, maximum DFT = 3 mils). The DFT indicated in the paint systems below relate to new coatings - MPI INT. MPI RIN will be less than the indicated DFT.
- e. Paint System Abbreviations: BF - Block Filler; C - Clear coat; P - Primer coat; I - Intermediate coat; T - Topcoat.

C304001 1.3 SURFACE PREPARATION

Comply with the "Interior Surface Preparation" section of the *MPI Architectural Painting Specification Manual* or the Interior Surface Preparation" section of the *MPI Maintenance Repainting Manual*. All suggestive language such as "may" or "should" are deleted from the standard and "must" or "shall" inserted in its place. Suggestive language such as "recommended" or "advisable" is deleted from the standard and "require" or "required" inserted in its place. The results of these wording substitutions change this document to required procedures. For surface preparation, determine a MPI DSD Assessment of each surface and comply with the MPI Surface Preparation Requirements relating to the assessments.

-- End of Section -

SECTION D20

PLUMBING

D20 GENERAL

D20 1.1 - NARRATIVE

This section must be used in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation.

This section includes the construction of interior plumbing systems such as fixtures, domestic cold and hot water piping, water heaters, pipe insulation, pipe supports, condensate drain piping, sanitary waste and vent piping, air compressors, and compressed air piping. This section includes all installations inside the facility and out to the five foot line beyond the exterior of the building.

D20 1.2 - General Requirements

Provide the design and installation in accordance with the following references.

D20 1.2.1 - Government Standards & Code Requirements

Federal Energy Management Program (FEMP)

IMC - International Mechanical Code, 2006

IPC - International Plumbing Code, 2006

IBC - International Building Code, 2006

ASHRAE 90.1-2007 - Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings.

Compressed Air and Gas Institute

D20 1.2.2 - Sustainability Requirements

See Part 3 of the RFP.

D20 1.2.3 - Plumbing Fixtures

ASSE 1016: Individual Thermostatic Pressure Balancing, and Combination Pressure Balancing and Thermostatic Control Valves for Individual Fixture Fittings.

ASSE 1017: Temperature Actuated Mixing Valves for Hot Water Distribution Systems.

ABAAS (Architectural Barriers Act Accessibility Standards)

ANSI-A117.1, current edition.

D20 1.2.4 - General Design Requirements

Provide all fittings, valves, specialty items, and appurtenances required for complete and operable plumbing systems.

Design plumbing systems such that they can be easily maintained. Provide shutoff valves to isolate convenient portions of piping systems (other than drainage systems) so that small portions of the systems may be deactivated for service or repair, leaving the remainder of the system in operation. Provide access doors for all devices, valves, and pieces of equipment that require access for operation, maintenance, or adjustment.

Provide high efficiency motors, meeting or exceeding the ratings in NEMA MG 1-2007.

Design plumbing systems such that they are completely drainable. Provide drain valves at all low points.

Provide sufficient clearance around major pieces of equipment, such as water heaters for operation and maintenance of the equipment, and as required by code or as recommended by the equipment manufacturer. Provide doors and corridors large enough for removal of major pieces of equipment from mechanical equipment rooms to the exteriors of the buildings.

Provide pipe sleeves for all wall and floor penetrations. Provide sleeves with a waterstop and segmented elastomeric mechanical seal where piping penetrates ground floor slabs, foundations, and exterior walls. Maintain integrity of wall and floor fire ratings with UL approved closure systems at all pipe penetrations. Provide escutcheons on all exposed pipe penetrations in occupied areas.

Provide 4-inch thick interior concrete housekeeping pads under all floor-mounted equipment.

D20 1.2.5 - Paint And Piping Identification Systems

Paint all exterior ferrous metal piping and ferrous metal pipe supports with one coat primer and two coats of corrosion resistant exterior enamel.

Provide identification for all piping, valves, and equipment per ANSI-A13.1, "Scheme for the Identification of Piping Systems".

Locate pipe labels adjacent to each valve, at each branch connection, where piping penetrates walls, floors, and ceilings, and every 25 feet on horizontal and vertical pipe runs.

Label all valves with valve tags and chains.

Label all equipment with engraved plastic identification markers. Each piece of equipment shall be provided with a manufacturer's nameplate indicating manufacturer's name, address, model number, serial number, and capacity.

D20 1.2.6 - Pipe Hanger Standards

Provide pipe hangers and supports per Manufacturers Standardization Society (MSS) and ASME/ANSI B31.1.

Provide vibration and acoustic isolation for all rotating equipment, reciprocating equipment, and connected piping in accordance with 2007 ASHRAE HVAC Applications Handbook, Chapter 47, "Sound and Vibration Control". Provide acoustic isolation for plumbing systems piping to attenuate water flow noise into adjacent occupied spaces.

Provide seismic restraints and bracing for all plumbing equipment and piping in accordance with 2007 ASHRAE HVAC Applications Handbook, Chapter 54, "Seismic and Wind Restraint Design".

D20 1.2.7 - General Installation Requirements

Installation of fixtures such as fixture heights, maintenance requirements, and fixture clearances shall be in accordance to IPC, IBC, ABAAS, and Manufacturers Instructions.

D2010 PLUMBING FIXTURES

Plumbing fixtures shall be provided in accordance with the IBC, IPC, and as specified. Provide plumbing fixtures complete with all required supplies, stops, drains, vacuum breakers, traps, carriers, etc.

D201001 WATER CLOSETS

D201001 1.1 - TANK TYPE

ASME A112.19.2M, white vitreous china, siphon jet. Provide ASME A112.19.5 trim. Provide floor mounted tank type 1.6 gallon per flush water closet. Handicapped fixture mounting height and appurtenances shall be in accordance with IBC, IPC, and ADAAG.

D201002 SINKS

D201002 1.1 - COUNTERTOP SINKS

ASME/ANSI A112.19.3M sink, 20 gage stainless steel with integral mounting rim, minimum dimensions of 33 inches wide for two compartment sinks by 21 inches front to rear, with ledge back and undersides coated with sound dampening material. Provide top-mounted ASME A112.18.1M chrome-plated copper alloy faucets, swing spout with aerator, matching hand sprayer, and stainless steel drain outlets with cup strainers. Provide adjustable P-trap with drain piping to vertical vent stack.

D201003 LAVATORIES

D201003 1.1 - WALL HUNG

ASME A112.19.2 lavatory, white vitreous china, wall-hung, with front overflow, concealed arm support, fitting ledge, contoured back and side splash shields, 20-inch by 18-inch nominal dimensions. Provide chrome-plated copper alloy centerset faucet, with gooseneck spout, lever handles, 2.2 gpm flow restricting aerator, and pop-up drain. Lever handles shall

open within one-quarter turn in opposite directions. Provide concealed adjustable floor-mounted fixture carriers.

D201004 SHOWERS

D201004 1.1 - ONE PIECE SHOWER MODULE

ANSI Z124.2, made of white fiberglass reinforced plastic (FRP) or acrylic with slip-resistant bathing surfaces, integral grab bar, and three walls integrally molded in one piece. Provide outlet at left or right as necessary to suit module arrangement. Provide pop-up drain fittings and adjustable P-trap. Shower supply fittings shall be diverter type with body mounted from behind the wall. Install one piece shower module in the Toilet/Shower Room.

D201004 1.3 - SHOWER SUPPLY FITTINGS

ASME A112.18.1M, ball joint, self-cleaning, adjustable spray pattern shower heads, connected to concealed pipe connected to copper alloy pressure balance single control type mixing valves with front access integral screwdriver stops. Anchor the mixing valves and the pipe to each showerhead in wall to prevent movement.

D201004 1.4 - HANDHELD SHOWER HEAD

ASSE 1014, adjustable spray hand-held shower head with swivel fitting, 60 inch minimum flexible chrome plated copper alloy hose and in-line vacuum breaker. Provide push button flow control. Provide 25 inch grab bar with sliding spray holder that locks at any height.

D2020 DOMESTIC WATER DISTRIBUTION

D202001 DOMESTIC WATER SYSTEM REQUIREMENTS

Provide cold water and hot water supply distribution systems to all plumbing fixtures, wall hydrants, hose bibbs, make-up water connections, and all other devices, equipment, and appliances requiring water supply.

Maximum design velocity in domestic water supply piping shall be 6 feet per second. Design the domestic water systems to provide a minimum pressure of 20 psig at the most remote fixture.

Connect domestic water systems to the domestic water services provided for building. Coordinate the exact service entrance locations, sizes, and invert elevations with site utilities. Provide main shutoff valve, strainer, double check valve backflow preventer assembly, and positive displacement water meter on the domestic water service. Water meters shall be compatible with the existing water meter/remote readout systems in the park. Provide each meter with a non-resettable remote read-out in an accessible location outside each building.

Provide pressure reducing valve(s) in domestic water service as necessary to limit water pressure to 80 psig. Provide domestic water pressure boosting pumping systems if required to meet domestic water system demands.

Provide shutoff valves at each piece of equipment, at main branch piping takeoffs, at connections for future equipment, at each floor takeoff, and where required for proper operation and maintenance of the systems. Provide individual supply line stops at each plumbing fixture.

Provide reduced pressure principle backflow preventers on cold water makeup connections to all hydronic heating and cooling systems.

Only the main building water service will be permitted under slab-on-grade. All other water piping shall be installed above grade. Minimize the length of main building water service piping installed under slab-on-grade.

Provide pressure gauges at domestic water service connections and on either side of pressure reducing valves.

Provide thermometers at domestic water heater outlets.

Provide unions or flanges at all control valves, equipment connections, and as required for proper maintenance.

Provide flexible connectors at all piping connections to circulating or booster pumps. For pumps installed in parallel, provide non-slam check valves at the discharge of each pump.

Provide dielectric unions or flanges where ferrous and non-ferrous piping materials are joined.

Provide water hammer arresters on all domestic water branches serving fixtures and equipment utilizing automatic closing valves,

i.e., water closets, urinals, showers, washing machines, dishwashers, etc.

Insulate all domestic cold water and hot water piping.

D202002 PIPES & FITTINGS

D202002 1.1 - COPPER

Use copper tubing and fittings for pipe sizes 4 inches or smaller. Use type L tubing above ground with either solder fittings, or press-on copper fittings. For buried piping, use type K tubing with either solder fittings, or press-on copper fittings

D202003 VALVES & HYDRANTS

D202003 1.1 - VALVES

Provide valves at water supplies to fixtures and to provide ease of maintenance as required in the IPC.

Ball Valves: Two-piece bronze, WOG, full port.

Check Valves: Cast bronze, Y-pattern, swing type.

Pressure Reducing Valves: Cast bronze, adjustable diaphragm type. Provide multiple pressure reducing valves in parallel for water services with demand flowrates greater than 20 GPM. Provide pressure gauges upstream and

downstream of each individual pressure reducing valve or each set of parallel pressure reducing valves.

D202003 2.1 - HOSE BIBBS & HYDRANTS

Use non-freeze wall hydrants where the winter design temperature is at or below freezing. Hose bibbs are acceptable for use elsewhere.

D202003 2.1.1 - Hose Bibbs

Angle type, copper alloy hose bibbs with vacuum breaker. Hose bibbs shall be installed in all mechanical room and in the Maintenance Building's Shop Area for floor washdown purposes.

D202003 2.1.2 - Wall Hydrants

Non-freeze, ASSE 1019, cast bronze, with vacuum breaker, locking shield and tee-handle. Provide freeze-proof wall hydrants every 75 to 100 feet on all building perimeters, with mounting height 18 inches above finished grade.

D202004 DOMESTIC WATER EQUIPMENT

D202004 1.1 - BACKFLOW PREVENTERS

Reduced pressure principle type. Furnish proof that each make, model/design, and size of backflow preventer being furnished for the project is approved by and has a current "Certificate of Approval" from the Foundation for Cross-Connection Control and Hydraulic Research (FCCCHR)-USC. Listing of the particular make, model/design, and size in the current FCCCHR-USC will be acceptable as the required proof. Provide freeze protection for aboveground exterior applications in areas where the winter design temperature is at or below freezing. Backflow preventers shall be installed on all potable water systems.

D202004 2.1 - WATER HEATERS

Electric water heaters shall be UL listed with double heating element according to safety specifications outlined in UL 174 . Water heaters shall 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 110 and 160 degrees F. Water heater warranty shall be a minimum of 10 year tank and parts warranty. Water heater must meet or exceed federal minimum energy standards effective January 20, 2004, according to latest editions of the National Appliance Energy Conservation Act (NAECA) and comply with the latest editions of the BOCA National Codes, CEC, UBC, SBCC, CABO and HUD standards.

Provide water heaters with NSF approved expansion tanks.

D202004 3.1 - WATER METERS

AWWA C700 nutating disc, positive displacement type, with register reading in liters and U.S. gallons. Water meters shall be installed on all potable water systems. Provide water meters with meter unions and remote read-outs

D202005 INSULATION & IDENTIFICATION

D202005 1.1 - PIPING INSULATION

Mineral fiber insulation with all-service jacket on all aboveground domestic water (hot and cold) piping. Provide continuous vapor retarder on cold water piping. Provide calcium silicate insulation inserts at all pipe clamps and pipe hangers

D202005 2.1 - PIPING & EQUIPMENT IDENTIFICATION

Provide laminated plastic nameplates for valves. Stop valves in supplies to fixtures will not require nameplates. Identify above ground pipe with the type of service and direction of flow. Letter size, lengths and colors shall be per ANSI A13.1.

D202006 SPECIALTIES

D202006 2.1 - VALVE BOXES

For each buried valve provide cast-iron, ductile-iron box of a suitable size. Provide cast-iron or ductile-iron cover for the box with the word "WATER" cast on the cover.

D202006 3.1 - WATER HAMMER ARRESTORS

Water hammer arrestors shall be installed on all domestic water piping systems and the numbers and sizes of water hammer arrestors shall be in accordance with PDI WH201-92, use water hammer arrestors in lieu of air chambers.

