



SPECIFICATIONS

BID DOCUMENTS PHASE SUBMISSION NARRATIVE

FORT SCOTT NATIONAL CEMETERY ROSTRUM RENOVATION

Department of Veteran Affairs
National Cemetery Association

Project #893CM3014B

AUGUST 3, 2015



RAPID CITY, SD | LAKEWOOD, CO

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**FORT SCOTT NATIONAL CEMETERY
ROSTRUM RENOVATION
FORT SCOTT, KANSAS
#893CM3014B**

SPECIFICATIONS MANUAL

OWNER: Department of Veterans Affairs
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Washington, DC 20001

ENGINEER: FourFront Design, Inc.
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Rapid City, SD 57701

PROJECT MANAGER: Eirik Heikes, PLA

DATE: July 31, 2015

CERTIFICATION: I hereby certify that the Specifications, together with the accompanying documents, were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Colorado.

**DEPARTMENT OF VETERANS AFFAIRS
NCA MASTER SPECIFICATIONS**

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SECTION 00 01 15
LIST OF DRAWING SHEETS

The drawings listed below accompanying this specification form; a part of the contract.

Drawing No.		Title
GENERAL SHEETS		
1	X-100	Cover Sheet
2	B-100	Topographic Survey
3	B-101	Photographic Site Legend: Existing Conditions
4	B-102	Photographic Site Analysis
LANDSCAPE ARCHITECTURAL		
5	L-100	Staging and Demolition/Preservation Plan
6	L-101	Site Plan - Reclamation Plan
7	L-102	Historical Rostrum Plan and Elevations - Existing Conditions Dismantling and Rehabilitation
8	L-103	Historical Rostrum Plan - Renovation
9	L-200	Historical Rostrum Elevations - Renovation
10	L-500	Historical Rostrum Wall/Column Sections and Details - Renovations
11	L-501	Historical Rostrum Details - Renovation
12	L-502	Historical Rostrum Perspectives and Reinforced Concrete Cap Plan
13	L-503	Site Details
STRUCTURAL SHEETS		
14	S-001	General Structural Notes, IBC Schedules and Abbreviations
15	S-101	Foundation, Main Level and Framing Plans
16	S-501	Sections

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SECTION 01 00 00
GENERAL REQUIREMENTS (MINOR NCA PROJECTS)

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SECTION 01 00 02
GENERAL REQUIREMENTS (MINOR NCA PROJECTS)

1.1 GENERAL INTENTION

A. Contractor shall completely prepare site for building operations, including demolition, documentation, storage, re-use and removal of existing structures, and furnish labor, materials, equipment and services and perform and complete all work for **Rostrum Renovations at Fort Scott National Cemetery** as required by drawings and specifications. Note the historical requirement of restoration and rehabilitation projects needs to meet the Secretary of Interior's Standards for the Treatment of Historic Properties. Additionally, the National Park Service (NPS) provides a series of Preservation Briefs with "guidance on preserving, rehabilitating and restoring historic buildings". Several of the briefs, all of which are available online through the NPS website (<http://www.nps.gov/tps/how-to-preserve/briefs.htm>), may be useful as references for the restoration and rehabilitation of the rostrum at Fort Scott National Cemetery. These include but are not limited to:

1. Preservation Brief 1: Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Brick
2. Preservation Brief 2: Repointing Mortar Joints in Historic Masonry Buildings
3. Preservation Brief 6: Dangers of Abrasive Cleaning to Historic Buildings
4. Preservation Brief 16: The Use of Substitute Materials on Historic Building Exteriors
5. Preservation Brief 17: Architectural Character - Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving their Character
6. Preservation Brief 39: Holding the Line: Controlling Unwanted Moisture in Historic Buildings

B. Visits to the site by Bidders may be made only by appointment with the Cemetery Director.

C. Offices of FourFront Design, Inc. 517 Seventh Street, Rapid City, SD 57701, Architect-Engineers (A/E), may render certain technical services during construction. Such services shall be considered as advisory to

the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by **Contracting Officer/Contracting Officer Representative (CO/COR)** or his duly authorized representative.

- D. All Testing Laboratory services will be retained and paid for by the Contractor (see Spec Section 01 45 29, Testing Laboratory Services). However, the Department of Veterans Affairs may elect to retain its own Testing Laboratory for any purpose. Before placement and installation of work subject to tests by testing laboratory retained by Department of Veterans Affairs, the Contractor shall notify the CO/COR in sufficient time to enable testing laboratory personnel to be present at the site in time for proper taking and testing of specimens and field inspection. Such prior notice shall be not less than three work days unless otherwise designated by the CO/COR.
- E. All employees of general contractor and subcontractors shall comply with security requirements as established by the CO/COR, be identified by name and employer. They shall be restricted from unauthorized access.
- F. Prior to commencing work, general contractor shall provide proof that a OSHA certified "competent person" (CP) (29 CFR 1926.20(b)(2)) will maintain a presence at the work site whenever the general or subcontractors are present.
- G. Training:
 - 1. All employees of general contractor or subcontractors shall, at the minimum, have successfully completed the 10-hour OSHA certified Construction Safety course and/or other relevant competency training, as determined by VA CP.
 - 2. Submit OSHA training records of all employees for approval before the start of work.

1.2 STATEMENT OF BID ITEM(S)

- A. ITEM I, GENERAL CONSTRUCTION: Installation of all work shown on the plans and described in the specifications including but not limited to: Rostrum Renovations at Fort Scott National Cemetery.

1.3 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

- A. Additional sets of drawings may be made by the Contractor, at Contractor's expense, from Bond files furnished by the Issuing Office.

1.4 CONSTRUCTION SECURITY REQUIREMENTS

A. Security Plan:

1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.

B. Security Procedures:

1. General Contractor's employees shall not enter the site without following the procedures approved by the CO/COR. They may also be subject to inspection of their personal effects when entering or leaving the project site.
2. For working outside the "regular hours" as defined in the contract, The General Contractor shall give **3 days** notice to the CO/COR for possible approval and so that appropriate arrangements can be provided for the Cemetery employees. This notice is separate from any notices required for utility shutdown described later in this section.
3. No photography of VA premises is allowed without written permission of the CO/COR.
4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the CO/COR.

C. Guards:

1. The General Contractor shall provide unarmed guards at the project site **when theft or vandalism warrants.**

D. Key Control:

1. The General Contractor shall provide duplicate keys and lock combinations to the CO/COR for the purpose of security inspections of every area of project including tool boxes and parked machines, and to take any necessary emergency action.

E. Document Control:

1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of "sensitive information".
2. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.
3. Certain documents, sketches, videos or photographs and drawings may be marked "Law Enforcement Sensitive" or "Sensitive Unclassified". Secure such information in separate containers and limit the access to only those who will need it for the project. Return the information to the CO/COR upon request.
4. These security documents shall not be removed or transmitted from the project site without the written approval of CO/COR.
5. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.
6. Notify CO/COR immediately when there is a loss or compromise of "sensitive information".
7. All electronic information shall be stored in a specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
 - a. Security, access and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.
 - b. "Sensitive information" including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.

1.5 FIRE SAFETY

A. Applicable Publications: Publications listed below form part of this Article to the extent referenced. Publications are referenced in text by basic designations only.

1. American Society for Testing and Materials (ASTM):

E84-2009a Surface Burning Characteristics of Building Materials

2. National Fire Protection Association (NFPA):

10-2010 Standard for Portable Fire Extinguishers

30-2008 Flammable and Combustible Liquids Code

51B-2009 Standard for Fire Prevention During Welding, Cutting and Other Hot Work

70-2008 National Electrical Code

241-2009 Standard for Safeguarding Construction, Alteration, and Demolition Operations

3. Occupational Safety and Health Administration (OSHA):

29 CFR 1926 Safety and Health Regulations for Construction

B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to CO/COR/ Cemetery Director for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Prior to any worker for the contractor or subcontractor's beginning work, they shall undergo a safety briefing provided by the General Contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of NCA equipment, etc. Documentation shall be provided to the CO/COR that individuals have undergone the Contractor's safety briefing.

C. Site and Building Access: Maintain free and unobstructed access to emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.

D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).

- E. Temporary Construction Partitions: as approved by CO/COR. See submittal section 01 33 23 Shop Drawings Product Data.
- F. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- G. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with CO/COR/Cemetery Director.
- H. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to CO/COR.
- I. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- J. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- K. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with CO/ COR. All existing or temporary fire protection systems (fire alarms) located in construction areas shall be tested as coordinated with the Cemetery. Parameters for the testing and results of any tests performed shall be recorded by the Cemetery and copies provided to the CO/COR.
- L. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with CO/COR.
- M. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with CO/COR.
- N. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to CO/COR.
- O. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.
- P. Dispose of waste and debris in accordance with NFPA 241. Remove from site weekly.

- Q. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

1.6 OPERATIONS AND STORAGE AREAS

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the CO/COR. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage trailers, office trailers) and utilities may be erected by the Contractor only with the approval of the CO/COR and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work.
- C. The Contractor shall, under regulations prescribed by the CO/COR, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the CO/COR. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs, sidewalks, or established turf areas, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, turf areas, or roads.
- D. Working space and space available for storing materials shall be as shown on the drawings. Contractor parking will be only in areas and on roadways designated and agreed to by the CO/COR in agreement of the Cemetery.
- E. Workmen are subject to rules of the Cemetery applicable to their conduct.
- F. Execute work so as to interfere as little as possible with normal functioning of Cemetery as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others.
1. Do not store materials and equipment in other than assigned areas.
 2. Schedule delivery of materials and equipment to immediate construction working areas **at** the Cemetery in quantities sufficient

for not more than two work days. Provide unobstructed access to the Cemetery areas required to remain in operation.

- G. Phasing: To insure such executions, the Contractor shall furnish the CO/COR with a schedule of approximate dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, the Contractor shall notify the CO/COR two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such dates to insure accomplishment of this work in successive phases mutually agreeable to the Cemetery Director, CO/COR and Contractor.
- H. Building(s) at Cemetery will be occupied during performance of work. The Contractor shall take all measures and provide all material necessary for protecting existing equipment and property in affected areas of construction against dust and debris, so that equipment and affected areas to be used in the Cemetery's operations will not be hindered. The Contractor shall permit access to Cemetery personnel through other construction areas which serve as routes of access to such affected areas and equipment. Coordinate alteration work in areas occupied by Cemetery Staff so that Cemetery operations will continue during the construction period.
- I. Construction Fence: Before construction operations begin, the Contractor shall provide a chain link construction fence, 2.1m (seven feet) minimum height, around the construction area indicated on the drawings. **Additionally, a canvas screen fabric (off white in color) to be attached continuously to the inside of fence to create a visual barrier between work area and cemetery.** Canvas material to be rot resistant and include durable grommets for attachment to fence (via zip ties or wire or like). Provide gates as required for access with necessary hardware, including hasps and padlocks. Fasten fence fabric to terminal posts with tension bands and to line posts and top and bottom rails with tie wires spaced at maximum 375mm (15 inches). Bottom of fences shall extend to 25mm (one inch) above grade. The temporary fencing shall encompass the construction work area(s) to serve as a pedestrian barrier to alert cemetery patrons of the construction site. Remove the fence when directed by CO/COR.
- J. Utilities Services: Maintain existing utility services for the Cemetery at all times. Provide temporary facilities, labor, materials,

equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by CO/COR. All such actions shall be coordinated with the Utility Company involved.

1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of CO/COR. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the CO/COR and Cemetery Director's prior knowledge and written approval.
2. The Contractor shall submit a request to interrupt any such services to both CO/COR and the Cemetery Director in writing, 48 hours in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
3. The Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of the Cemetery. Interruption time approved by the Cemetery and CO/COR may occur at other than Contractor's normal working hours.
4. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to the desired time and shall be performed as directed by the CO/COR.
5. In case of a contract construction emergency, service will be interrupted on approval of CO/COR. Such approval will be confirmed in writing as soon as practical.
6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.

K. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged. The lines shall not be capped in finished

areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.

- L. To minimize interference of construction activities with flow of Cemetery traffic, comply with the following:
 - 1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles. Wherever excavation for new utility lines cross existing roads, at least one lane must be open to traffic at all times.
 - 2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the CO/COR.
- M. Coordinate the work for this contract with other construction operations as directed by CO/COR. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.
- N. Coordination of Construction with Cemetery Director: The burial activities at a National Cemetery shall take precedence over construction activities. The Contractor must cooperate and coordinate with the Cemetery Director, through the CO/COR, in arranging construction schedule to cause the least possible interference with Cemetery activities in actual burial areas. Construction noise during the committal services shall not disturb the service. Trucks and workmen shall not pass through the service area during this period.
 - 1. The Contractor is required to discontinue his work sufficiently in advance of Easter Sunday, Mother's Day, Father's Day, Memorial Day, Veteran's Day and/or Federal holidays, to permit him to clean up all areas of operation adjacent to existing burial plots before these dates.
 - 2. Cleaning up shall include the removal of all equipment, tools, materials and debris and leaving the areas in a clean, neat condition.

1.7 ALTERATIONS

- A. Survey: Before any work is started, the Contractor shall make a thorough survey with the CO/COR of areas in which alterations occur and furnish a signed report, to the Contracting Officer. This report shall list:

1. Shall note any discrepancies between drawings and existing conditions at site.
 2. Shall designate areas for working space, materials storage and routes of access where alterations occur and which have been agreed upon by Contractor and CO/COR.
- B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of CO/COR, to be in such condition that their use is impossible or impractical, shall be furnished and/or replaced by the Contractor with **historically acceptable identical** items in accordance with specifications which will be furnished by the Government.
- Provided the contract work is changed by reason of this subparagraph B, the contract will be modified accordingly, under provisions of clause entitled "DIFFERING SITE CONDITIONS" (FAR 52.236-2) and "CHANGES" (FAR 52.243-4 and VAAR 852.236-88).
- C. Protection: Provide the following protective measures:
1. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.

1.8 ENVIRONMENTAL CONTROLS

- A. In general, preventive measures shall be adopted during construction to keep down dust and prevent mold.

1.9 DISPOSAL AND RETENTION

- A. Materials and equipment accruing from work removed and from demolition of buildings or structures, or parts thereof, shall be disposed of as follows:
1. Reserved items which are to remain property of the Government are noted on drawings or in specifications as items to be stored. Items that remain property of the Government shall be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items where directed by CO/COR.
 2. Items not reserved shall become property of the Contractor and be removed by Contractor from the Cemetery.
 3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract shall remain

the property of the Government. When rooms and spaces are vacated by the Department of Veterans Affairs during the alteration period, such items which are NOT required by drawings and specifications to be either relocated or reused will be removed by the Government in advance of work to avoid interfering with Contractor's operation.

1.10 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS

- A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, tree roots, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the CO/COR.
- B. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the CO/COR may have the necessary work performed and charge the cost to the Contractor.

(FAR 52.236-9)

- C. Refer to Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, for additional requirements on protecting vegetation, soils and the environment. Refer to Articles, "Alterations", "Restoration", and "Operations and Storage Areas" for additional instructions concerning repair of damage to structures and site improvements.

1.11 RESTORATION

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified,

do not cut, alter or remove any structural work, and **do not disturb any water/irrigation or electric work** without approval of the CO/COR.

Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the CO/COR before it is disturbed. Materials and workmanship used in restoring work shall conform in color, texture, type and quality to that of original existing construction, except as otherwise shown or specified.

- B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, landscape stone, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.
- C. At the Contractor's own expense, the Contractor shall immediately restore to service and repair any damage caused by the Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services, communications systems (including telephone, irrigation system control and power which **are or are not** indicated on drawings and which are not scheduled for discontinuance or abandonment.
- D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

1.12 PHYSICAL DATA

- A. Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.
 - 1. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by FourFront Design, Inc., Tri-State Engineering, Inc. and Terracon Consultants, Inc.
- B. Subsurface conditions have been developed by core borings and test pits. Logs of subsurface exploration conducted by Terracon Consultants, Inc. are shown diagrammatically in **Specifications**.