D202007 OTHER DOMESTIC WATER SUPPLY

D202007 1.1 - SUPPORTS

Provide piping supports in accordance with the IPC.

D202007 2.1 - INSPECTIONS

Prior to initial operation, inspect piping system for compliance with drawings and specifications.

D202007 3.1 - DISINFECTION

Upon completion of the installation, disinfect all systems per the IPC and AWWA C651-91 and AWWA C652-92.

D202007 4.1 - PLUMBING SYSTEMS TESTING

Upon completion of the installation test all systems per the IPC.

D2030 SANITARY WASTE AND VENT SYSTEMS

D203001 SANITARY WASTE AND VENT SYSTEM REQUIREMENTS

Connect sanitary waste and vent systems to all drains, fixtures, equipment, and all other devices requiring sanitary waste disposal.

Connect building drains to the sanitary sewer services provided for the building. Coordinate the exact service entrance locations, sizes, and invert elevations with site utilities.

Provide two-way cleanouts at points of connection of building sewers to sanitary sewer services, 5 feet beyond faces of buildings. Extend cleanout access to grade and provide with suitable access box or cover.

All sanitary vent terminations through the roof shall be located within 2 feet of the roof ridge line, a minimum of 25 feet away from any outdoor air intake, and a minimum of 15 feet away from exterior walls.

D203002 WASTE PIPE & FITTINGS

D203002 1.1 - BELOW-GROUND PIPING

Cast iron hub and spigot pipe and fittings, rubber compression gasket joints. Where approved for use by the local authority and IPC, plastic PVC or ABS piping, fittings, and solvent cement per ASTM D 2665 or ASTM D 2661 may be provided.

D203002 1.2 - ABOVE-GROUND PIPING

Cast-iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where approved for use by the local authority and IPC, plastic PVC or ABS piping, fittings, and solvent cement per ASTM D 2665 or ASTM D 2661 may be provided. Plastic piping shall be equipped with approved firestopping devices as required by code.

D203002 1.3 - CLEANOUTS

Provide cleanouts as required by the IPC. Material shall be consistent with the piping system materials. Cleanouts shall be provided in all buildings that have sanitary waste piping.

D203002 1.4 - VENT PIPE & FITTINGS

Cast-iron hubless pipe and fittings, CISPI 301 with CISPI 310 couplings. Where approved for use by the local authority and IPC, plastic PVC or ABS piping, fittings, and solvent cement per ASTM D 2665 or ASTM D 2661. PVC piping shall be equipped with approved firestopping devices as required by code. Single drainage/vent stack systems (Philadelphia system, etc) and mechanical air admittance valves are not acceptable. Termination of vent piping shall be in accordance with IPC installation requirements.

D203003 FLOOR DRAINS AND TRAP PRIMERS

Floor drains shall be flush strainer or extended rim type as required by the IPC. Provide floor drains of the types listed and at the locations indicated below, and elsewhere as shown or required for proper drainage.

<u>Location</u>	<u>Floor Drain Type</u>
Toilet Room	6-inch diameter strainer
Storage Room	6-inch diameter strainer
Mechanical Room	8-inch square top floor sink

Break Room	6-inch diameter strainer
Shop Area	4-inch wide precast polymer concrete trench drains with heavy-duty cast iron frames and grates.

Provide automatic trap primer valves in conformance with the IPC for all floor drains in toilet rooms. Provide trap primers for floor drains in mechanical rooms and other areas where continuous water flow is not present.

Provide oil/water separators in waste lines connected to floor drains and trench drains in the Maintenance Building's Shop Area.

D203004 CONDENSATE DRAIN SYSTEMS

Connect condensate drain systems to all air conditioning equipment requiring condensate disposal. Provide vented traps at each condensate drain connection.

Terminate condensate drains as indirect waste at floor drains, floor sinks, mop sinks, or service sinks.

Insulate all condensate drain piping.

D203004 1.1 - CONDENSATE PIPE & FITTINGS

Piping: Type L hard drawn copper tubing with cast bronze solder joint drainage fittings or wrought copper solder joint fittings. Use 95/5 tin-antimony or other code approved lead-free solder for joints.

D203004 1.2 - CONDENSATE PIPE INSULATION

Condensate Drain Insulation: Provide fiberglass insulation with all-service jacket on all aboveground condensate drain piping. Provide continuous vapor barrier on all condensate drain piping. Provide calcium silicate insulation inserts at all pipe clamps and pipe hangers.

D203005 COMPRESSED AIR SYSTEMS

Aboveground Piping: Schedule 40 hot-dipped galvanized steel pipe with hot-dipped galvanized Class 150 threaded malleable iron fittings.

Underground Piping: Same as aboveground piping above, except with extruded high density polyethylene coating. Fittings shall be covered with heat-shrink polyethylene pipe sleeves.

Ball Valves: Two-piece bronze, WOG, full port.

Flexible Piping Connectors: Corrugated stainless steel with stainless steel braid covering, ends to match piping connections.

Air Pressure Regulators: Aluminum alloy body, diaphragm type, rated for 250 psig inlet pressure.

Air Hose Reels: Low pressure hose reel, with 3/8-inch x 30 foot air hose, ball stop, and air coupler.

Air Compressor: Vertical tank type, with 80 gallon ASME receiver, two-stage compressor, 30 CFM free air capacity, 150 psig pressure switch setting.

Design compressed air systems with total friction losses not to exceed 10 percent of the compressor discharge air pressure.

All compressed air service drops shall be taken off of the tops of the main or branch lines. Provide drain valve drops at the end of each main or branch line, with drain valve accessible from floor level. Slope all lines toward drain drops.

Provide a shutoff valve; drain valve, and air pressure regulator at each compressed air service connection point.

D203006 MAINTENANCE EQUIPMENT

Provide the following maintenance equipment to be installed in the Maintenance Building:

10W-40 Motor Oil: Double-acting air driven pump, suitable for mounting on 55 gallon drum, with 5:1 pressure ratio, bung adapter, suction tube, air connector hose, and oil connector hose.

90W Gear Oil: Double-acting air driven pump, suitable for mounting on 55 gallon drum, with 5:1 pressure ratio, bung adapter, suction tube, air connector hose, and oil connector hose.

Chassis Lube: High pressure hose reel, with 3/8-inch x 50 foot lube hose, ball stop, control valve, swivel, rigid extension, and standard grease fitting coupler.

Air: Low pressure hose reel, with 3/8-inch x 50 foot air hose, ball stop, air coupler, and tire chuck.

Water: Low pressure hose reel, with 1/2-inch x 50 foot water hose, ball stop, and water bibb with flexible extension.

Drop Light: UL listed drop light reel, designed to meet OSHA standards, with 50 foot electric cord, insulated handle, and bulb protector.

The Contractor shall be responsible for coordinating the exact equipment locations with the Owner and the Contracting Officer.

D203007 TRENCH DRAINS

Provide modular, precast polymer concrete type, with heavy-duty cast iron grates and frames. Provide trench drains with sand traps.

D203008 OIL/WATER SEPARATORS

Underground coalescing type, with UL 1316 double-walled fiberglass or UL 58 double-walled steel, fiberglass wrapped tank (ACT-100 corrosion protection system), sized for a maximum influent flowrate of 30 GPM, nominal oil storage capacity of 60 gallons, and an emergency oil storage capacity of 360 gallons. Effluent shall contain no more than 10 ppm oil at design flowrate conditions. Concrete tanks or single walled fiberglass wrapped steel tanks will not be acceptable.

Tank Access Fittings: Influent and effluent connection cleanouts, coalescer access manway, oil pumpout connection, high level alarm access, leak detector access, manual gauging port, and all other necessary tank access openings and fittings shall terminate at grade with manholes. Provide concrete pad around all manholes at grade to support and secure them in place.

Tank Vent: Provide tank vent, running underground to adjacent building wall and terminating above the building roof.

Tank Ballast: Provide tank ballast as necessary to provide 100 percent tank floatation resistance.

Tank Backfill: Pea gravel.

High Level Alarm: Provide high oil level alarm system to alarm when oil level reaches nominal oil storage capacity. High level alarm shall be provided with both visual and audible alarm annunciation.

Leak Detection Monitoring System: Provide electronic continuous monitoring leak detection system to monitor the tank secondary containment interstitial space.

-- End of Section --

SECTION D30

HVAC

D30 GENERAL

D30 1.1 - NARRATIVE

This section includes the construction of interior mechanical systems. This section covers installations inside the facility and out to the five foot line.

D30 1.2 - MECHANICAL DESIGN GUIDANCE

Provide the design and installation in accordance with the following references.

D30 1.2.1 - Government Standards & Applicable Codes

Federal Energy Management Program (FEMP)

IMC - International Mechanical Code, 2006

IPC - International Plumbing Code, 2006

IBC - International Building Code, 2006

NFPA 70-09 - National Electrical Code

NFPA 90A-09 - Standard for the Installation of Air-Conditioning and Ventilating Systems

ASHRAE 62-2007 - Ventilation for Acceptable Indoor Air Quality

ASHRAE 90.1-2007 - Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings

D30 1.2.2 - Sustainability Requirements

See Part 3 of the RFP.

D30 1.2.3 - General DESIGN Requirements

Provide all fittings, valves, piping, ductwork, specialty items, and appurtenances required for complete and operable HVAC systems.

Design hydronic systems such that they are completely drainable. Provide drain valves at all low points and air vents at all high points.

Design HVAC systems such that they can be easily maintained. Provide shutoff valves to isolate convenient portions of piping systems (other than drainage systems) so that small portions of the systems may be deactivated for service or repair, leaving the remainder of the system in operation. Provide access doors for all devices, valves, and pieces of equipment that require access for operation, maintenance, or adjustment. Extend grease fittings to the exteriors of equipment casings. Provide removable insulation as necessary. Provide access

platforms for all major mechanical equipment mounted 6'-6" or higher above finished floor.

Provide sufficient clearance around major pieces of equipment, such as furnaces for operation and maintenance of the equipment, and as required by code or as recommended by the equipment manufacturer. Provide doors large enough for removal of equipment from space to the exteriors of the building.

Provide shutoff valves at each piece of equipment, at main branch piping takeoffs, at connections for future equipment, at each floor takeoff, and where required for proper operation and maintenance of the systems.

Provide unions or flanges at all control valves, equipment connections, and as required for proper maintenance.

Provide dielectric unions or flanges where ferrous and non-ferrous piping materials are joined.

Provide pipe sleeves for all wall and floor piping penetrations. Provide sleeves with a waterstop and segmented elastomeric mechanical seal where piping penetrates ground floor slabs, foundations, and exterior walls. Maintain integrity of wall and floor fire ratings with UL approved closure systems at all pipe penetrations. Provide escutcheons on all exposed pipe penetrations in occupied areas.

Provide 4-inch thick interior concrete housekeeping pads under all floor-mounted equipment.

Provide 6-inch thick exterior concrete housekeeping pads under all grade-mounted equipment.

Provide ventilation in accordance with ASHRAE 62-2007.

Provide materials that meet all required smoke and flame spread ratings in accordance with ASTM E84-98.

Motors: Provide high efficiency motors, meeting or exceeding the ratings in Table 12-10 of NEMA MG 1-98.

Provide duct smoke detectors for all air supply systems with a capacity greater than 2,000 CFM. Duct smoke detectors shall be connected to the building fire alarm system and shall automatically shut down their respective fans upon detection of smoke.

D30 1.2.4 - HVAC Requirements

The Shop Area shall be cooled by an Evaporative Cooler and heated with Electrical Unit Heaters.

The Office, Break room, Storage, and Mechanical Room shall be conditioned using an air-to-air heat pump with minimum outside air capability.

General ventilation shall be provided for the Shop Area with exhaust fans, intake louvers, and exhaust louvers. The louvers shall be provided with motorized dampers interlocked with the exhaust fans.

A dedicated exhaust fan shall be provided for the Toilet Room.

D30 1.3 - PAINT, EQUIPMENT COATINGS, AND IDENTIFICATION SYSTEMS

Provide identification for all HVAC systems. HVAC systems exposed to the outside elements shall be provided with a corrosion resistant coating. Paint all exterior ferrous metal piping and ferrous metal pipe supports with one coat primer and two coats of corrosion resistant exterior enamel.

Piping: Label all piping systems with the name of the substance contained within the system and the direction of flow. Provide coiled plastic sheets with sealed color text and graphics for pipe labeling. Labeling shall comply with the requirements of ASME A13.1-96. Locate pipe labels adjacent to each valve, at each branch connection, where piping penetrates walls, floors, and ceilings, and every 25 feet on horizontal and vertical pipe runs.

Equipment: Label all equipment with engraved plastic identification markers. Each piece of equipment shall be provided with a manufacturer's nameplate indicating manufacturer's name, address, model number, serial number, and capacity.

D30 1.4 - SUPPORT AND MOUNTING

Provide vibration and acoustic isolation for all rotating equipment, reciprocating equipment, and connected piping in accordance with 2007 ASHRAE Applications Handbook, Chapter 47, "Sound and Vibration Control".

D30 1.5 - PERFORMANCE VERIFICATION and ACCEPTANCE TESTING

Verification of satisfactory HVAC system performance shall be via Performance Verification Testing, as detailed in this section.

The Government reserves the right to witness all Acceptance Tests and Inspections, review data, and request other such additional inspections and repeat tests as necessary to ensure that the system and provided services conform to the stated requirements.

The Qualified Testing Organization shall provide the Acceptance Tests and Inspections test plan and perform the acceptance tests and inspections. Test methods, procedures, and test values shall be performed and evaluated in accordance with appropriate standards, and the manufacturer's recommendations. Equipment shall be placed in service only after completion of required tests and evaluations of the test results have been completed. Contractor shall supply to the testing organization complete sets of shop drawings, settings of adjustable devices, and other information necessary for an accurate test and inspection of the system prior to the performance of any final testing. Perform acceptance tests and inspections on Air Conditioning Units, Controls System, and HVAC Testing/Adjusting/Balancing.