- C. **A copy of the geotechnical investigation is an Appendix to these specifications and shall be considered part of the contract documents.**
- D. The Government does not guarantee that other materials will not be encountered nor that proportions, conditions or character of several materials will not vary from those indicated by explorations. Bidders are expected to examine the site of work and logs of borings and, after investigation, decide for themselves the character of materials and make their bids accordingly. Upon proper application to the Department of Veterans Affairs, including approved scheduling bidders will be permitted to make subsurface explorations of their own at site.

1.13 PROFESSIONAL SURVEYING SERVICES

- A. A registered professional land surveyor or registered civil engineer whose services are retained and paid for by the Contractor shall perform services specified herein and in other specification sections. The Contractor shall certify that the land surveyor or civil engineer is not one who is a regular employee of the Contractor, and that the land surveyor or civil engineer has no financial interest in this contract.

1.14 LAYOUT OF WORK

- A. The Contractor shall lay out the work from Government established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at the Contractor's own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the CO/COR. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the CO/COR until authorized to remove them. If such marks are destroyed by the Contractor or through Contractor's negligence before their removal is authorized, the CO/COR may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

(FAR 52.236-17)

- B. Establish and plainly mark center lines for each structure/ building and/or addition to each existing building, lines for each gravesite

control monument, and such other lines and grades that are reasonably necessary to properly assure that location, orientation, and elevations established for each such structure and/or addition, roads, parking lots, gravesite control monuments, are in accordance with lines and elevations shown on contract drawings.

- C. Following completion of general mass excavation and before any other permanent work is performed, establish and plainly mark (through use of appropriate batter boards or other means) sufficient additional survey control points or system of points as may be necessary to assure proper alignment, orientation, and grade of all major features of work. The Survey shall include, but not be limited to, location of lines and grades of footings, exterior walls, center lines of columns in both directions, major utilities and elevations of floor slabs:

1. Such additional survey control points or system of points thus established shall be checked and certified by a registered land surveyor or registered civil engineer. Furnish such certification to the CO/COR before any work (such as footings, floor slabs, columns, walls, utilities and other major controlling features) is placed.

- D. During progress of work, the Contractor shall have lines, grades, locations and plumbness of all major form work checked and certified by a registered land surveyor or registered civil engineer as meeting requirements of contract drawings. Furnish such certification to the CO/COR before any major items of concrete work are placed. In addition, furnish to the CO/COR certificates from a registered land surveyor or registered civil engineer that the following work is complete in every respect as required by contract drawings.

1. Lines of each **structure** and/or addition.
2. Elevations of bottoms of footings and tops of floors of each **structure** and/or addition.
3. Lines and elevations of sewers and of all outside distribution systems.
4. Lines of grave plot documentation.
5. Lines of elevations of all swales and interment areas.
6. Lines and elevations of roads, streets and parking lots.
7. Northing/Easting coordinate locations depth below finished grade of all water, sanitary, storm, gas and irrigation structures, directional fittings, control wire and lines.

8. Northing/Easting coordinate locations and elevation for each gravesite grid monument.
- E. Upon completion of the work, the Contractor shall furnish the CO/COR with reproducible drawings, in AutoCAD form, at the scale of the contract drawings, showing the finished grade on the grid developed for constructing the work. These drawings shall bear the seal of the registered land surveyor or registered civil engineer.

1.15 AS-BUILT DRAWINGS

- A. The Contractor shall maintain two full size sets of as-built drawings which will be kept current during construction of the project, which will include all contract changes, modifications and clarifications.
- B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the CO/COR's review, as often as requested.
- C. The Contractor shall deliver two approved completed sets of as-built drawings to the CO/COR within 15 calendar days after acceptance of the project by the CO/COR.
- D. Paragraphs A, B, & C shall also apply to all shop drawings.

1.16 USE OF ROADWAYS

- A. For hauling, use only established public roads and designated permanent roads on Cemetery property and, when authorized by the CO/COR, temporary roads which are necessary in the performance of contract work. Temporary roads shall be constructed by the Contractor at the Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.

1.17 CO/COR'S FIELD OFFICE

NOT USED

1.19 TEMPORARY TOILETS

- A. Provide where directed, (for use of all Contractor's workers) ample temporary sanitary toilet accommodations with suitable sewer and water connections, or when approved by CO/COR provide suitable dry closets where directed. Keep such places clean and free from flies and all connections and appliances connected therewith are to be removed prior to completion of contract, and premises left perfectly clean.

1.20 AVAILABILITY AND USE OF UTILITY SERVICES

- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The amount to be paid by the Contractor for chargeable electrical services shall be the prevailing rates charged to the Government. The Contractor shall carefully conserve any utilities furnished without charge.
- B. The Contractor, at Contractor's expense and in a workmanlike manner satisfactory to the CO/COR, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.
- C. The Contractor shall install meters at the Contractor's expense and furnish the Cemetery a monthly record of the Contractor's usage of electricity as hereinafter specified.
- D. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may smoke and damage finished work, will not be permitted. Maintain minimum temperatures as specified for various materials:
- E. Electricity (for Construction and Testing): Furnish all temporary electric services.
 - 1. Obtain electricity by connecting to the Cemetery electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Where not available or not convenient to connect to the Cemetery distribution system, the contractor shall supply power via portable generators at own expense. Generators shall be acoustically screened so as not to disturb committal services and/or visitation to the adjacent columbarium.
- F. Water (for Construction and Testing): Furnish temporary water service.
 - 1. Obtain water by connecting to the Cemetery **irrigation** distribution system. Backflow preventer may not be required at connections to the irrigation system. Water is available at no cost to the Contractor.

2. If potable water is required and convenient connection is available the contractor may connect to the Cemetery potable water distribution system. The contractor shall install reduced pressure backflow preventer at each connection at own expense.
3. Maintain connections, pipe, fittings and fixtures and conserve water-use so none is wasted. Failure to stop leakage or other wastes will be cause for revocation (at CO/COR's discretion) of use of water from the Cemetery's system.
4. Where not available or not convenient to connect to the Cemetery distribution system, the Contractor shall supply water via portable/temporary means at his own expense.

1.21 INSTRUCTIONS

- A. The Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by the various sections of the specifications and as hereinafter specified.
- B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment shall be delivered to the CO/ COR coincidental with the delivery of the equipment to the job site. Manuals shall be complete, detailed guides for the maintenance and operation of equipment. They shall include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components. Manuals shall include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations shall include "exploded" views showing and identifying each separate item. Emphasis shall be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control shall be clearly and thoroughly explained. All necessary precautions for the operation of the equipment and the reason for each precaution shall be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.
- C. Instructions: the Contractor shall provide qualified, factory-trained manufacturers' representatives to give detailed instructions to assigned Department of Veterans Affairs personnel in the operation and

complete maintenance for each piece of equipment. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Instructions for different items of equipment that are component parts of a complete system; shall be given in an integrated, progressive manner. All instructors for every piece of component equipment in a system shall be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods shall be at such times as scheduled by the CO/ COR and shall be considered concluded only when the CO/ COR is satisfied in regard to complete and thorough coverage. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the CO/COR, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

1.22 GOVERNMENT-FURNISHED PROPERTY

- A. The Government shall deliver to the Contractor, the Government-furnished property shown on drawings.
- B. Materials furnished by the Government to be installed by the Contractor will be furnished to the Contractor at the Cemetery.
- C. Storage space for materials will be provided by the Contractor and the Contractor shall be prepared to unload and store such equipment therein upon its receipt at the Cemetery.
- D. Notify CO/ COR in writing, 60 days in advance, of date on which Contractor will be prepared to receive materials furnished by Government. Arrangements will then be made by the Government for delivery of materials.
 - 1. Immediately upon delivery of materials, the Contractor shall arrange for a joint inspection thereof with a representative of the Government. At such time the Contractor shall acknowledge receipt of materials described, make notations, and immediately furnish the Government representative with a written statement as to its condition or shortages.
 - 2. The Contractor thereafter is responsible for such material until such time as acceptance of contract work is made by the Government.
- E. Equipment furnished by the Government will be delivered in a partially assembled (knock down) condition in accordance with existing standard

commercial practices, complete with all fittings, fastenings, and appliances necessary for connections to respective services installed under contract. All fittings and appliances (i.e., couplings, ells, tees, nipples, piping, conduits, cables, and the like) necessary to make the connection between the Government furnished equipment item and the utility stub-up shall be furnished and installed by the contractor at no additional cost to the Government.