D303001 AIR DISTRIBUTION, HEATING & COOLING SYSTEMS

D303001 1.1.1 - Air Distribution, Heating & Cooling Systems Requirements

Provide all dampers required to properly balance the air distribution systems.

Provide duct smoke dampers, fire dampers, and combination fire/smoke dampers in accordance with NFPA 90A.

Insulate all supply air ductwork, return air ductwork located in unconditioned spaces, and outside air ductwork. Duct liner shall be installed only in those areas where ductwork is run exposed or immediately downstream of fans for sound attenuation.

Seal all duct seams and joints in accordance with SMACNA Seal Class C requirements. Duct Sizing Criteria: Ductwork shall be sized for Low Pressure Ductwork (1,800 fpm or less):

Less than 2,000 CFM: Decreasing friction loss ranging from 0.1 inches W.G. per 100 feet at 2,000 CFM to 0.025 inches W.G. per 100 feet at 25 CFM.

Between 2,000 CFM to 12,999 CFM: 0.1 inches W.G. per 100 feet developed length.

Acoustic Criteria: Equipment shall be sized such that Noise Criterion (NC) levels shall be below the maximum NC levels as follows:

Office & Break Room: NC 35.

Shop Area: NC 45.

The Shop area shall be ventilated (exhausted) at a minimum rate of 6 air changes per hour, unless noted otherwise or unless a higher ventilation rate is required by code.

Outside air shall be supplied to conditioned spaces at a rate of not less than 110 percent of the total exhaust rate.

Outside air supply systems for conditioned spaces shall operate continuously during occupied periods.

D303002 - HEAT PUMPS

D303002 1.1.1 - Air-To-Air Heat Pumps

Air-cooled, high efficiency, two-stage heat pumps. Provide units factory assembled, designed, tested, and rated in accordance with ARI 210/240 or ARI 340/360. Units UL listed and ENERGY STAR® qualified. Units shall have a minimum 13 SEER and 7.7 HSPF. Units shall be provided with corrosion resistant coating to help protect against corrosion. Units shall be installed per manufacturer's minimum recommended installation heights and clearances. Refrigerant shall be R-410A and piping size shall be per the manufacturer's recommendations.

D303003 - EVAPORATIVE COOLERS

D303003 1.1.1 - Evaporative Coolers

Self-contained packaged, pre-wired and factory-fabricated evaporative coolers with indirect and direct sections for two-stage cooling. Provide units factory assembled, designed, tested, and rated in accordance with ARI 410, ARI 430 and ARI 435. Units shall be factory tested under UL standard 1995 and labeled with UL and ETL. Factory fabricated evaporative cooling units shall be suitable for outdoor

installation and shall be constructed of prime quality 316 stainless steel outer panels secured to an integral welded tubular 304 stainless steel frame and to each other, such that exterior panels are non-load bearing. Exterior panels shall be individually removable without affecting the structural integrity of the unit. Unit shall come complete with 8-inch high welded 10-gauge 316 stainless structural steel base around the entire perimeter. Unit shall have wall and roof panels constructed of minimum 16-gauge, 316 stainless Steel and roof shall be pitched (1-1/2 inch standing seam), suitable for use outdoors. Units shall be installed per manufacturer's minimum recommended installation heights and clearances.

D303004 - ELECTRIC UNIT HEATERS

D303004 1.1.1 - Electric Unit Heaters

Electric Unit Heaters and electrical accessories shall be labeled by UL. Units shall be provided with corrosion resistant and finish to help protect against corrosion. Units shall be provided with quality steel, reinforced, welded, construction; designed to withstand heavy duty commercial and institutional use. Units shall be installed per manufacturer's minimum recommended installation heights and clearances.

D303005 AIR DISTRIBUTION SYSTEMS

D303005 1.1 - DUCTWORK

Except as specified herein, provide ductwork constructed, braced, reinforced, installed, supported, and sealed per SMACNA standards.

D303005 1.1.1 - Flexible Ducts

Use insulated flexible duct only for connections to air distribution devices to adapt to minor offsets. Flexible duct shall be UL 181 listed and per SMACNA DCS with a minimum R value of 4. Maximum length of flexible ductwork shall be 6 feet.

D303005 1.1.2 - Flexible Connections

Provide flexible connectors between fans and ducts.

D303005 1.1.3 - Volume Dampers

Provide manual volume dampers in each branch take-off from the main duct to control air quantity except for primary supply ductwork on VAV systems. Dampers shall conform to SMACNA DCS and shall be seal class "A" construction.

D303005 2.1 - LOUVERS

Louvers shall bear AMCA ratings seal for air performance and water penetration in accordance with AMCA 500 and AMCA 511. Louvers shall be constructed of anodized aluminum alloy or stainless steel. Provide birdscreens.

D303005 3.1 - GRILLES, REGISTERS, & DIFFUSERS

Factory-finished grilles, registers, and diffusers. Exterior and exposed edges shall be rolled, or otherwise stiffened and rounded.

D303005 4.1 - INSULATION

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 shall be the minimum thickness required by ASHRAE 90.1. Insulate the backs of all supply air diffusers with blanket flexible mineral fiber insulation.

D303006 EXHAUST SYSTEMS

D303006 1.1 - FANS

Fans shall be AMCA 210 certified, with AMCA seal. Fan bearings shall have a minimum average life of 200,000 hours at design operating conditions. Provide bird screens for outdoor inlets and outlets. Provide direct-drive type fans.

D303006 1.2 - BATHROOM FAN

UL 507 and UL-listed, Home Ventilating Institute (HVI) certified and with AMCA seal for ceiling installation.

D303007 HVAC CONTROLS AND INSTRUMENTATION

D303007 1.1 - ELECTRONIC HVAC CONTROLS

General: Control systems shall be standard electric/electronic controls. DDC control systems shall not be used. Provide dampers and valves with electric actuators. Provide all wiring in accordance with the National Electrical Code, using all UL listed components.

Air-to-Air Heat Pump - Provided with 7 day programmable thermostats.

Evaporative Coolers - All controls shall be factory mounted by the Air Handling Unit manufacturer. These controls shall include all damper actuators, temperature sensors, pressure sensors, and air flow measuring sensors, filter switches, smoke and fire detectors, etc.

Electrical Unit Heaters - Provided remote thermostats.

D303008 SYSTEMS TESTING AND BALANCING

D303008 1.1 - HVAC SYSTEM

Agency Qualifications: The DBC shall obtain the services of a qualified testing, adjusting, and balancing (TAB) organization to test, adjust, and balance the HVAC systems. Prior to commencing the TAB work, the TAB organization shall have been approved by the Contracting Officer. The criteria for determining qualifications shall be membership in the AABC or certification by the NEBB. The testing organization shall be independent of the HVAC system installers or equipment suppliers for this project.

D303009 GENERAL CONSTRUCTION ITEMS

D303009 1.1 - SEISMIC DESIGN

Provide seismic restraints and bracing for all HVAC equipment and piping in accordance with 2007 ASHRAE Applications Handbook, Chapter 54, "Seismic and Wind Restraint Design and ASCE-7, chapter 13.

-- End of Section --

SAMPLE

SECTION D40

FIRE PROTECTION

D40 GENERAL

D40 1.1 DESIGN GUIDANCE

Provide the design and installation of fire protection systems 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*.

D40 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work shall be inspected and found to be in compliance with industry standards and these specifications prior to acceptance of the work. Items found not to be in compliance shall be removed or corrective measures taken, to assure compliance with the referenced standard.

Qualifications, Training Plans, and Test Plans and Procedures indicated herein, shall be submitted 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

D40 1.2.1 Qualified Workers

Use qualified workers who are certified as a minimum Level III Technician by National Institute for Certification in Engineering Technologies (NICET), thoroughly trained and experienced, and completely familiar with the specified requirements and the methods needed for proper performance of the work in this section. Installers of systems in D4090 shall be certified at a minimum Level IV NICET. Installers of Chlorinated Poly Vinyl Chloride (CPVC) sprinkler systems shall be certified by the manufacturer and maintain a copy of their certification on hand at all times.

D40 1.2.2 Fire Protection QC Specialist

The Fire Protection (FP) QC Specialist shall be a registered Fire Protection Engineer (FPE) and shall be an integral part of the Prime Contractor's Quality Control Organization. This FPE shall have no business relationships (owner, partner, operating officer, distributor, salesman, or technical representative) with any fire protection equipment device manufacturers, suppliers or installers for any such equipment provided as part of this

project. The Fire Protection Designer of Record (FPDOR) may serve as the FPQC Specialist provided the following qualifications are met.

- a. Qualifications/Experience: The FPQC Specialist shall have obtained their professional registration by successfully completing the Fire Protection Engineering discipline

examination. This FPE shall have a minimum of 5 years full time and exclusive experience in every aspect of facility design and construction as it relates to fire protection, which includes, but is not limited to, building code analysis, life safety code analysis, design of automatic detection and suppression systems, passive fire protection design, water supply analysis, and a multi-discipline coordination reviews, and construction surveillance.

- b. Area of Responsibility: The FPQC Specialist is responsible for assuring the proper construction and installation of life safety and fire protection features across all disciplines and trades. The FPQC Specialist shall be responsible for assuring that life safety and fire protection features are provided in accordance with the design documents, approved construction submittals, and manufacturer's requirements. Examples include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as spray-applied fire proofing of structural components and fire rated walls/partitions, fire alarm and detection systems, fire suppression and standpipe systems, and emergency and exit lighting fixtures.
- c. Construction Surveillance: The FPQC Specialist shall visit the construction site as necessary to ensure life safety and fire protection systems are being constructed, applied, and installed in accordance with the approved design documents, approved construction submittals, and manufacturer's requirements. Frequency and duration of the field visits are dependent upon particular system components, system complexity, and phase of construction. At a minimum, field visits shall occur just prior to installation of suspended ceiling system to inspect the integrity of passive fire protection features and fire suppression system piping, preliminary inspections of fire alarm/detection and suppression systems, and final acceptance testing of fire alarm/detection and suppression systems. The FPQC Specialist shall prepare a written report detailing compliance of any outstanding submittal review comments, summarizing the results of all tests, detailing all discrepancies discovered, corrective action taken, all forms as required by the respective NFPA codes, and recommendations and certifications for acceptance. Forward one copy of the report with attachments to the Contracting Officer.

D40 1.2.3 Performance Verification Testing

All systems shall have operational tests to demonstrate compliance with contract requirements and respective NFPA codes, International Building Code and as noted below. Test procedures shall be in full compliance with the respective NFPA codes and the equipment manufacturer recommendations. Provide all personnel, equipment, and materials for tests. Return trips to witness repeat acceptance tests due to failure of previous tests will be at the Contractor's expense.

D40 1.2.3.1 Preliminary Inspections and Final Acceptance Testing

The FPQC Specialist shall personally witness all preliminary inspections of fire alarm/detection and suppression systems. Once preliminary inspections have been successfully completed, the FPQC Specialist shall submit a signed certificate to the QC Manager that systems are ready for final inspection and testing. The Regional Structural Fire Management Officer (RSFMO) will witness formal tests and approve all systems before they are accepted. The QC Manager shall submit the request for formal inspection at least 15 days prior to the date the inspection is to take place. The QC manager shall provide 10 days advance notice to the Contracting Officer and the RSFMO of scheduled final inspections.

D40 1.2.3.2 Final Life Safety/Fire Protection Certification

The FPQC Specialist shall provide certification that all life safety and fire protection systems have been installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification shall summarize all life safety and fire protection features, and shall bear the professional seal of the FPQC Specialist. NPS form CO-1 (Certificate of Occupancy) shall be completed.

D40 1.2.3.3 System Manufacturers Representatives

The systems manufacturer technical representative shall be present for the final inspection and test for the following systems: fire alarm and detection, fire pump, carbon dioxide, foam generating and clean agent extinguishing.

D40 1.2.3.4 Fire Suppression Water Supply and Equipment

The fire hydrants shall be inspected prior to backfilling the trench surrounding the fire hydrants. A report, including pictures, shall be provided to the Contracting Officer.

Fire pump tests shall be conducted in the presence of the pump, controller, and engine manufacturer technical representatives. The fire pump manufacturer shall also be present for the preliminary test of the fire pump system.

D40 1.2.3.5 Kitchen Hood Fire Extinguishing Systems

The kitchen hood fire extinguishing system shall contain water for the actual performance testing. The nozzles may be bagged in order to minimize damage from water spray.

D40 1.2.3.6 Spray-Applied Fire Proofing and Fire Stopping

See Section C1030 for requirements.

D40 1.2.4 Training

The contractor shall provide training for the active systems within 6 weeks of final acceptance of the systems. The training shall be scheduled at least 2 weeks in advance.

D40 1.3 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Z10, *General Performance Technical Specifications* and NPS DO/RM 58 *Structural Fire*.

D40 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with Part 2 of the RFP for the following:

All fire protection engineering submittals including:

- a. Shop Drawings. Provide shop drawings for all systems.(GOV)
- b. Product Data. Provide product data for all equipment.
- c. Design Data. Provide design data for all system calculations.
- d. Test Reports
- e. Certificates

D4010 FIRE ALARM AND DETECTION SYSTEMS

D401001 FIRE ALARM DISTRIBUTION

D401001 1.1 REMOTE ANNUNCIATORS

Remote annunciators shall have a minimum 80 character alphanumeric display with alarm acknowledge, alarm silence, and reset functions.

D401001 1.2 TRANSMITTED SIGNALS

Provide the following signals to be sent to the fire alarm receiving station:

- a. Sprinkler Water Flow
- b. Smoke Detector
- c. Manual Pull Station
- d. Supervisory (i.e., valve tamper switch, fire pump loss of power, fire pump phase reversal)
- e. Duct Smoke Detector
- f. Fire Pump Running
- g. Sleeping Room Smoke Detector

D4020 FIRE SUPPRESSION WATER SUPPLY AND EQUIPMENT

D402001 FIRE PROTECTION WATER PIPING AND EQUIPMENT

The design point of connection to the existing water supply shall require the approval of the Contracting Officer. The FP DOR shall conduct additional flow tests after contract award prior to any design

submissions. Tests shall be conducted under the supervision of the Contracting Officer.

D4040 SPRINKLERS

D404001 SPRINKLER SYSTEMS

D404001 1.1 DESCRIPTION

Areas subject to freezing shall be provided with a dry pipe system. Loading docks may be protected with dry-type sidewall sprinklers supplied by the wet-pipe system.

D404001 1.2 REQUIREMENTS

Utilize upright sprinklers with ordinary temperature rating and color to match finish in normally occupied rooms without a finished ceiling (i.e., laboratories, and other spaces with exposed ceilings).

D4090 OTHER FIRE PROTECTION SYSTEMS

D409001 CLEAN AGENT SYSTEMS

D409001 1.1 SYSTEM INSTALLATION

The system shall be supplied and installed by a factory-authorized distributor. The distributor shall be trained by the manufacturer to design, install, test, and maintain the system and shall be able to provide proof of training upon request.

D409001 1.2 RELEASING CONTROL SYSTEM

Where provided manual release stations shall be dual-action type located inside a clear plastic tamper cover that must be lifted prior to actuating the station. The words "fire" or "fire alarm" shall not appear on the cover. The station shall not require the breaking of glass to actuate. Unit shall have operating instructions clearly marked on the station cover. Unit shall be compatible with the control panel to which it is connected. Operation of a station shall result in immediate release of the clean agent system for that space.

D409004 HOOD & DUCT FIRE PROTECTION

Exhaust hoods with grease extractors listed by UL or FM are not required to have protection downstream of the grease extractor.

--End Of Section--

SECTION D50

ELECTRICAL

D50 GENERAL

D50 1.1 - NARRATIVE

This section covers installations inside the facilities and out to the five foot line.

D50 1.2 - ELECTRICAL 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. All buildings and structures containing electrical systems shall conform to NFPA 70, the National Electrical Code. Refer to section Z10 paragraph 1.5 for specific equipment mounting requirements in relation to seismic information.

Electrical design for this project shall comply with the energy and design requirements of 10 CFR 433, 10 CFR 434 and 10 CFR 435.

D50 1.3 - QUALITY ASSURANCE

Qualifications, certifications, and Test Plans indicated herein shall be submitted 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

D50 1.3.1 Qualified Testing Organization

Contractor shall engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization shall be independent of the supplier, manufacturer, and installer of the equipment. The organization shall be a first tier subcontractor.

Submit name and qualifications of organization. Organization shall have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization shall have a calibration program, and test instruments used shall be calibrated in accordance with NETA ATS.

Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments shall be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting,

testing, and calibrating electrical distribution and generation equipment, systems, and devices.

D50 1.3.2 - NEC Qualified Worker

Provide in accordance with NFPA 70. Qualified Workers shall be allowed to be assisted by helpers on a 1 to 1 ratio, provided such helpers are registered in recognized apprenticeship programs. Submit a certification confirming NEC Qualified Worker requirements.

In addition to the above requirement, the electrical installation shall be performed by a certified and licensed electrical contractor. Contractor shall follow state and local requirements for electrical installations at this site.

D50 1.3.3 - Qualified Telecommunications Worker

All installers assigned to the installation of telecommunications systems or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installation Technicians or have a minimum of 3 years experience in the installation of the specified copper components. Include names and locations of two projects successfully completed using copper communications cabling systems. Include written certification from users that systems have performed satisfactorily for not less than 18 months. Include specific experience in installing and testing structured telecommunications distribution systems using Category 5e cabling systems.

D50 1.3.4 - Material Standards

Ensure service support and provide manufacturer's nameplate.

D50 1.3.4.1 - Warning Labels

Provide arc flash warning labels for all panelboards and electrical enclosures.

D50 1.3.4.2 - Field-Required Nameplates

Provide laminated plastic nameplates for each panelboard, equipment enclosure and switch. Each nameplate must identify the function and, when applicable, the position. Provide melamine plastic nameplates, 3 mm (0.125 inch) thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be 25 by 65 mm (one by 2.5 inches). Lettering shall be a minimum of 6.35 mm (0.25 inch) high normal block style.

D50 1.3.5 - Electrical System Startup and Testing

Submit test plans for approval. The test plans shall be tailored to the systems provided.

The test plan shall list make and model and provide functional description of the test instruments and accessories and shall describe the setup of the tests to be conducted. Test instruments shall be capable of measuring and recording or displaying test data at a higher

resolution and greater accuracy than specified for the equipment's performance.

D50 1.3.6 - Performance Verification Testing

The Contractor shall show by demonstration in service to the NPS contracting officer that all circuits and devices are in operating condition. Tests shall be such that each item of control equipment will function not less than five times. The Contractor shall provide all necessary test equipment, tools, fuel, etc., labor, and materials for testing. As a minimum, all systems shall be tested in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. The Contractor shall assure that all applicable test instruments are maintained within rated accuracy. Dated calibration labels shall be visible on all test equipment.

Submit a separate electrical field test plan in accordance with manufacturer's recommendations for each System requiring Performance Verification Testing.

The following items identify specific test requirements.

- a. Panelboards - Field test each GFI and AFI circuit breaker with a UL 1436-certified outlet circuit tester to verify correct operation.
- b. Transient voltage surge suppressors(TVSS) -
 1. Inspect for physical damage and compare nameplate data with the drawings and specifications, if applicable. Verify from the nameplate data that the TVSS equipment is appropriate for the system voltage.
 2. Verify lead length between the TVSS equipment and the circuit connection is less than one foot.
 3. Verify wiring between the TVSS equipment and the circuit connection does not include high-inductance coils or sharp bends.
 4. Confirm circuit breaker used for TVSS circuit connection is sized in accordance with TVSS manufacturer's requirements.
 5. Ensure TVSS equipment is grounded in accordance with TVSS manufacturer's requirements. Check the ground lead on each device for individual attachment to the ground bus or electrode.
 6. Check tightness of connections in accordance with NETA ATS.
 7. For TVSS equipment with visual indications of proper operation, verify that it displays normal operating characteristics.
- c. Receptacles - Test GFI receptacles with a UL 1436-certified outlet circuit tester to verify correct operation.

- d. Lighting - Verify that equipment operates in accordance with user's requirements and in accordance with manufacturer's recommendations.
- e. Data Systems - All data systems shall be full channel tested from originating point to data outlet, per latest ANSI/EIA/TIA-568-B standards. Minimum test performed shall be: High Test Frequency, Input Impedance, NEXT and ELFEXT, Pair-to-Pair ACR and Power Sum ACR, Maximum Skew, and Maximum Attenuation.
- f. Grounding systems - Test the grounding system in accordance with NETA ATS.

D50 1.3.7 - Construction Submittals

The general requirements of this PTS section are located in PTS Section Z10, General Performance Technical Specification. Construction submittals shall be in accordance with Part 2 of the RFP.

An Operations and Maintenance manual is a contract requirement, provide product data for all equipment; and submit operation and maintenance data in accordance with National Park Standards.

D5010 ELECTRICAL SERVICE AND DISTRIBUTION

D501001 PANELBOARDS

Panelboards shall comply with UL 67 and UL 50. UL 869A shall apply if used as service entrance equipment. Panelboards for non-linear loads shall be UL listed, including heat rise tested, in accordance with UL 67, except with the neutral assembly installed and carrying 200 percent of the phase bus current during testing. Panelboards shall be sized to provide at least 25% spare capacity.

Provide bolt-on molded case circuit breakers in accordance with UL 489. Ground fault circuit interrupting circuit breakers shall comply with UL 943.

D501002 DISCONNECTS AND SWITCHES

Disconnects and switches shall be heavy-duty type and shall be furnished in accordance with NEMA KS-1. The switch blades shall be fully visible in the OFF position. The contact operation shall be quick-make/quick break. All disconnect for motor circuits shall be horsepower rated. All disconnects shall be lockable in the ON or OFF position. Enclosures shall be NEMA 1 with a baked enamel over rust-inhibiting primer, or NEMA 3R where required. Provide fused or non-fused disconnects where required. All disconnects shall be UL listed.

D501003 WIRING DEVICES

Provide NEMA 5-20R duplex receptacles as convenience outlets. All receptacles shall be UL listed in accordance with UL 498. Ground fault circuit interruption rated devices shall be UL listed in accordance with UL 943. Switches shall be UL listed in accordance with UL 20. Cover plates shall be UL listed in accordance with UL 514D.

Within the Vehicle Bay provide general receptacles at +48" on each wall greater than 2' in length with the exception of the north and west wall, which will have receptacles every 3' on center. See E109002 for additional information. All wiring devices, cord reels and other pieces of electrical equipment installed in the Vehicle Bay shall be installed in accordance with NEC Article 511 (as applicable).

The Storage Room shall be provided with one general duplex receptacle mounted at +48".

The Restroom shall have a GFCI duplex receptacle adjacent to the lavatory mounted at +44".

The Mechanical Room shall have two general duplex receptacles. Provide a dedicated circuit and simplex receptacle for the irrigation controller. Provide a dedicated circuit and junction box for the exterior lighting time clock. Provide a dedicated circuit and quadraplex receptacle for the telephone service entrance equipment.

The Office shall have one quadraplex receptacle on each wall.

The Break Room shall have a general receptacle on each wall. Provide dedicated receptacles for the under counter refrigerator, microwave, and garbage disposal. The garbage disposal shall be switched above the counter at +44" A.F.F. Provide additional GFCI duplex receptacles above the counter at +44" A.F.F. on 4' centers for counters 1' in width or greater.

An exterior GFCI receptacle shall be placed adjacent to each exterior door. Each canopy shall have a GFCI receptacle located on each support column at +48". Exterior GFCI receptacles shall also be placed within 25' of heating, air conditioning, and refrigeration equipment per NEC 210.63. Exterior receptacles shall be provided with weather proof while in use covers.

D501004 ENCLOSED CIRCUIT BREAKERS

Provide bolt-on molded case circuit breakers in accordance with UL 489. UL 869A shall apply if used as service entrance equipment. Provide with solid neutral when grounded conductor is present.

D501090 OTHER SERVICE AND DISTRIBUTION

D501090 1.1 TRANSIENT VOLTAGE SURGE SUPPRESSORS (TVSS)- UL 1449

D5020 LIGHTING, BRANCH WIRING, CONDUIT, AND BOXES

D502001 LIGHTING EQUIPMENT

Installation shall meet requirements of manufacturer's recommendations. All lighting equipment and fixtures shall bear the UL label. Lighting fixtures shall be listed for use in their location. Light fixtures shall be commercial grade rated. The lighting design shall be based on IESNA Handbook v.9 recommendations for illumination levels in interior spaces and NFPA/IBC for path of egress illumination levels. However the requirements of ASHRAE 90.1 shall take final precedence over IESNA recommendations.

The Vehicle Bay shall have high bay fixtures with T8 fluorescent lamps. Provide with emergency ballast and battery as needed.

The Storage and Mechanical Room shall have turret industrial fixtures with T8 fluorescent lamps. Provide with emergency ballast and battery as needed.

The Restroom shall have a wall bracket with T8 fluorescent lamps rated for damp locations above the lavatory. In addition, the Restroom shall have compact fluorescent down lights rated for damp locations. Provide with emergency ballast and battery as needed. The restroom shall have a compact fluorescent down light rated for wet locations above the shower stall switched separately from the rest of the restroom lighting.

The Office and Break Room shall have 2x4 troffers with T8 fluorescent lamps. Provide emergency ballast and battery as needed.

Contractor shall provide ceiling mounted occupancy sensors throughout the building. Each ceiling mounted occupancy sensor shall be provided with a manual override 'ON' switch mounted at standard switch height.

D502001 1.1 - BALLASTS

Electronic ballasts shall be UL listed and include a 5-year warranty.

D502002 BRANCH WIRING

Provide all branch wiring as required for a complete electrical system, including connections for special outlets where required. All branch wiring shall be sized according to the NEC, and to allow no more than 2% voltage drop from origination to load. All homerun circuits must contain no more than 2 phase conductors for a single phase system. All conductors shall be copper. Aluminum and copper clad conductors shall not be allowed.

All branch wiring shall be installed in conduit.

D502003 CONDUIT

All conduit in buildings shall be EMT type galvanized steel conduit, and shall meet standards as defined by UL 797, UL 514B. The minimum conduit size shall be 3/4". Size all conduits per conduit fill requirements as defined by the NEC.

D502004 BOXES

Back boxes and pull boxes shall be hot-dipped galvanized and be UL listed in accordance with UL 514A. Lighting outlet boxes shall be 4 IN octagon. All other back boxes shall be 4 IN square. Size all pull boxes per box fill requirements as defined by the NEC.

D5030 COMMUNICATIONS

D503001 TELECOMMUNICATIONS SYSTEM

Provide RJ-45 telephone/data jacks, complete with cover plates and back boxes, at locations within the Office, Break Room and Shop Area. Placement within the Office shall be adjacent to each quadraplex. The Break Room and Shop Area shall have one location with a single RJ-45 telephone jack mounted at +48" A.F.F. for a wall mounted phone. Provide 4-pair, 24 gauge,

solid conductor UTP, CAT 6 rated cable routed in conduit to the Mechanical Room. This will serve as the distribution point. Provide a standard 4'x 8' painted, telephone terminal board in the Mechanical room. Provide a wall mounted patch panel containing 8 pin RJ-45 front, 110 punch down backs. Patch panels shall contain adequate jacks to accommodate all horizontals. Horizontals shall be fully terminated on both ends per EIA/TIA wiring configuration T568-B. The installation shall meet all requirements of ANSI/EIA/TIA 568-A, 569-A, 606, and 607.