- F. Completely assemble and install the Government furnished equipment in place ready for proper operation in accordance with specifications and drawings.
- G. Furnish supervision of installation of equipment at construction site by qualified factory trained technicians regularly employed by the equipment manufacturer.

1.23 RELOCATED EQUIPMENT / ITEMS

- A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment and items indicated by symbol "R" or otherwise shown to be relocated by the Contractor.
- B. Perform relocation of such equipment or items at such times and in such a manner as directed by the CO/COR.
- C. Suitably cap existing service lines, such as water, drain, gas, air, and/or electrical, whenever such lines are disconnected from equipment to be relocated. Remove abandoned lines in finished areas and cap as specified herein before under paragraph "Abandoned Lines".
- D. Provide all mechanical and electrical service connections, fittings, fastenings and any other materials necessary for assembly and installation of relocated equipment; and leave such equipment in proper operating condition.
- E. All service lines such as noted above for relocated equipment shall be in place at point of relocation ready for use before any existing equipment is disconnected. Make relocated existing equipment ready for operation or use immediately after reinstallation.

1.24 SAFETY SIGN

- A. Provide a Safety Sign where directed by CO/COR or **where shown on drawings**. Signboard shall be three feet x four feet, 19 mm (3/4-inch) thick exterior grade plywood. Provide two 100 mm by 100 mm (four by four inch) posts extending full height of sign and 900 mm (three feet)

into ground. Set bottom of sign level at 1200 mm (four feet) above ground.

- B. Paint all surfaces of Safety Sign and posts with one prime coat and two coats of white gloss paint. Letters and design shall be painted with gloss paint of colors noted.
- C. Maintain sign and remove it when directed by CO/COR.
- D. Detail drawing of safety sign showing required legend and other characteristics of sign is included in this specification.
- E. Post the number of accident free days on a daily basis.
- F. See drawings for appearance and requirements as well as location of signage for both project and safety.

1.28 CONSTRUCTION DIGITAL IMAGES

- A. During construction period through completion, furnish Department of Veterans Affairs weekly color digital photographs of construction progress (8 to 40 images per week.) Photographs of the reinforcing steel shall be taken after all reinforcing steel, sleeves, inserts, etc. are in place but prior to setting of runways. Photographs must show distinctly, at as large a scale as possible, all parts of work embraced in picture.
- B. Photographs are to be taken with a high-resolution digital camera, minimum 6 megapixels, with good wide-angle capability. The images shall be recorded in JPEG format with a minimum of 24-bit color and no reduction in actual picture size.
 - 1. Compressed size of the file shall be no less than 80% or the original with no loss of information.
 - 2. File names shall contain the project number, the date the image was taken, and a unique sequential identifier, for example:
101CM3202_10-01-2013_0001. Use underscore, not spaces in digital file names.
- C. The digital photo files shall become property of Government and will be both e-mailed and submitted on CD-ROM.
 - 1. The images shall be forwarded electronically to the CO/COR/Project Manager via email to steve.davis@va.gov within 2 days of when the photo was taken. Identify the content of each picture by a caption incorporated in the photo.
 - 2. The digital photo files shall also be submitted on CD-ROM to the CO/COR/Project Manager at the conclusion of the project. The CD-ROM

shall also contain an index of all the images contained therein in either a TXT or Microsoft Word format.

1.29 FINAL ELEVATION PHOTOGRAPHS

- A. Final photographs shall be taken by a commercial/professional photographer. They shall be taken upon completion, including landscaping. They shall be taken on a clear sunny day at as large a scale as possible to obtain sufficient detail to show depth and to provide clear, sharp pictures. All images shall become property of the Government.
- B. Photographs shall be artistically composed showing full front elevations of new **Rostrum**, site features and surrounding landscapes. A minimum of thirty six (36) images shall be taken as per these specifications.
- C. Minimum digital photo file size for final photos is 20 mb un-interpolated, preferably 52 mb. Submit proofs, via e-mail or web photo gallery, from which the CO/COR/Project Manager will select the final images for printing.
- D. Pictures selected by the CO/COR/Project Manager for printing shall be printed on regular weight paper, matte finish archival grade photographic paper and produced by a RA4 process from the digital image with a minimum 300 PPI. Photographs shall have full picture print with no margin.
- E. Submit two (2) 400 mm x 500 mm (16 x 20) framed prints and three (3) 8 x 10 prints of the final selected photos. Deliver to the CO/COR /Project Manager, in boxes suitable for shipping.
- F. Submit a CD-ROM to the CO/ COR /Project Manager containing all (minimum 36) final digital photo files.
 - 1. Images on CD-ROM shall be recorded in JPEG format with a minimum of 24 bit color and no reduction in actual picture size. Compressed size of the file shall be no less than 80% of the original with no loss of information.
 - 2. File names shall contain the date the image was taken, the Project number and a unique sequential identifier.
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- G. Each of the selected 16 x 20 prints shall be placed in a frame with a minimum 2 inches, maximum 3 inches, of appropriate matting as a

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- B. Photographs shall be artistically composed showing full front elevations of new **Rostrum**, site features and surrounding landscapes. A minimum of thirty six (36) images shall be taken as per these specifications.
- C. Minimum digital photo file size for final photos is 20 mb un-interpolated, preferably 52 mb. Submit proofs, via e-mail or web photo gallery, from which the CO/COR/Project Manager will select the final images for printing.
- D. Pictures selected by the CO/COR/Project Manager for printing shall be printed on regular weight paper, matte finish archival grade photographic paper and produced by a RA4 process from the digital image with a minimum 300 PPI. Photographs shall have full picture print with no margin.
- E. Submit two (2) 400 mm x 500 mm (16 x 20) framed prints and three (3) 8 x 10 prints of the final selected photos. Deliver to the CO/COR /Project Manager, in boxes suitable for shipping.
- F. Submit a CD-ROM to the CO/ COR /Project Manager containing all (minimum 36) final digital photo files.

1. Images on CD-ROM shall be recorded in JPEG format with a minimum of 24 bit color and no reduction in actual picture size. Compressed size of the file shall be no less than 80% of the original with no loss of information.
 2. File names shall contain the date the image was taken, the Project number and a unique sequential identifier.
 3. The CD-ROM shall also contain an index of all the images contained therein in either a TXT or Microsoft Word format.
- G. Each of the selected 16 x 20 prints shall be placed in a frame with a minimum 2 inches, maximum 3 inches, of appropriate matting as a border. Provide a selection of 3 different mats and 3 different frames from which the CO/ COR will select one mat and one frame style to frame both prints. Preferred frame style is wood molding, matte black finish, box frame, 1-1/8" wide x 7/8-inch deep.
- H. Place a typewritten self-adhesive identity label on the back of each final print without damage to photograph. PHOTO NUMBER shall be included in both the digital file name on the CD and on the photo print label.
- I. The following information shall be on the identity-label for photographs:
1. PHOTO NUMBER
 2. CEMETERY NAME
 3. LOCATION
 4. PROJECT TITLE
 5. PROJECT NUMBER
 6. DATE TAKEN
 7. CONSTRUCTION COMPANY
 8. CONTRACT NUMBER

1.30 HISTORIC PRESERVATION

- A. Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor shall immediately stop work, notify the CO/COR verbally, and then with a written follow up.

1.31 PROJECT HEALTH AND SAFETY PLAN

A. Prior to commencing any construction, the Contractor shall submit a site specific Project Health and Safety Plan (PHSP). At a minimum, the PHSP shall cover the following topics:

1. Organizational structure (including Responsible Persons)
2. Site Characterization and Job Hazard Identification
3. Site Control and Security
4. Training
5. PPE
6. Heat Stress
7. Spill Containment
8. Decontamination
9. Emergency Response
10. Trench Safety

- - - E N D - - -

SECTION 01 32 17
NETWORK ANALYSIS SCHEDULES
(MICROSOFT PROJECT GANTT CHART)

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. The Contractor shall develop a Microsoft Project 2003 (or later) Gantt Chart (bar chart) schedule demonstrating fulfillment of the contract requirements. The Contractor shall keep the network up-to-date in accordance with the requirements of this section. The Contractor shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). The Gantt Chart will be utilized to satisfy time applications.

1.2 CONTRACTOR'S REPRESENTATIVE:

- A. The Contractor shall designate an in-house representative who will be responsible to prepare the schedule, review the schedule and report progress of the project to the Contracting Officer/ Contracting Officer's Representative.
- B. The Contractor's in-house representative shall be given authority to act on behalf of the Contractor in fulfilling the requirements of this specification section. Such authority shall not be interrupted throughout the duration of the project.

1.3 COMPUTER PRODUCED SCHEDULES:

- A. The contractor shall provide to VA monthly computer processing of all computer produced schedules generated from monthly project updates. The Contractor shall provide to VA two (2) copies of the updated Microsoft Project Gantt Chart and an electronic copy of this data. This must be submitted with and substantively support the contractor's monthly payment request.
- B. The Contractor is responsible for the correctness and timeliness of the computer-produced reports. The Contractor is also responsible for the accurate and timely submittal of the updated project schedule.
- C. VA shall report errors in computer-produced reports to the Contractor's representative within ten (10) calendar days from receipt of reports.
The Contractor shall reprocess the Gantt Chart and associated CDs, when

requested by the Contracting Officers Representative, to correct errors that affect the schedule for the project.

1.4 THE COMPLETE PROJECT GANTT CHART SUBMITTAL:

- A. The Complete Project Microsoft Project Gantt Chart will contain all critical work activities and events as necessary to fully detail the project schedule.
- B. Within ten (10) calendar days after receipt of the Notice to Proceed, the Contractor shall submit for the Contracting Officer's review, a Microsoft Project Gantt Chart and a CD. Each activity/event on the Gantt Chart schedule shall contain as a minimum, but not limited to, activity/event description, duration, start dates and finish dates. Activity constraints, not required by the contract, will not be accepted. Logic events (non-work) will be permitted where necessary to reflect proper sequence among work events, but must have zero duration.
- C. The complete working Gantt Chart shall reflect the Contractor's approach to scheduling the complete project. The final Gantt Chart in its original form shall contain no contract changes or delays that may have been incurred during the final Gantt Chart development period. It shall reflect the Contractors "AS BID" or "DAY 1" schedule. Changes and /or delays shall be entered at the first monthly update after the final Gantt Chart has been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time as a result of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION.
- D. Within ten (10) calendar days after receipt of the complete project Gantt Chart, the Contracting Officer or his representative, will do one or both of the following:
 - 1. Notify the Contractor concerning his actions, opinions, and objections.
 - 2. Schedule a meeting with the Contractor at, or near the job site, for joint review, correction or adjustment of the proposed plan. Within ten (10) calendar days after the joint review, the Contractor shall revise and shall submit two (2) copies of the revised Gantt Chart and a revised CD as specified to the Contracting Officer. The revised submission will be reviewed by the Contracting Officer and, if found to be as previously agreed upon, will be approved.

1.5 WORK ACTIVITY/EVENT AND COST DATA INFORMATION:

- A. The Contractor shall not be required to "cost load" the computerized Microsoft Project Gantt Chart. As part of this submission, the Contractor shall provide a separate **Schedule of Costs on AIA document G703**. This Schedule of Costs shall reflect and contain all the same activities/events identified on the Gantt Chart.
- B. The Contractor and the Contracting Officer shall use this Schedule of Costs for monthly payment purposes as referenced in the General Conditions of this agreement.
- C. The Contractor and Contracting Officer shall agree on percentages for monthly work accomplished. The cumulative total amount of all cost loaded activities/events (including alternates) shall equal the total contract price.
- D. Prorate overhead, profit and general conditions on all work activities/events for the entire project. Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.

1.6 GANTT CHART REQUIREMENTS:

- A. Show on the Gantt Chart the sequence and interdependence of work activities/events required for complete performance of all items of work. In preparing the Gantt Chart, the Contractor shall:
 - 1. Show the following on each work activity/event:
 - a. Concise description of the work represented by the activity/event.
 - b. Duration (in work days.)
 - 2. Show activities/events as:
 - a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
 - b. Contracting Officer Representative's and Architect-Engineer's review and approval of shop drawings, equipment schedules, samples, template, or similar items.
 - c. Interruption of VA Cemetery utilities, delivery of Government furnished equipment, project phasing and any other specification requirements.
 - d. Test, balance and adjust various systems and pieces of equipment.

3. Break up the work into activities/events of durations no longer than thirty (30) work days each, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the Contracting Officer may approve the showing of a longer duration. [The duration for VA approval of any required submittal, shop drawing, or other submittals shall not be less than ten (10) workdays.] The construction time as determined by the Gantt Chart schedule from start to finish for any sub-phase, phase or the entire project shall not exceed the total contract duration. Describe work activities/events clearly, so the work is readily identifiable for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable.
4. Exterior Label Information: Provide the following information on an external label attached to each diskette(s):
 - a. VA project number and project location.
 - b. Name and telephone number of a point of contact, preferably the person who created the CD
 - c. The CD number and total number of CDs in the set
 - d. The project data status date.

1.7 PAYMENT TO THE CONTRACTOR:

- A. Monthly, the contractor shall submit the Gantt Chart updated for remaining activity durations and a Schedule of Costs updated for costs. **AIA application and certification for payment documents G702 and G703** will be used. The payment request should reflect and be in accordance with the provisions of the following Article, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article, PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS of Section GENERAL CONDITIONS. The Contractor is entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated Schedule of Costs unless, in special situations, the Contracting Officer permits an exception to this requirement. Monthly payment requests shall include: two (2) copies of the updated Microsoft Project Gantt Chart, a listing of all project schedule changes, and associated data, made at the update. These must

be submitted with and substantively support the contractor's monthly application and certificate for payment request documents.

- B. When the Contractor fails or refuses to furnish to the Contracting Officer the information and the associated updated Gantt Chart data, which, in the sole judgment of the Contracting Officer, are necessary for validating the monthly progress payment, the Contractor shall not be deemed to have provided supporting schedule data upon which progress payment may be reasonably determined.

1.8 PAYMENT AND PROGRESS REPORTING:

- A. Monthly job site progress meetings shall be held on dates mutually agreed to by the Contracting Officer (or Contracting Officer's Representative) and the Contractor. Presence of subcontractors during the progress meeting is optional unless required by the Contracting Officer (or Contracting Officer's Representative). Job progress will be reviewed to verify:
1. Actual start and/or finish dates for updated/completed activities/events.
 2. Remaining duration, required to complete each activity/event started, or scheduled to start, but not completed.
 3. Time and cost data for change orders, and supplemental agreements that are to be incorporated into the Gantt Chart.
 4. Percentage for completed and partially completed activities/events.
 5. Logic and duration revisions required by this section of the specifications.
 6. Activity/event duration and percent complete shall be updated independently.
- B. The Contractor shall submit a narrative report as a part of his monthly review and update, in a form agreed upon by the Contracting Officer. The narrative report shall include a description of problem areas; current and anticipated delaying factors and their estimated impact on performance of other activities/events and completion dates; and an explanation of corrective action taken or proposed. This report is in addition to the daily reports pursuant to the provisions of Article, **DAILY REPORT OF WORKERS AND MATERIALS in the GENERAL CONDITIONS.**
- C. As part of the monthly jobsite progress meeting, the General Contractor, specifically requested subcontractors and the Contracting Officers Representative shall meet to discuss the monthly updated

schedule. The main emphasis shall be to address work activities to avoid slippage of project schedule and to identify any necessary actions required to maintain project schedule during the reporting period.