Provide a 4" conduit from the telephone back board in the mechanical room to the existing telephone service pedestal located near the existing power transformer. Conduit shall be installed below grade and shall have a minimum cover of 24". Local telephone provider shall furnish, install and terminate cabling from existing pedestal to new telephone back board. Telephone line surge suppressors provided by local telephone provider at new telephone back board.

D5090 OTHER ELECTRICAL SERVICES

D509002 EMERGENCY LIGHTING

Contractor shall provide emergency egress lighting throughout the building through the use of emergency ballasts and battery backup in finished areas and stand alone emergency fixtures in unfinished areas to maintain 1fc along the path of egress. Contractor shall provide exterior emergency egress lighting at all man door exits.

Provide emergency egress illumination per section 1006 of the 2006 IBC.

D509003 GROUNDING SYSTEMS

Contractor shall provide a grounding system per NEC 250. All branch circuits shall contain a green "equipment grounding" conductor. Provide a #6 AWG ground wire in ¾"C to the electrical system ground from the telephone board.

D509004 LIGHTNING PROTECTION

Contractor shall install all lightning protection equipment per NFPA 780. Contractor shall furnish a UL Master Label for the lightning protection system installed.

D509005 ELECTRIC HEATING

Provide all associated wiring and final connections for a complete and operable system. Coordinate requirements with the mechanical contractor.

D509090 PHOTOVOLTAICS

Photovoltaic base system shall be a fixed array having a DC rating of 4KW located on the portion of the roof facing south. The system shall convert the DC output to an AC output for connection to the building's electrical system. Contractor shall install all photovoltaic equipment per NEC 690. Coordinate additional requirements, including the rebate application for photovoltaic system and net metering, with Nevada Energy.

-- End of Section --

SECTION E10

EQUIPMENT

E 10 GENERAL

E10 1.1 GENERAL REQUIREMENTS

All specialty equipment will be installed by qualified installers regularly engaged in installing the specialty equipment.

E10 1.2 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

E109002 2.1 RESIDENTIAL OR LIGHT COMMERCIAL ELECTRIC KITCHEN EQUIPMENT

E109002 2.1.1 Under Counter Refrigerator - UL 250, refrigerator, minimum 5.0 cubic feet.

E109002 2.1.2 Microwave Oven - UL 923, minimum 1 cubic foot (0.03 cubic meter) capacity.

E109002 2.1.3 Garbage Disposal - UL 430, stainless steel, continuous feed with minimum 1/3 hp motor.

E109002 2.2 VEHICLE BAY EQUIPMENT

E109002 2.2.1 Garage Door Opener -

E109002 2.2.2 Fixed Point Electric Hoist -

E109002 2.2.3 Ice Maker - UL listed and NSF approved; self-contained, air-cooled model, minimum ice production of 355 pounds (161 kg) per 24 hours, and a minimum bin storage capacity of 180 pounds (82 kg) of ice cubes.

E109002 2.2.4 220V Table Saw (Existing)

E109002 2.2.5 Two Stage Air Compressor

E109002 2.2.6 Welder

E109002 2.2.7 Two Ceiling Mounted Cord Reels - One with NEMA L6-20 plug and receptacle and the other shall be NEMA 5-20 plug and receptacle.

E109002 2.2.8 Pre-wired Channel Raceways - Mounted on the north and west walls 48" A.F.F. with duplex receptacles on 3' centers.

E109002 2.2.9 Electric Unit Heaters - Coordinate requirements with mechanical contractor.

E109002 2.2.10 Flammable Storage Ground Bar - 2" x 12" x ¼" tin electroplated copper ground bar with all accessories as required. One #6 ground wire from panelboard ground bus to grounding bar in ¾" conduit. One

#6 wire from ground bar to flammable storage location. Coordinate location with Owner.

E109002 2.3 MECHANICAL ROOM EQUIPMENT

E109002 2.3.1 Telephone Service Entrance

E109002 2.3.2 Electric Tank Water Heater

E109002 2.3.3 Air Source Heat Pump Fan Coil

-- End of Section --

SAMPLE

SECTION F20

SELECTIVE BUILDING DEMOLITION

F20 GENERAL

F20 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*.

F20 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work shall be inspected and found to be in compliance with industry standards prior to acceptance of the work. Items found not to be in compliance shall be removed or corrective measures taken, to assure compliance with the referenced standard. Disposal of materials shall be as specified and performed in a manner to protect workers and existing structures to remain.

F20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE CRITERIA

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection.

F20 1.4 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Part 2 of the RFP.

F20 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with Part 2 of the RFP for the following:

- Temporary Environmental Controls for Design-Build

- Supplementary Temporary Environmental Controls

- Asbestos Hazard Control Activities (GOV)

- Lead Based Paint Hazard Abatement

- Dirt and Dust Control Plan

F2010 BUILDING ELEMENTS DEMOLITION

All demolition materials and appurtenances shall be properly disposed and in accordance with all applicable regulations. Maximize the use of deconstruction and recycling services. Before demolition can commence, any hazardous materials shall be abated in accordance with the requirements of the ESR and other parts of the RFP. The Contractor shall obtain approval from the Contracting Officer for the proposed demolition plan and work/outage schedule prior to demolition activities.

F2010 1.1 GENERAL DEMOLITION

The work includes demolition, salvage of identified items and materials and removal of resulting rubbish and debris. Rubbish and debris shall be removed from Government property daily, unless otherwise directed. Materials that cannot be removed daily shall be stored in areas specified in the approved Demolition Plan.

F2010 1.2 UTILITIES

Remove existing utilities and terminate in a manner conforming to the nationally recognized code covering the specific utility. Disturbance to utilities cannot cause a failure to utilities to remain operational, unless a planned outage is approved by the Contracting Officer and coordinated with on-site personnel.

F2010 1.3 DUST CONTROL

Perform dust control activities in accordance with approved Dirt and Dust Control Plan.

F2010 1.4 TRAFFIC CONTROL

Where pedestrian or vehicle safety is endangered, use traffic barricades.

F2010 1.5 WEATHER PROTECTION

For portions of the building to remain, protect building interior, materials, and equipment from weather at all times.

F2010 1.6 BURNING

Perform burning operations in accordance with the ESR.

F201001 SUBSTRUCTURE & SUPERSTRUCTURE

Perform substructure or superstructure demolition work in accordance with the ESR.

F201002 EXTERIOR CLOSURE

Perform exterior closure demolition work in accordance with the ESR.

For occupied buildings ensure openings to the exterior are secured by the end of the work shift.

F201003 ROOFING

Perform roofing demolition work in accordance with the ESR.

For removal and re-roofing projects, remove only as much roofing as can be re-covered by the end of the work shift.

F201004 INTERIOR CONSTRUCTION & FINISHES

Perform interior construction & finishes demolition in accordance with the ESR.

F201005 CONVEYING SYSTEMS

Perform conveying systems demolition in accordance with the ESR.

F201006 MECHANICAL SYSTEMS

Perform mechanical systems demolition in accordance with the ESR.

F201007 ELECTRICAL SYSTEMS

Perform electrical systems demolition in accordance with the ESR.

F201008 EQUIPMENT & FURNISHINGS

Perform special equipment and furnishing demolition in accordance with the ESR.

F201009 OTHER NON-HAZARDOUS SELECTIVE BUILDING DEMOLITION

Perform non-hazardous selective building demolition in accordance with the ESR.

F2020 HAZARDOUS COMPONENTS ABATEMENT

Prior to starting work, conduct any additional testing that may be needed to provide a final design and comply with all applicable Federal, regional, state and local regulations.

F2020 1.1 FURNISHINGS

The government shall remove all uncontaminated furnishings and equipment from the work area prior to the start of the work.

F2020 1.2 ASBESTOS

Perform asbestos related work as indicated in the RFP, in accordance with the ESR, and the approved asbestos removal work plan. The Designer of Record must be an EPA accredited Asbestos Project Designer.

F2020 1.3 LEAD BASED PAINT

Perform lead based paint related work as indicated in the RFP, in accordance with the ESR and the approved lead based paint removal work plan.

All federal, state and local regulations regarding lead based paint within a child occupied facility must be followed. For lead based paint work performed in child occupied facilities the Designer of

F2020 1.4 PAINT RELATED WORK

Perform paint related work as indicated in the RFP, in accordance with the ESR and the approved paint removal work plan.

F2020 1.5 MERCURY & LLR COMPONENTS

Perform work as indicated in the RFP, in accordance with the ESR and the approved mercury & LLR components removal work plan.

F2020 1.6 PCB'S

Perform PCB related work as indicated in the RFP, in accordance with the ESR and the approved PCB removal work plan. Notify the contracting officer immediately on discovery of any equipment leaking PCB containing fluid. Take reasonable preventative measures to contain the leak and prevent movement of the PCB containing fluids.

F2020 1.7 DISPOSAL

All waste materials shall become the property of the Contractor and shall be transported, disposed of and recycled in accordance with the approved disposal plan as described in Part 2 of the RFP.

-- End of Section -

SECTION G10
SITE PREPARATION

G10 GENERAL

G10 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*.

G10 1.2 PERFORMANCE VERIFICATION AND ACCEPTABLE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection.

G10 1.3 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Part 2 of the RFP.

G10 1.4 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with Part 2 of the RFP for the following:

- Temporary Environmental Controls for Design-Build (GOV)
- Excavation and Fill.
- Demolition Plan

G10 1.5 GEOTECHNICAL REPORT

See requirements for Geotechnical Report in section A10, Foundations

G1010 SITE CLEARING

G1010 1.1 GENERAL

Clear and grub project site as required for project construction.

G1010 1.2 BURNING

Where burning is permitted, adhere to the applicable federal, state, and local regulations.

G101001 CLEARING

G101001 1.1 CLEARING

The Contractor shall clear all trees, shrubs, brush and vegetation necessary for construction of the project

G101001 1.2 PRESERVATION

Preserve and protect trees, shrubs and vegetation not directly impacted by the construction in accordance with Section 01 57 19.00 20, *Temporary Environmental Controls*

G101002 TREE REMOVAL

Remove and dispose of trees to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions with satisfactory material and compact. Mound fill 2 inches (50 mm) above adjacent surface to allow for settling when not part of a sub base.

G101003 STUMP REMOVAL

NOT USED

G101004 GRUBBING

Within the clearing limits, remove and dispose of all logs, shrubs, brush, matted roots, roots larger than 2 inches (50 mm) in diameter, and other debris to a depth of at least 18 inches (450 mm) below ground surface. Fill depressions made by grubbing with satisfactory material and compact to make the new surface conform to the adjacent surface of the ground.

G101005 SELECTIVE THINNING

NOT USED

G101006 DEBRIS DISPOSAL

Prevent spillage on pavements, streets, or adjacent areas. Dispose of all surplus and unsuitable material off of Government property.

G1020 SITE DEMOLITION & RELOCATIONS

G1020 1.1 GENERAL

Demolition work shall include the demolition, removal and legal disposal of existing structures and construction debris as required to accommodate the new construction. Existing office trailer in the trailer court and the existing shop at the site will remain functional by the Owner until the new structure is usable and the Owner has relocated storage materials and furnishings. After this transfer, the existing structures are to be removed in their entirety with the exception of the floor slab of the existing shop. The Contractor shall take care to prevent damages to existing utilities, construction and materials not scheduled for demolition, repair or replacement, and shall repair damages to the construction and materials to the satisfaction of the Contracting Officer and at no additional cost to the Government.

G1020 1.2 AUTHORIZATION

Do not begin demolition until the Demolition Plan has been approved by and authorization in writing is received from the Contracting Officer.

G1020 1.3 TITLE TO MATERIALS

Whenever possible, all features demolished shall be salvaged or recycled in lieu of being disposed of as waste in a landfill. Existing features to be demolished which are not salvageable or reused, shall become the property of the Contractor and shall be removed from project site. The Government will not be responsible for the condition, loss of, or damage to, such property after contract award. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

G1020 1.4 REUSE OF MATERIALS AND EQUIPMENT

Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses.

G1020 1.5 SALVAGED MATERIALS AND EQUIPMENT

Salvage materials and equipment that are to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site on the station in accordance with instructions of the Contracting Officer.

G102001 BUILDING MASS DEMOLITION

Refer to Section F20 for additional information.

G102002 ABOVEGROUND SITE DEMOLITION

G102002 1.1 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to occupied portions of a building or on pavements and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water for dust control if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements as often as necessary to control the spread of debris.

G102002 1.2 PROTECTION

G102002 1.2.1 Traffic Control

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Provide temporary traffic control in accordance MUTCD.

G102002 1.2.2 Existing Work

Protect existing work that is to remain in place, be reused, or remain the property of the Government. At no additional expense to the government, repair all items that are damaged during performance of the work to their original condition, or replace with new. Do not overload pavements to remain.

G102002 1.2.3 Noise Pollution

Make the maximum use of low-noise emission products, as certified by the EPA.

G102002 1.3 PAVING AND SLABS

Remove concrete and asphaltic concrete paving and slabs as required for construction of project. Provide neat sawcuts at limits of pavement removal; protect sawcuts so that new pavement will butt against the existing without feathering.

G102003 UNDERGROUND SITE DEMOLITION

G102003 1.1 UTILITY TERMINATION

Terminate utilities in accordance with state and local rules and regulations; the nationally recognized code; and the requirements of the utility provider covering the specific utility; and approved by the Contracting Officer.

G102003 1.2 PROTECTION OF EXISTING UTILITIES

Protect existing utilities to remain. Where removal of existing utilities and pavement is required, provide approved barricades, temporary covering of exposed areas, and temporary services or connections. Repair damage to existing utilities to remain at no additional expense to the government.