1.9 RESPONSIBILITY FOR COMPLETION:

- A. Whenever it becomes apparent from the monthly progress review meeting or the monthly computer-produced Gantt Chart schedule that phasing or contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:
 - 1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
 - 2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
 - 3. Reschedule the work in conformance with the specification requirements.
- B. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the Contracting Officer for the proposed schedule changes. If such actions are approved, the revisions shall be incorporated by the Contractor into the Gantt Chart before the next update, at no additional cost to the Government.

1.10 CHANGES TO GANTT CHART SCHEDULE:

- A. Within ten (10) calendar days after VA acceptance and approval of any updated computer-produced schedule, the Contractor shall submit a revised Gantt Chart, the associated CDs, and a list of any activity/event changes including predecessors and successors for any of the following reasons:
 - 1. Delay in completion of any activity/event or group of activities/events, which indicate an extension of the project completion by twenty (20) working days or 10 percent of the remaining project duration, whichever is less. Such delays which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the Gantt Chart as the direct cause for delaying the project beyond the acceptable limits.
 - 2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.

3. The schedule does not represent the actual prosecution and progress of the project.
 4. When there is, or has been, a substantial revision to the activity/event costs of the network diagram regardless of the cause for these revisions.
- B. Revisions made under this paragraph, which affect the previously approved computer-produced schedules for Government furnished equipment, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, must be furnished in writing to the Contracting Officer for approval.
 - C. Contracting Officer's approval for the revised Gantt Chart and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Contracting Officer or the Contracting Officer's Representative.
 - D. The cost of revisions to the Gantt Chart resulting from contract changes will be included in the cost of the change.
 - E. The cost of revisions to the Gantt Chart not resulting from contract changes is the responsibility of the Contractor.

1.11 ADJUSTMENT OF CONTRACT COMPLETION:

- A. The contract completion time will be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification, Gantt Chart data and supporting evidence as the Contracting Officer may deem *necessary for determination as to whether or not the Contractor is* entitled to an extension of time under the provisions of the contract. Submission of proof based on revised activity/event logic, durations (in work days) and costs is obligatory to any approvals.
- B. The Contracting Officer's determination as to the total number of days of contract extension will be based upon the current computer-produced Gantt Chart schedule for the time period when the change took place and all other relevant information. The Contracting Officer will, within thirty (30) calendar days after receipt of such justification and supporting evidence, advise the Contractor in writing of his decision on the matter.
- C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the

provisions specified under Article, **CHANGES, in the Section 01 00 00, GENERAL CONDITIONS**. The Contractor shall include, as a part of each change order proposal, a sketch showing all revisions, duration (in work days) changes, and cost changes, for work in question and its relationship to other activities on the approved network diagram.

- D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events shall be analyzed on a month by month basis.

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SECTION 01 33 23
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- 1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.
- 1-2. For the purposes of this contract, samples (including laboratory samples to be tested), test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. **The following text refers to all items collectively as SUBMITTALS.**
- 1-3. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:
 - A. Satisfactory written evidence is presented to, and approved by CO/COR, that manufacturer cannot make scheduled delivery of approved item or;
 - B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
 - C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.
- 1-4. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals (including any laboratory samples to be tested) will not serve as a basis for extending contract time for completion.
- 1-5. Submittals will be reviewed for compliance with contract requirements by A-E (A-E), and action thereon will be taken by Contracting Officer or Contracting Officers Representative (CO/COR) on behalf of the CO.

Note: State Historic Preservation Officer may also be included in required submittal review protocols in addition to CO/COR.
- 1-6. **Upon receipt of submittals, A-E will assign a file number thereto.** Contractor, in any subsequent correspondence, shall refer to this file

and identification number to expedite replies relative to previously approved or disapproved submittals.

1-7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefor by CO, adjustment in contract price and time will be made in accordance with Articles titled **CHANGES** (FAR 52.243-4) and **CHANGES - SUPPLEMENT** (VAAR 852.236-88) of the GENERAL CONDITIONS.

1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and A-E. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The CO and Architect- Engineer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.

1-9. Submittals must be submitted by Contractor only and shipped prepaid. CO assumes no responsibility for checking quantities or exact numbers included in such submittals.

A. **Submit samples required by Section 09 06 00, SCHEDULE FOR FINISHES, in quadruplicate.** Submit other samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.

B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail and shall contain the list of items, name of Cemetery, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.

1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.

2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Cemetery, name

of Contractor, manufacturer, brand, contract number and ASTM or Federal Specification Number as applicable and location(s) on project.

3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.

C. In addition to complying with the applicable requirements specified in preceding Article 1.9, samples which are required to have Laboratory Tests (those preceded by symbol "LT" under the separate sections of the specification shall be tested, at the expense of Contractor, in a commercial laboratory approved by CO.

1. Laboratory shall furnish CO with a certificate stating that it is fully equipped and qualified to perform intended work, is fully acquainted with specification requirements and intended use of materials and is an independent establishment in no way connected with organization of Contractor or with manufacturer or supplier of materials to be tested.
2. Certificates shall also set forth a list of comparable projects upon which laboratory has performed similar functions during past five years.
3. Samples and laboratory tests shall be sent directly to approved commercial testing laboratory.
4. Contractor shall send a copy of transmittal letter to both CO/COR and to A-E simultaneously with submission of material to a commercial testing laboratory.
5. Laboratory test reports shall be sent directly to CO/COR for appropriate action.
6. Laboratory reports shall list contract specification test requirements and a comparative list of the laboratory test results. When tests show that the material meets specification requirements, the laboratory shall so certify on test report.
7. Laboratory test reports shall also include a recommendation for approval or disapproval of tested item.

D. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.

E. Approved samples will be kept on file by the CO/COR at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.

F. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.

1. For each drawing required, submit one legible photographic paper or vellum reproducible.
2. Reproducible shall be full size.
3. Each drawing shall have marked thereon, proper descriptive title, including Cemetery location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
7. When work is directly related and involves more than one trade, shop drawings shall be submitted to A-E under one cover.

1-10. Samples (except laboratory samples), shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to

(A-E)

FourFront Design, Inc.

(A/E P.O. Address)

517 Seventh Street,
Rapid City, SD, 57701

1-11. At the time of transmittal to the A-E, the Contractor shall also send a copy of the complete submittal directly to the CO/ COs Representative

1-12. Samples for approval shall be sent to A-E, in care of CO,

TBD

(P.O. Address)

(City, State and Zip Code)

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SECTION 01 42 19
REFERENCE STANDARDS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the availability and source of references and standards specified in the project manual under paragraphs APPLICABLE PUBLICATIONS and/or shown on the drawings.

Note: **The project consists of Historic Restoration and Rehabilitation methods; of particular importance as a reference to project would be the following document: The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (NPS 2015a, 2015b)**

Additionally, The National Park Service (NPS) provides a series of Preservation Briefs with "guidance on preserving, rehabilitating and restoring historic buildings" (NPS, 2015d). Several of the briefs, all of which are available online through the NPS website (<http://www.nps.gov/tps/how-to-preserve/briefs.htm>), may be useful as references for the restoration and rehabilitation of the rostrum at Fort Scott National Cemetery. These include but are not limited to:

- **Preservation Brief 1: *Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Brick***
- **Preservation Brief 2: *Repointing Mortar Joints in Historic Masonry Buildings***
- **Preservation Brief 6: *Dangers of Abrasive Cleaning to Historic Buildings***
- **Preservation Brief 16: *The Use of Substitute Materials on Historic Building Exteriors***
- **Preservation Brief 17: *Architectural Character - Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving their Character***
- **Preservation Brief 39: *Holding the Line: Controlling Unwanted Moisture in Historic Buildings***

The relevant and available reference materials and practices noted above will be officially incorporated into the project, ensuring that the final design for the Rostrum meets *The Secretary of the Interior's Standards for the Treatment of Historic Properties* and its applicable guidelines.

1.2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS FPMR PART 101-29 (FAR 52.211-1) (AUG 1998)

- A. The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29 and copies of specifications, standards, and commercial item descriptions cited in the solicitation may be obtained for a fee by submitting a request to - GSA Federal Supply Service, Specifications Section, Suite 8100, 470 East L'Enfant Plaza, SW, Washington, DC 20407, Telephone (202) 619-8925, Facsimile (202) 619-8978.
- B. If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the addressee in paragraph (a) of this provision. Additional copies will be issued for a fee.

1.3 AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-4) (JUN 1988)

- A. The specifications and standards cited in this solicitation can be examined at the following location:
United States Department of Veteran Affairs
Technical Information Library
<http://www.cfm.va.gov/til/>

1.4 AVAILABILITY OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-3) (JUN 1988)

- A. The specifications cited in this solicitation may be obtained from the associations or organizations listed below.
 - AAMA American Architectural Manufacturer's Association
<http://www.aamanet.org>
 - AAN American Nursery and Landscape Association
<http://www.anla.org>

AASHTO	American Association of State Highway and Transportation Officials http://www.transportation.org/Pages/default.aspx
ACGIH	American Conference of Governmental Industrial Hygienists http://www.acgih.org
ACI	American Concrete Institute http://www.aci-int.net
ADA	American with Disabilities Act http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/adaag
AGC	Associated General Contractors of America http://www.agc.org
AISC	American Institute of Steel Construction http://www.aisc.org
AISI	American Iron and Steel Institute http://www.steel.org
AITC	American Institute of Timber Construction http://www.aitc-glulam.org
ANLA	American Nursery & Landscape Association http://www.anla.org
APA	Architectural Precast Association http://www.archprecast.org/
ASCE	American Society of Civil Engineers http://www.asce.org
ASTM	American Society for Testing and Materials http://www.astm.org
AWI	Architectural Woodwork Institute http://www.awinet.org
AWS	American Welding Society http://www.aws.org
BIA	The Brick Industry Association http://www.bia.org
CFR	Code of Federal Regulations http://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR
CLFMI	Chain Link Fence Manufacturers Institute http://www.chainlinkinfo.org

CRSI	Concrete Reinforcing Steel Institute http://www.crsi.org
CSI	Cast Stone Institute http://www.caststone.org
DOE	U.S. Department of Energy http://www.energy.gov/
EEI	Edison Electric Institute http://www.eei.org
EPA	Environmental Protection Agency http://www.epa.gov
FCC	Federal Communications Commission http://www.fcc.gov
FHA	Federal Highway Administration http://www.fhwa.dot.gov/
FPS	The Forest Products Society http://www.forestprod.org
FSC	Forest Stewardship Council http://www.fscus.org
GBI	Green Building Initiative http://www.thegbi.org/
GSA	General Services Administration http://www.gsa.gov
ICC	The International Code Council http://www.iccsafe.org/Pages/default.aspx
IEEE	Institute of Electrical and Electronics Engineers http://www.ieee.org/
MHI	Material Handling Industry of America http://www.mhi.org/
MIC	Masonry Industry Council
MPI	Master Painters Institute http://www.mpi.net/
MSJC	Masonry Standards Joint Committee http://www.masonrysociety.org/msjc/
NAAMM	National Association of Architectural Metal Manufacturers http://www.naamm.org

NBS National Bureau of Standards
See - NIST

NEC National Electric Code
See - NFPA National Fire Protection Association

NEMA National Electrical Manufacturers Association
<http://www.nema.org>

NFPA National Fire Protection Association
<http://www.nfpa.org>

NHLA National Hardwood Lumber Association
<http://www.natlhardwood.org>

NIH National Institute of Health
<http://www.nih.gov>

NIOSH The National Institute for Occupational Safety and Health
<http://www.cdc.gov/niosh/>

NIST National Institute of Standards and Technology
<http://www.nist.gov>

NLMA Northeastern Lumber Manufacturers Association, Inc.
<http://www.nelma.org>

NSF NSF International
<http://www.nsf.org/>

OSHA Occupational Safety and Health Administration
Department of Labor
<http://www.osha.gov>

PCA Portland Cement Association
<http://www.cement.org/>

RCSC Research Council of Structural Connections
<http://www.boltcouncil.org/>

SEI Structural Engineering Institute
<http://www.asce.org/SEI/>

SSPC The Society for Protective Coatings
<http://www.sspc.org>

SWRI Sealant Waterproofing and Restoration Institute
<http://www.swrionline.org/>

UL Underwriters' Laboratories Incorporated
<http://www.ul.com>

ULC Underwriters' Laboratories of Canada
<http://www.ulc.ca>

USDA U.S. Department of Agriculture
<http://www.usda.gov>

USGBC U.S. Green Building Council
<http://www.usgbc.org>

WCLIB West Coast Lumber Inspection Bureau
<http://www.wclib.org/>

WRCLA Western Red Cedar Lumber Association
<http://www.wrcla.org/>

WWPA Western Wood Products Association
<http://www2.wwpa.org/>

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SECTION 01 45 29
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies materials testing activities and inspection services required during project construction to be provided by a testing laboratory retained and paid for by contractor. Refer to section 01 00 00, general requirements, for additional information.

1.2 RELATED DOCUMENTS

- A. Section 01 00 00, GENERAL REQUIREMENTS (Minor NCA Projects)
B. Section 02 83 33.13 Lead Based Paint Removal and Disposal.

1.3 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Association Of State Highway And Transportation Officials (AASHTO):
- | | |
|-----------------|--|
| T27-11 | sieve analysis of fine and coarse aggregates |
| T96-02 (R2006) | resistance to degradation of small-size coarse aggregate by abrasion and impact in the los angeles machine |
| T99-10 | the moisture-density relations of soils using a 2.5 kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop |
| T104-99 (R2007) | soundness of aggregate by use of sodium sulfate or magnesium sulfate |
| T180-10 | moisture-density relations of soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop |
| T191-02 (R2006) | density of soil in-place by the sand-cone method |
- C. American Society For Testing And Materials (Astm):
- | | |
|---------|---|
| A325-10 | structural bolts, steel, heat treated, 120/105 ksi minimum tensile strength |
|---------|---|

A370-12A	definitions for mechanical testing of steel products
A490-12	heat treated steel structural bolts, 150 KSI minimum tensile strength
C31/C31M-12	making and curing concrete test specimens in the field
C33/C33M-13	concrete aggregates
C39/C39M-12	compressive strength of cylindrical concrete specimens
C109/C109M-12	compressive strength of hydraulic cement mortars
C138/C138M-12A	unit weight, yield, and air content (gravimetric) of concrete
C140-13	sampling and testing concrete masonry units and related units
C143/C143M-12	slump of hydraulic cement concrete
C172/C172M-10	sampling freshly mixed concrete
C173/C173M-12	air content of freshly mixed concrete by the volumetric method
C330/C330M-09	lightweight aggregates for structural concrete
C567/C567M-11	density structural lightweight concrete
C780-12A	pre-construction and construction evaluation of mortars for plain and reinforced unit masonry
C1019-11	sampling and testing grout
C1064/C1064M-12	freshly mixed hydraulic cement concrete
C1077-13	agencies testing concrete and concrete aggregates for use in construction and criteria for laboratory evaluation
C1314-12	compressive strength of masonry prisms
D698-12	laboratory compaction characteristics of soil using standard effort
D1556-07	density and unit weight of soil in place by the sand-cone method
D1557-12	laboratory compaction characteristics of soil using modified effort
D2166-06	unconfined compressive strength of cohesive soil