G102004 BUILDING RELOCATION

NOT USED

G102005 UTILITY RELOCATION

NOT USED

G102006 FENCING RELOCATION

NOT USED

G102007 SITE CLEANUP

Remove rubbish and debris from the project site daily; do not allow accumulations inside or outside the building(s) or on pavements. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

G1030 SITE EARTHWORK

G1030 1.1 GENERAL

This section includes the design and construction requirements for earthwork and grading related to construction of the roadways, parking, paved areas and other related sitework. Refer to Section A10 for earthwork related to construction of structures, including building, footings, foundations, retaining walls, slabs, tanks, and utility appurtenances.

G103001 GRADING

G103001 1.1 ELEVATIONS

Establish finish floor elevations as required Match existing shop finished floor at approximate elevation 1348.00 MSL

G103001 1.2 SITE GRADING

The Contractor shall preserve natural topographic features to minimize the impact on the existing drainage patterns at and adjacent to the site. Provide site grading.

G103001 1.3 FINISHED SURFACES

Finish grading shall provide drainage toward existing drainage features. Finish grading shall not result in low spots that hold water or that direct runoff towards new or existing facilities or site amenities.

G103002 COMMON EXCAVATION

The Contractor shall preserve natural topographic features to minimize cut and fill requirements. All unsuitable material and surplus excavation shall become the property of the Contractor and shall be disposed of as indicated in the Project Program.

G103003 ROCK EXCAVATION

If blasting is allowed, it shall be conducted in accordance with National Park Service Explosives Use Policy (NPS Directors Order 65); rules and OSHA regulations contained in 29 CFR 1910 and 1926; DOT rules and regulations contained in 14 CFR 103, 46 CFR 146-149, and 49 CFR 390-397; and IRS regulations contained in 27 CFR 55. Blasting mats shall be provided, and non-electric blasting caps shall be used. Notify the Contracting Officer 24 hours prior to blasting.

Requests for additional compensation shall not be made by the Contractor for degree of hardness or difficulty encountered in removal of material. All unsuitable material and surplus excavation shall become the property of the Contractor and shall be disposed of as indicated in Project Program.

G103004 FILL & BORROW

G103004 1.1 SOURCES

Where sufficient topsoil and satisfactory materials are not available on the project site, provide suitable borrow materials.

G103004 1.2 UNSATISFACTORY SOIL MATERIALS

Remove unsatisfactory soil materials from the site in accordance with the Project Program and replace with satisfactory soil materials

G103004 1.3 TOPSOIL

Utilize existing materials from top 6" of site.

G103005 COMPACTION

Provide compaction in accordance *the recommendations of the Contractor's Geotechnical Engineer.*

G103006 SOIL STABILIZATION

NOT USED

G103007 SLOPE STABILIZATION

NOT USED

G103008 SOIL TREATMENT

G103008 1.1 TERMITE CONTROL

Refer to Section A1010 1.2, "Termite Control".

G103008 1.2 RODENT AND VEGETATION CONTROL

Prevent and eliminate standing water.

G103009 SHORING

Provide sheeting, shoring, bracing, cribbing and underpinning in accordance with OSHA 1926 Subpart P and all other applicable Federal, State and local codes and requirements

Provide protection of existing structures.

G103010 TEMPORARY DEWATERING

NOT USED

G103011 TEMPORARY EROSION & SEDIMENT CONTROL

G103011 1.1 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 site work is completed.

G103011 1.2 MAINTENANCE

Maintain temporary erosion control measures in accordance with state Erosion and Sediment Control Laws and Regulations throughout the project until areas are fully stabilized.

G103090 OTHER SITE EARTHWORK

G103090 1.1 HISTORIC AND ARCHAEOLOGIC ARTIFACTS

NOT USED

G103090 1.2 TOPSOIL AND SEED

Utilize materials salvaged from top 6" of site.

G1040 HAZARDOUS WASTE REMEDIATION

NOT USED

-- End of Section --

SECTION G20

SITE IMPROVEMENTS

G20 GENERAL

G20 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*.

G20 1.1.1 Industry Standards and Codes

U.S CONSUMER PRODUCT SAFETY COMMISSION, PUBLICATION NO. 325

G20 1.2 QUALITY ASSURANCE

G20 1.2.1 Qualifications of Geotechnical Subconsultant

Contractor shall be a professional Geotechnical company holding a Geotechnical license in the state where the work is to be performed and have a minimum five years experience.

G20 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection.

G20 1.3.1 Subgrade Preparation Performance Verification

Perform subgrade preparation in accordance with PTS Section G10.

G20 1.3.2 Base Course Performance Verification

G20 1.3.2.1 Aggregate Base Course

- a. Sampling: ASTM D 75.
- b. Gradation: ASTM C 136.
- c. Thickness: Confirm in-place compacted thickness. Acceptable tolerances are plus or minus 0.5 inches (13 mm). One test for every 500 square yards (418 square meters); minimum 2 tests.
- d. Density: ASTM D 1556 or ASTM D 2922 and ASTM D 3017. One field test for every 1000 square yards (836 square meters); minimum 2 tests. ASTM D 1557, Method D; one laboratory test for the project.
- e. Visual: Surface shall be smooth with no ruts.

G20 1.3.3 Bituminous Concrete Pavement Performance Verification

- a. Visual: Finished surface shall be uniform in texture and appearance and free of cracks and creases.

- b. Sampling: ASTM D 979.
- c. Job Mix: Determine gradation and bitumen content. One sample for every 400 tons (362,500 kilograms); minimum 1 test.
- d. Thickness: ASTM D 3549. Confirm in-place compacted thickness. Acceptable tolerances are plus or minus 0.5 inches (13 mm) for bituminous base course and plus or minus 0.25 inches (6 mm) for bituminous surface course. One test for every 500 square yards (418 square meters); minimum 2 tests.
- e. Surface Smoothness: Test surface smoothness by using a 10 foot (3 meter) straightedge in transverse and longitudinal directions to pavement. Acceptable tolerances are plus or minus 0.25 inches (6 mm) for bituminous base and surface courses.
- f. Density: Conduct field density of in-place compacted pavement in accordance with ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726. One field test for every 1000 square yards (836 square meters); minimum 2 tests. One laboratory test for the project.

G20 1.3.4 Portland Cement Concrete Pavement Performance Verification

- a. Visual: Finished surface shall be uniform in texture and appearance and free of cracks.
- b. Sampling: ASTM C 31M (ASTM C 31).
- c. Thickness: Acceptable tolerances are plus or minus 0.5 inches (13 mm). One test for every 500 square feet (418 square meters); minimum 2 tests.
- d. Surface Smoothness: Test surface smoothness by using a 10 foot (3 meter) straightedge in transverse and longitudinal directions to pavement. The finished surfaces of the pavements shall have no abrupt change of 0.12 inch (3 mm) or more.
- e. Strength: Samples for strength tests of each mix design of concrete placed each day shall be taken not less than once a day, nor less than once for each 100 cubic yards (120 cubic meters) of concrete, nor less than once for each 5000 square feet (500 square meters).
 - 1. Compressive Strength: ASTM C 39. Make five test cylinders for each set of tests. Test two cylinders at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Each strength test result shall be the average of two cylinders from the same concrete sample tested at 28 days. If the average of any three consecutive strength test results is less than $f'c$ or if any strength test result falls below $f'c$ by more than 500 psi, take a minimum of three ASTM C 42/C 42M core samples from the in-place work represented by the low test cylinder results and test. Concrete represented by core test shall be considered structurally adequate if the average of three cores is equal to at least 85 percent of $f'c$ and if no single core is less than 75 percent of $f'c$. Locations represented by erratic core strengths shall be retested.

- f. Remove concrete not meeting strength criteria and provide new acceptable concrete at no expense to the government. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

G20 1.3.5 Concrete Joint Performance Verification

Install a test section of 500 linear feet (150 m) at start of sealing operation for each type sealant to be used. Obtain approval of test section by Contracting Officer prior to installing additional joint seal. 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 shall be rejected. Remove rejected sealer, reclean and reseal joints.

G20 1.4 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Part 2 of the RFP.

G20 1.5 CONSTRUCTION SUBMITTALS

Provide product data for all exterior furnishings.

G2010 ROADWAYS

G2010 1.1 PAVEMENT DESIGN

Provide geometric and pavement design, including minimum pavement sections in accordance with AASHTO and applicable State DOT requirements Provide any required additional pavement design to provide a complete and useable facility.

For pavements subject to aircraft traffic or aircraft ground support equipment traffic consult Government Civil Reviewer for design criteria and requirements. State Department of Transportation standards are not acceptable for airfield pavements.

G2010 1.2 PAVEMENT AESTHETICS

Provide surfaces consistent in color and finish.

G2010 1.4 TRAFFIC CONTROL DEVICES

New traffic control devices (i.e., signs and markings) shall be provided and installed in accordance with the United States Department of Transportation Federal Highway Administration's *Manual on Uniform Traffic Control Devices* and their standard, "Rigid Sign Supports". New traffic control devices shall also be provided along/in the existing streets adjacent to the project site as necessary to provide complete traffic control to the new facilities.

G2010 1.5 EXISTING UTILITY STRUCTURES

Existing utility structures shall be adjusted to meet the new finished pavement grades as required.

G201001 BASES & SUBBASES

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.

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.

G201003 1.1 PAVEMENT MIX

G201003 1.1.1 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.

G201003 1.1.1.1 Bituminous Concrete Placement

Bituminous concrete placement, including minimum temperature during placement, joints, and maximum lift thickness shall be in accordance with the SHS. Compact bituminous concrete in accordance with the SHS, modified to 96 percent of maximum laboratory density. Pavement section and mix design no less than existing access road construction.

G201003 1.1.2 Portland Cement Concrete Pavement

If reinforced, the welded wire fabric shall conform to ASTM A 185. Bar reinforcement shall conform to ASTM A 615/A 615M, Grade 400 (Grade 60).

Provide concrete in accordance with the applicable standard mix of the SHS for the design strength plus any allowable deviations, minimum compressive strength at 28 days of 3500 psi.

G201003 1.2 JOINTS FOR PORTLAND CEMENT CONCRETE PAVEMENT

Joints shall be in accordance with SHS and the applicable portions of TM 5-822-5, *Pavement Design for Roads, Streets, Walks, and Open Storage Areas*. Joints shall be installed in a manner and at such time to prevent random or uncontrolled cracking. Joints shall form a regular rectangular pattern. Wherever curved pavement edges occur, make joints to intersect tangents to curve at right angles.

G201003 1.2.1 Expansion Joints

Provide thickened edge expansion joints at the intersection of two rigid pavements. Use preformed ½" thick joint filler, full depth of concrete thickness, ASTM D 1751. Filler must be compatible with joint sealer material. Preformed joint filler shall be securely held in position during concreting operations.

G201003 1.2.2 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.

G201003 1.2.3 Contraction Joints

Joint lines shall be sawed within specified tolerance, straight, and extend for width of transverse joint, and for entire length of longitudinal joint.

G201003 1.2.4 Construction Joints

If an emergency stop occurs remove the concrete back to location of transverse joint and install a construction joint.

G201003 1.2.5 Joint Sealants

ASTM D 5893; Provide single component cold-applied silicone. Silicone sealant shall be self-leveling and non-acid curing.

G201003 1.2.6 Preformed Compression Seals

Use performed compression seals in areas where silicone joint sealant does not perform, such as areas subject to water inundation.

ASTM D 2628. ASTM D 2835, for lubricant.

G201003 1.3 PRIME COAT

Use prime coat in accordance with the SHS. Prime coat shall be emulsified asphalt materials.

G201003 1.4 TACK COAT

Tack coat is required for bituminous pavement overlays and on vertical cut faces of pavement patches. Tack coat shall be in accordance with the SHS.

G201003 1.5 PAVEMENT PATCHES

Provide pavement patches for existing pavements where required for installation of utility trenches. Saw-cut 12 inches beyond edge of trench. Thicknesses of pavement materials shall be equal to or greater than the existing pavement section.

For spalls or repairs of existing concrete pavement, perform repairs in conformance with AASHTO and applicable State DOT requirements. Spall repair materials shall 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. A manufacturer's data sheet and certificate supporting the satisfactory use shall be provided to the Contracting Officer with the design. A product manufacturer's representative shall be present during the initial two days of product application to verify that manufacturer's instructions for use are adhered to. The Contracting Officer shall be

given 7 days notice prior to the initial application in order to be present.

G201004 MARKING & SIGNAGE

G201004 1.1 MARKING

Pavement markings shall be in accordance with the SHS. Water based paints shall 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.

G201004 1.2 SIGNAGE

Provide signage in accordance with the MUTCD.

G201005 GUARDRAILS & BARRIERS

G201005 1.1 BOLLARDS

Bollards shall be 6" diameter minimum steel pipe filled with concrete and embedded in a portland cement concrete foundation.

G201005 1.2 WHEELSTOPS

Provide precast concrete wheel-stops.

G201006 RESURFACING

Adjust rims of existing utility structures to match proposed grades after resurfacing.

G201006 1.1 SLURRY SEAL

ASTM D 3910 and in accordance with the SHS.

G2020 PARKING LOTS

NOT USED

G2030 PEDESTRIAN PAVING

NOT USED

G203001 BASES & SUBBASES

Provide as required by local standards or geotechnical report; refer to Section G201001.

G203003 PAVED SURFACES

G203003 1.1 CONCRETE SLAB UNDER ROOF OVERHANG.

Slab shall be portland cement concrete pavement, reinforced 6 inches (100 mm) thick minimum. 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.

Provide a broomed finish. 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).

G203003 1.1.1 Joints

Provide contraction joints spaced at intervals equivalent to the width of the slab. Provide 0.5 inch (13 mm) thick transverse expansion joints at changes in direction where slab abuts 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 slab before concrete is placed at that location.

G203003 1.2 BITUMINOUS PAVEMENT

Provide minimum 30' wide access drive from existing drive to new structure pavement.

G203003 1.3 HANDICAPPED RAMPS

NOT USED

G203004 GUARDRAILS & BARRIERS

Refer to Section G201005.

G2040 SITE DEVELOPMENT

NOT USED

G2050 LANDSCAPING

NOT USED

-- End of Section --

SECTION G30

SITE CIVIL UTILITIES

G30 GENERAL

G30 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*.

G30 1.1.1 Industry Standards and Codes

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

G30 1.2 QUALITY ASSURANCE

Materials and assemblies installed in the work shall be inspected and found to be in compliance with industry standards and these specifications prior to acceptance of the work. Items found not to be in compliance shall be removed, or corrective measures taken, to assure compliance with the referenced standard. The Contractor shall perform field tests and provide labor, equipment and incidentals required for testing.

G30 1.2.1 Materials

All materials shall be new, and shall bear the label of standardizing agency whenever standards have been established and label service is normally and regularly furnished by the agency. All equipment provided shall be listed and labeled suitable for the specified purpose, environment, and application and installed in accordance with manufacturer's recommendations.

G30 1.2.2 Additional Work

Provide such other labor and materials as are required for a complete and usable system in accordance with the requirements of the criteria listed, regardless of whether such materials and associated labor are

G30 1.3 PERFORMANCE VERIFICATION AND ACCEPTANCE TESTING

Compliance with the requirements will be determined by a review of the design and construction submittals and by field inspection.

G30 1.3.1 Water Distribution System Verification 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.

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.

G30 1.3.2 Sanitary Sewer Distribution System Verification Testing

Provide testing on sewer mains and laterals in accordance with the state sewerage regulations.

G30 1.3.2.1 Visual Test

Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically full circle of light through the pipeline when viewed from the adjoining end of line.

G30 1.3.2.2 Leakage Tests

G30 1.3.3 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).

G30 1.3.4 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.

G30 1.4 DESIGN SUBMITTALS

Design Submittals shall be in accordance with Part 2 of the RFP.

G30 1.5 CONSTRUCTION SUBMITTALS

Submit construction submittals in accordance with Part 2 of the RFP for the following:

All test reports.

G30 1.6 COORDINATION

To the extent that site work is indicated on the RFP drawings, the Contractor shall verify that the locations and inverts of all site utility lines are coordinated with building utility lines. If necessary, the Contractor shall make adjustments to the locations and inverts indicated on the RFP drawings in accordance with applicable codes and standards.

G30 1.7 BACKFLOW PREVENTION

The Contractor shall submit backflow prevention training certificates and backflow preventer devices certification in accordance with Section 01 50 00.05 20 (01501N), *Temporary Facilities and Controls for Design-Build*.

G30 1.8 NACE CERTIFIED CATHODIC PROTECTION SPECIALIST QUALIFICATIONS

Submit prior to site welding. Certifications shall not be more than one year old. Submit documentation of NACE certification.

G30 1.9 EXCAVATION, BACKFILLING AND COMPACTION OF UTILITIES

Refer to Section G10, *Site Preparation*.

G30 1.10 DELIVERY, STORAGE AND HANDLING OF MATERIALS

Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes, fittings, valves, and hydrants free of dirt and debris. Handle in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry, do not drag pipe to the trench.

G3010 WATER SUPPLY

G3010 1.1 WATER SYSTEM DESIGN

The Contractor shall determine domestic demand for the facility and shall verify the design of all components of the domestic supply system. The water system design and construction shall be in accordance with AWWA, ASTM, IPC, NSF, local codes, state waterworks' regulations, and the utility provider's requirements. Design the water supply systems to provide required flow and maintain residual pressure based upon peak demand.

If the new water system is an extension of an existing water system, the Contractor shall obtain all necessary static pressure, residual pressure and flow characteristics of the existing distribution system by actual field tests. The Contractor shall conduct flow and pressure tests and provide design calculations that show the existing lines are capable of handling the additional flows. The new water system shall connect to the nearest existing fitting or water line.

The Contractor shall design the connections to the water system including the necessary meter assemblies and backflow-preventing devices in accordance with the requirements of the Activity or utility provider and the state waterworks regulations.

Wherever possible, valve boxes and all other utility access structures shall be located out of paved areas.

G301001 WELL SYSTEMS

NOT USED

G301002 POTABLE WATER DISTRIBUTION

G301002 1.1 WATER SERVICE LINES

Water service lines less than 4 inches (100 mm) in diameter shall be copper tubing, PVC, or polyethylene (PEX) tubing

G301002 1.1.1 Materials

a. Copper Tubing

1. Pipe: ASTM B 88M (ASTM B 88), 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. Polyethylene Tubing: AWWA C901.

G301002 1.1.2 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 frost-line.

- a. Ductile-iron water mains: AWWA C600.
- b. PVC water mains: UBPPA UNI-B-8 and the recommendations of AWWA M23, Chapter 9, "Service Connections."

G301002 1.1.3 Installation

Install pipe, fittings and accessories in accordance with manufacturer's instructions.

- a. Metallic Piping: applicable requirements of AWWA C600.
- b. PVC: applicable requirements of ASTM D 2774 and ASTM D 2855.
- c. Polyethylene: applicable requirements of ASTM D 2774 and ASTM F 645.

G301002 1.2 CORROSION PROTECTION

G301002 1.2.1 Insulating Joints

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

shall be wrapped with polyethylene or suitable dielectric tape for a minimum clear distance of 3 feet (900 mm) from the main.

G301002 1.3 VALVES

Valves shall be the same diameter and have the same joint ends as the mains to which they are installed. Each type of valve shall be of one manufacturer.

G301002 1.3.1 Gate Valves

G301002 1.3.1.1 Location

Valves shall be installed at all new points of connection. At a minimum, valves shall be located 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. Valves shall be located outside of pavement and heavy traffic areas whenever possible.

G301002 1.3.1.2 Gate Valves 3-inch (75 mm) and Larger in Diameter

- a. Valves (20-inch and smaller in diameter): AWWA C509 or AWWA C515, non-rising stem and of one manufacturer.
- b. Interior Coating: AWWA C550.

G301002 1.3.1.3 Gate Valves Smaller than 3-inch (75 mm) in Diameter

MSS SP-80, Class 150, solid wedge. Valves shall have flanged or threaded end connections, with unions on both sides of the valve and a hand-wheel operator.

G301002 1.3.1.4 Valve Box

Provide a cast iron, adjustable, valve box for each gate valve on buried piping. Valve boxes shall be 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.

G301002 1.3.2 Corporation Stops

If service lines 2-inch diameter or less are tapping water mains, provide corporation stops. The corporation stops shall be ground key type, bronze, ASTM B61 or ASTM B62.

G301002 1.3.3 Installation of Valves

Make and assemble joints to valves as specified for making and assembling the same type of joints between pipe and fittings.

G301002 1.4 WATER METERS

Provide water meter and remote reading as required by the utility provider and in accordance with AWWA standards.

G301002 1.5 BACKFLOW PREVENTION

Provide backflow prevention and cross connection control in accordance with AWWA M-14 and governing local/state plumbing codes and waterworks' regulations.

G301002 1.6 THRUST RESTRAINT

Provide thrust restraint for all piping, valves, fittings, and other appurtenances of the water distribution system.

- a. Concrete Thrust Blocks: AWWA C600.
- b. Restrained Joints: Pipe manufacturer's recommendations and required length of pipe to be restrained calculated in accordance with IPC, AWWA, ASTM.

G301002 1.7 DISINFECTION

Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with the state waterworks' regulations and AWWA C651.

G301003 POTABLE WATER STORAGE

NOT USED

G301004 FIRE PROTECTION WATER DISTRIBUTION

NOT USED

G301005 FIRE PROTECTION WATER STORAGE

NOT USED

G301006 NON-POTABLE WATER DISTRIBUTION

NOT USED

G301007 PUMPING STATIONS

NOT USED

G301008 PACKAGED WATER TREATMENT PLANTS

NOT USED

G3020 SANITARY SEWER

G3020 1.1 GENERAL REQUIREMENTS

The gravity sanitary sewage collection system shall be designed and constructed in accordance with ASSE, IPC, NSF, ASTM, and the state sewer collection and treatment regulations. The new sanitary sewage collection system shall connect to a new sanitary pump station. The pump station force main will tap an existing force main adjacent to the project site. The Contractor shall provide design calculations that show the existing system is capable of handling the additional flows.

In areas where chemicals and other substances may be stored (including mechanical and electrical rooms), it is recommended that the floor drains be eliminated or provisions made to prevent spills from entering the sanitary sewer system. If there is process flow from equipment, discharge can be hard piped, with air gap, to the sanitary sewer.

Wherever possible, manholes and all other utility access structures shall be located out of paved areas.

G302001 SANITARY SEWER PIPING

G302001 1.1 GENERAL REQUIREMENTS

Provide all materials, equipment, labor, testing, and miscellaneous related items to provide sanitary sewage lines necessary for distribution and services to the buildings.

G302001 1.2 GRAVITY SEWER PIPING

Gravity sewer mains and laterals shall be PVC sewer pipe and fittings, except under roadways or at depths greater than 10 feet (3.0 m) where ductile iron pipe shall be provided.

G302001 1.2.1 Materials

a. PVC Gravity Sewer Pipe

1. Piping and Fittings: ASTM D 3034, SDR 35.
2. Joints: ASTM D 3212 and ASTM F 477.

b. Ductile Iron Gravity Sewer Pipe

1. Piping: ASTM A 746. Provide required Thickness Class based on design information and methods in ASTM A 746.
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.

G302001 1.2.2 Installation

Install pipe, fittings and accessories in accordance with manufacturer's instructions.

- a. PVC: 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.

G302002 SANITARY SEWER MANHOLES & CLEANOUTS

G302002 1.1 GENERAL REQUIREMENTS

Provide all materials, equipment, labor, testing, and miscellaneous related items for the sanitary manholes in accordance with the following:

- a. Manhole rim elevations shall be set 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 shall conform to ASTM C 923M (ASTM C 923).
- 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.

G302002 1.2 PRECAST CONCRETE MANHOLES

ASTM C 478M (ASTM C 478); base and first riser shall be monolithic.

Precast manhole sections shall have:

- a. ASTM C 990M (ASTM C 990) butyl gaskets;
- b. ASTM C 443M (ASTM C 443) rubber O-ring joints; or
- c. AASHTO M 198, Type B preformed plastic gaskets.

G302002 1.3 CAST-IN-PLACE CONCRETE MANHOLES

Reinforced concrete; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading. Concrete work shall be in accordance with ACI 301M (ACI 301) and ACI 350-01; provide a minimum compressive strength of 4000 psi (28 MPa).

G302002 1.4 MANHOLE FRAMES AND COVERS

FS A-A-60005; cast iron or ductile iron; designed to accommodate the traffic loadings. The word "Sewer" shall be stamped or cast into covers so that it is plainly visible.

G302002 1.5 MANHOLE 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 443M (ASTM C 443). Aluminum steps or rungs will not be permitted.

Steps are not required in manholes less than 4 feet (1.2 m) deep.

G302002 1.6 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.

G302002 1.7 CLEANOUTS

Construct cleanouts of cast iron soil pipe and fittings; see G302001, paragraph 1.3.

G302003 LIFT STATIONS AND PUMPING STATIONS

G302003 1.1 GENERAL REQUIREMENTS

If a pump station is allowed, provide all materials, equipment, labor, testing and miscellaneous related items for a packaged simplex lift or pump station system for the facility in compliance with the ASSE, IPC, NSF, ASTM, the state sewerage regulations; and the utility provider's requirements.

G302003 1.2 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. Guide rail system shall be constructed of stainless steel. Provide a stainless steel lifting chain for raising and lowering the pump in the basin.

G302003 1.3 PUMP MOTOR

Provide pump motor sized to accommodate pump operation along the entire impeller curve.

G302003 1.4 STATION PIPING WITHIN WET WELL AND VALVE VAULT

G302003 1.4.1 Piping Less than 4-Inch (100 mm) in Diameter

a. PVC Pressure Pipe

1. Pipe: ASTM D 1785, Schedule 80.
2. Fittings: Schedule 80 socket fittings, ASTM D 2467; Schedule 80 threaded fittings, ASTM D 2464.

G302003 1.5 FORCE MAINS

G302003 1.5.1 Force Mains for Grinder Pumps

Force mains less than 4 inches (100 mm) in diameter shall be PVC pressure pipe:

a. PVC Pressure Pipe

1. Pipe: ASTM D 1785, Schedule 80
2. Fittings: Schedule 80 socket fittings, ASTM D 2467, schedule 80 threaded fittings, ASTM D 2464.

G302003 1.6 PIPING ACCESSORIES

G302003 1.6.1 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.

G302003 1.6.2 Accessories

Provide flanges, connecting pieces, transition glands, transition sleeves, and other adapters as required.

G302003 1.6.3 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).

G302003 1.7 VALVES

Suitable shutoff and check valves shall be provided 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 shall 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. Valves shall be capable of withstanding normal pressure and water hammer. Use valves from one manufacturer.

G302003 1.7.1 Shut Off Valves

G302003 1.7.1.1 Shut Off Valves Less than 4 Inch (100 mm) in Diameter
PVC ball valves.

G302003 1.7.2 Check Valves

G302003 1.7.2.1 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).

G302003 1.7.3 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.

G302003 1.8 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.

G302003 1.9 THRUST RESTRAINT

Provide thrust restraint for force mains, valves and other features of the wastewater distribution system.

- a. Concrete Thrust Blocks: AWWA C600.
- b. Restrained Joints: Pipe manufacturer's recommendations and required length of pipe to be restrained calculated in accordance with IPC, AWWA, ASTM.

G302003 1.10 STATION CONTROL SYSTEM

G302003 1.10.1 Alarm Controls

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.

G302003 1.11 STATION ACCESSORIES

G302003 1.11.1 Ventilation

Covered wet wells shall have provisions for air displacement venting to the outside. Galvanized ASTM A 53/A 53M pipe with insect screening.

Provide adequate ventilation for all pump stations.

G302003 1.11.2 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.

G302003 1.11.3 Miscellaneous Metals

Use stainless steel bolts, nuts, washers, anchors, and supports for installation of equipment.

-- End of Section --

SECTION G40

SITE ELECTRICAL UTILITIES

G40 GENERAL

G40 1.1 - NARRATIVE

This section covers installations exterior to the facility (building, aerators, sewage pump station, etc. on site) up to the five foot line. See Section D50, *Electrical*, for continuation of systems into the buildings.

G40 1.2 - ELECTRICAL 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*. All electrical site work shall conform to NFPA 70, the National Electric Code.

G40 1.3 - QUALITY ASSURANCE

Qualifications, certifications, and Test Plans indicated herein shall be submitted 45 calendar days prior to the expected date of execution. Notify the Contracting Officer 14 calendar days prior to all testing. Submit test results within 7 calendar days of completion of testing.

D50 1.3.1 Qualified Testing Organization

Contractor shall engage the services of a qualified testing organization to provide inspection, testing, calibration, and adjustment of the electrical distribution system and equipment listed in paragraph entitled "Acceptance Tests and Inspections" herein. Organization shall be independent of the supplier, manufacturer, and installer of the equipment. The organization shall be a first tier subcontractor.

Submit name and qualifications of organization. Organization shall have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of 5 years. The organization shall have a calibration program, and test instruments used shall be calibrated in accordance with NETA ATS.

Submit name and qualifications of the lead engineering technician performing the required testing services. Include a list of three comparable jobs performed by the technician with specific names and telephone numbers for reference. Testing, inspection, calibration, and adjustments shall be performed by an engineering technician, certified by NETA or the National Institute for Certification in Engineering Technologies (NICET) with a minimum of 5 years' experience inspecting, testing, and calibrating electrical distribution and generation equipment, systems, and devices.

G40 1.3.2 - NEC Qualified Worker

Provide in accordance with NFPA 70. Qualified Workers shall be allowed to be assisted by helpers on a 1 to 1 ratio, provided such helpers are registered in recognized apprenticeship programs. Submit a certification confirming NEC Qualified Worker requirements.

In addition to the above requirement, the electrical installation shall be performed by a certified and licensed electrical contractor. Contractor shall follow state and local requirements for electrical installations at this site.

G40 1.3.3 - Qualified Cable Splicer (Telecommunications)

Certification shall include the training, and experience of the individual on specific type and classification of telecommunications cable to be provided under this contract.

G40 1.3.4 - Material Standards

Ensure service support and provide manufacturer's nameplate in accordance with PTS Section Z10, *General Performance Technical Specification*.

G40 1.3.5 - Warning Labels

Each enclosure of electrical equipment shall have a warning label identifying the enclosure as 1) containing energized electrical equipment and 2) an arc flash hazard.

G40 1.3.6 - Electrical System Startup and Testing

Submit test plans for approval. The test plans shall be tailored to the systems provided.

The test plan shall list make and model and provide functional description of the test instruments and accessories and shall describe the setup of the tests to be conducted. Test instruments shall be capable of measuring and recording or displaying test data at a higher resolution and greater accuracy than specified for the equipment's performance.

G40 1.3.6.1 - Performance Verification Testing

The Contractor shall show by demonstration in service that all circuits and devices are in operating condition. Tests shall be such that each item of control equipment will function not less than five times. The Contractor shall provide all necessary test equipment, tools, fuel, etc., labor, and materials for testing. As a minimum, all systems shall be tested in accordance with manufacturer's recommendations. Additional testing requirements for the various systems are described with those systems, hereinafter. The Contractor shall assure that all applicable test instruments are maintained within rated accuracy. Dated calibration labels shall be visible on all test equipment.

Submit a separate electrical field test plan in accordance with manufacturer's recommendations and that conforms to NETA ATS for

each piece of Electrical Distribution Equipment and/or System requiring Performance Verification Testing.

The following items identify specific test requirements.

- a. Cable - Test cable in accordance with the manufacturer's recommendations and NETA ATS.
- b. Grounding - Test ground systems in accordance with the manufacturer's recommendations and NETA ATS.
- c. Site Lighting - Contractor's Quality Control (CQC) representative shall perform a field survey of site lighting systems in accordance with IESNA for acceptance. Show that the lighting system operates in accordance with the user's requirements and is in accordance with designed levels. Provide certification that the measured lighting levels conform to the design requirements.
- d. Telecommunications Wiring - Test all cables in accordance with industry standards.

G40 1.4 - DESIGN SUBMITTALS

The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*. Design submittals shall be in accordance with Part 2 of the RFP.

G40 1.5 - CONSTRUCTION SUBMITTALS

The general requirements of this PTS section are located in PTS Section Z10, *General Performance Technical Specification*. Construction submittals shall be in accordance with Part 2 of the RFP.

An Operations and Maintenance manual is a contract requirement, provide product data for all equipment; and submit operation and maintenance data in accordance with National Park Standards.

G4010 ELECTRICAL DISTRIBUTION

The new facility shall be provided with a new 120/240v, single phase, three wire service from the existing utility transformer.

The main service entrance panel shall be located in the mechanical room, and shall carry a NEMA rating as appropriate for the location. Distribution to the building and other items requiring power on site shall occur from this point. The main service entrance panel shall be service rated and contain the main service disconnect. All service bonding shall occur at this panel. Sub-feed additional panelboards from the main service entrance panel as needed.

All power company and telephone service provider charges and fees for new services shall be paid by the Contractor.

G401006 UNDERGROUND ELECTRIC CONDUCTORS

All site electrical work shall be underground. Route cables to minimize splices. All cables shall be copper. Aluminum or copper clad conductors

shall not be allowed. Cable pulling tensions shall not exceed the maximum pulling tension recommended by the cable manufacturer. Cables shall be routed from the existing utility transformer to the buildings mechanical room. Cable size shall be determined by actual load for the building plus 25% for future expansion and shall have voltage drop limited to three percent.

All feeders shall contain an appropriately sized equipment grounding conductor, and all feeders shall be installed in conduit.

G401007 PULL-BOXES AND RACEWAYS

Electrical pull-boxes shall be NEMA 4x rated. All pull-boxes shall be UL listed for such use.

Raceways shall be PVC coated rigid steel for all exterior locations. Conduit shall be provided for all electrical distribution, and all conduit shall be UL listed.

G401008 GROUNDING SYSTEMS

A ground ring with ground rods at a minimum of 4 locations, equally spaced shall be installed around the building. The main distribution panel ground shall be connected to the ground ring, water piping, a concrete encased electrode and building steel, if applicable. The entire grounding system shall meet the requirements of NEC 250.

G401009 METERING

Coordinate metering requirements with Nevada Energy.

G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS

Maintained mean area lighting levels shall be 6 lux (0.5 fc). The area to be illuminated shall be lit by a building mounted wall pack installed above each building entrance and shall illuminate an area approximately 2FT to each side, and 6 FT out from each building entrance. Lighting uniformity shall be maintained with the following average to minimum (avg/min) uniformity ratios:

- a. Walkways, 6:1
- b. Building Entrances, 6:1
- c. Area Lighting Under Canopies, 6:1

Exterior lighting shall be low pressure sodium and 100% cutoff in order to provide minimal disturbance to all surrounding habitat.

Exterior lighting shall be controlled by photocell and timer.

Provide emergency egress illumination at each exterior door of the building.

G409001 ELECTRICAL SUPPORT SYSTEMS

Provide power and control conduit and wire to support the existing two aerators as required to maintain a complete operable system.

Provide power and control conduit and wire to support the 1 HP simplex sewage pump station for a complete operable system.

-- End of Section --

SAMPLE

SECTION Z10

GENERAL PERFORMANCE TECHNICAL SPECIFICATION

1/6/09

Z10 GENERAL

Z10 1.1 - NARRATIVE

All Performance Technical Specification (PTS) sections must be used in conjunction with all parts of the Design Build (D/B) Request for Proposal (RFP) to determine the full requirements of this solicitation. This PTS section provides general requirements for the other PTS sections of this RFP and is used in conjunction with the other PTS sections.

Z10 1.2 - DESIGN GUIDANCE

Provide work in compliance with the following design standards and codes, as a minimum.

The advisory provisions of all codes, requirements, and standards shall be mandatory; substitute words such as "shall", "must", or "required" for words such as "should", "may", or "recommended," wherever they appear. The results of these wording substitutions incorporate these code and standard statements as requirements. Reference to the "authority having jurisdiction" shall be interpreted to mean "Contracting Officer". Comply with the required and advisory portions of the current edition of the standard at the time of contract award.

The following list of codes and standards is not comprehensive and is augmented by other codes and standards referenced and cross-referenced in the RFP.

Z10 1.2.1 - Industry Codes

American Concrete Institute (ACI) Publications

ACI 117/117R: Standard Specifications for Tolerances for Concrete Construction and Materials and Commentary, 1990 Edition (Re-approved 2002)

ACI 301-05: Specifications for Structural Concrete

ACI 315-99: Details and Detailing of Concrete Reinforcement

ACI 318-02/318R-05: Building Code Requirements for Structural Concrete and Commentary

ACI 530/530.1R-05: Building Code Requirements for Masonry Structures and Specifications for Masonry Structures and Commentaries.

American Institute of Steel Construction

AISC 360-05: Specification for Structural Steel Buildings - 2005

AISC 303-05: Code of Standard Practice for Steel Buildings and Bridges.

AISC 341s-05: Seismic Provisions for Structural Steel Buildings,
Including Supplement No. 1 Dated 2005.

Association of Iron and Steel Institute (AISI)

AISI: Specifications of the Design of Cold Formed Structural Steel
Members (latest edition and supplements)

American Society of Civil Engineers (ASCE) Publications

ASCE 7 05: Minimum Design Loads For Buildings and Other Structures

American Welding Society (AWS) Publications

Metal Buildings Manufacturer Association (MBMA) Publications

MBMA: Metal Building Systems Manual, 2002 Edition.

Steel Deck Institute (SDI) Publications

SDI: Design Manual for Composite Deck, Form Decks and Roof Decks,
Publication No. 30, April 2001.

Diaphragm Design Manual, 2004.

Research Council On Structural Connections (RCSC)

RCSC: Specification for Structural Joints Using ASTM A325 or A490
Bolts

AMERICAN FOREST & PAPER ASSOCIATION

National Design Specification (NDA), for Wood Construction, 2001

Wood Frame Construction Manual For One- and Two-Family Dwellings
2001

INTERNATIONAL BUILDING CODE (IBC) - 2006

INTERNATIONAL MECHANICAL CODE (IMC)

INTERNATIONAL PLUMBING CODE (IPC)

NATIONAL ELECTRIC CODE 2008 (NEC)

NATIONAL FIRE CODES (NFC)

Z10 1.2.2 - Industry Requirements

WHOLE BUILDING DESIGN GUIDE (WBDG)

WHOLE BUILDING DESIGN GUIDE, Ensure Occupant Safety and Health (Systems
Safety Engineering) at

http://www.wbdg.org/design/ensure_health.php

Z10 1.2.3 - Federal Standards

Architectural Barriers Act Accessibility Standards (ABAAS)

Architectural Barriers Act Accessibility Standards (ABAAS)

Occupational Safety and Health Association (OSHA)

Z10 1.3 - MATERIALS AND EQUIPMENT REQUIREMENTS IDENTIFICATION

Z10 1.3.1 - MATERIALS STANDARD

Refer to the Design Build Project Scope for identification of Government Furnished Equipment.

Materials, equipment, fixtures, and other appurtenances shall comply with applicable Underwriters Laboratories, (UL) Inc., American National Standards Institute, Inc., and National Electrical Manufacturer's Association standards or applicable standards of a similar independent testing organization. All materials shall be new, and shall bear the label of Underwriters Laboratories whenever standards have been established and label service is normally and regularly furnished by the agency. All equipment provided shall be listed and labeled suitable for the specified purpose, environment, and application and installed in accordance with manufacturer's recommendations. Insulation shall be asbestos free.

Z10 1.3.2 - Equipment Nameplate Identification

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

Z10 1.4 - PERFORMANCE VERIFICATION AND ACCEPTANCE TESTS

Refer to each PTS section to identify Performance Verification and Acceptance Testing related to the work identified in that PTS section.

Z10 1.5 - STRUCTURE

Z10 1.5.1 - Earthquake Loads

The building structure shall be designed using spectral response acceleration 0.613g at short period (S_s), 0.181g at 1-second periods (S₁). Site Class as determined from Geotechnical Report, Occupancy Category II, and Importance Factor 1.0.

Z10 1.5.2 - Wind Loads

Basic wind speed of 90 mph, Importance Factor of 1.0, Exposure C.

Z10 1.5.3 - Snow Loads

Roof snow loads shall be designed in accordance with ASCE 7-05. Roof snow load, including additional loading due to snow drifting, snow sliding and unbalanced snow conditions where appropriate shall be calculated using a ground snow load of 10 psf, and importance factor of 1.0.

Z10 1.5.4 - Rain Loads

Resist loads from ponding rainwater when primary drainage system is blocked.

Z10 1.5.5 - Floor Live Loads

Maintenance Building: 250 psf.

Office: 100 psf.

Mezzanine Storage: 125 psf.

Z10 1.5.6 - Monorail Hoist

The building structure shall be designed to support a 1-ton capacity monorail hoist, track, trolley, hangers, bracing and accessories plus an impact load of 1.25 times the hoist capacity.

--End of Section--