D2167-08	density and unit weight of soil in place by the rubber balloon method
D2216-10	laboratory determination of water (moisture) content of soil and rock by mass
D2974-07	moisture, ash, and organic matter of peat and other organic soils
D3740-12A	minimum requirements for agencies engaged in testing and/or inspection of soil and rock
E94-04 (2010)	radiographic examination
E164-08	contact ultrasonic testing of weldments
E329-11C	agencies engaged in construction inspection, testing, or special inspection
E543-13	agencies performing nondestructive testing
E709-08	guide for magnetic particle testing
D. American Welding Society (AWS):	
D1.1-07	structural welding code-steel

1.4 REQUIREMENTS

A. Accreditation requirements: testing laboratory retained and paid for by contractor must be accredited by one or more of the national voluntary laboratory accreditation program (NVLAP) programs acceptable in the geographic region for the project. Furnish to the CO/COR a copy of the certificate of accreditation and scope of accreditation. For testing laboratories that have not yet obtained accreditation by a nvlap program, submit an acknowledgement letter from one of the laboratory accreditation authorities indicating that the application for accreditation has been received and the accreditation process has started, and submit to the CO/COR for approval, certified statements, signed by an official of the testing laboratory attesting that the proposed laboratory, meets or conforms to the astm standards listed below as appropriate to the testing field.

1. Laboratories engaged in testing of construction materials must meet the requirements of ASTM e329.
2. Laboratories engaged in testing of concrete and concrete aggregates must meet the requirements of ASTM c1077.
3. Laboratories engaged in testing of soil and rock, as used in engineering design and construction, must meet the requirements of ASTM d3740.

4. Laboratories engaged in inspection and testing of steel, stainless steel, and related alloys will be evaluated according to ASTM a880.
 5. Laboratories engaged in non-destructive testing (NDT) must meet the requirements of ASTM e543.
 6. Laboratories engaged in hazardous materials testing must meet the requirements of OSHA and EPA.
- B. Inspection and testing: testing laboratory to inspect materials and workmanship and perform tests described herein and additional tests requested by CO/COR. When it appears materials furnished, or work performed by contractor fail to meet construction contract requirements, testing laboratory must direct attention of CO/COR to such failure.
- C. Written reports: testing laboratory to submit test reports to re, contractor within 24 hours after each test is completed unless other arrangements are agreed to in writing by the CO/cor. Submit reports of tests that fail to meet construction contract requirements on colored paper.
- D. Verbal reports: give verbal notification to CO/COR immediately of any irregularity.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EARTHWORK

- A. General: the testing laboratory is to provide qualified personnel, materials, equipment, and transportation as required to perform the services identified/required herein, within the agreed to schedule and/or time frame. The work to be performed is as identified herein including, but not be limited to, the following:
1. Observe fill and subgrades during proof-rolling to evaluate suitability of surface material to receive fill or base course. Provide recommendations to the re regarding suitability or unsuitability of areas where proof-rolling was observed. Where unsuitable results are observed, witness excavation of unsuitable material and recommend to re extent of removal and replacement of unsuitable materials and observe proof-rolling of replaced areas until satisfactory results are obtained.

2. Provide part time observation of fill placement and compaction and field density testing in building areas and provide part time observation of fill placement and compaction and field density testing in pavement areas to verify that earthwork compaction obtained is in accordance with contract documents.
3. Provide supervised geotechnical technician to inspect excavation, subsurface preparation, and backfill for structural fill.

B. Testing compaction:

1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with AASHTO T99/T180, ASTM D698 and/or ASTM D1557.
2. Make field density tests in accordance with the primary testing method following ASTM D2922 and/or AASHTO T238 wherever possible. Field density tests utilizing ASTM d1556 and/or AASHTO T191 to be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they must provide satisfactory explanation to the CO/COR before the tests are conducted.
 - a. Footing subgrade: at least one test for each layer of soil on which footings will be placed. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested subgrade when acceptable to CO/COR. In each compacted fill layer below wall footings, perform one field density test for every 15 m (50 feet) of wall. Verify subgrade is level, all loose or disturbed soils have been removed, and correlate actual soil conditions observed with those indicated by test borings.
 - b. Foundation wall backfill: one test per 15 m (50 feet) of each layer of compacted fill but in no case fewer than two tests.
 - c. Pavement subgrade: one test for each 335 m² (400 square yards), but in no case fewer than two tests.
 - d. Curb, gutter, and sidewalk: one test for each 90 m (300 feet), but in no case fewer than two tests.
 - e. Trenches: one test at maximum 30 m (100 foot) intervals per 1200 mm (4 foot) of vertical lift and at changes in required density, but in no case fewer than two tests.

- C. Testing for footing bearing capacity: evaluate if suitable bearing capacity material is encountered in footing subgrade.
- D. testing materials: test suitability of on-site and off-site borrow as directed by CO/COR.

3.2 LANDSCAPING

- A. Test imported topsoil for organic materials, ph, phosphate, potash content, and gradation of particles.
 - 1. Test for organic material by using ASTM D2974.
 - 2. Determine percent of silt, sand, clay, and foreign materials such as rock, roots, and vegetation.
- B. Submit laboratory test report of topsoil to CO/COR.
- C. Submit recommendations for soil amendments, from a regional soil conservation service or cooperative extension, to bring soil into compliance with minimum parameters in these specifications.

3.3 SITE WORK CONCRETE

- A. Test site work concrete including materials for concrete as required in article concrete of this section.

3.4 CONCRETE

- A. Batch plant inspection and materials testing:
 - 1. Perform continuous batch plant inspection until concrete quality is established to satisfaction of re with concurrence of contracting officer and perform periodic inspections thereafter as determined by CO/COR.
 - 2. Periodically inspect and test batch proportioning equipment for accuracy and report deficiencies to CO/COR.
 - 3. Sample and test mix ingredients as necessary to insure compliance with specifications.
 - 4. Sample and test aggregates daily and as necessary for moisture content. Test the dry rodded weight of the coarse aggregate whenever a sieve analysis is made, and when it appears there has been a change in the aggregate.
 - 5. Certify, in duplicate, ingredients and proportions and amounts of ingredients in concrete conform to approved trial mixes. When concrete is batched or mixed off immediate building site, certify (by signing, initialing or stamping thereon) on delivery slips

(duplicate) that ingredients in truck-load mixes conform to proportions of aggregate weight, cement factor, and water-cement ratio of approved trial mixes.

B. Field inspection and materials testing:

1. Provide a technician at site of placement at all times to perform concrete sampling and testing.
2. Review the delivery tickets of the ready-mix concrete trucks arriving on-site. Notify the contractor if the concrete cannot be placed within the specified time limits or if the type of concrete delivered is incorrect. Reject any loads that do not comply with the specification requirements. Rejected loads are to be removed from the site at the contractor's expense. Any rejected concrete that is placed will be subject to removal.
3. Take concrete samples at point of placement in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with ASTM c31. Make at least three cylinders for each 40 m³ (50 cubic yards) or less of each concrete type, and at least three cylinders for any one day's pour for each concrete type. Label each cylinder with an identification number. CO/COR may require additional cylinders to be molded and cured under job conditions.
4. Perform slump tests in accordance with astm c143. Test the first truck each day, and every time test cylinders are made. Test pumped concrete at the hopper and at the discharge end of the hose at the beginning of each day's pumping operations to determine change in slump.
5. Determine the air content of concrete per ASTM C173. For concrete required to be air-entrained, test the first truck and every 20 m³ (25 cubic yards) thereafter each day. For concrete not required to be air-entrained, test every 80 m³ (100 cubic yards) at random. For pumped concrete, initially test concrete at both the hopper and the discharge end of the hose to determine change in air content.
6. If slump or air content fall outside specified limits, make another test immediately from another portion of same batch.
7. Perform unit weight tests in compliance with ASTM c138 for normal weight concrete and ASTM C567 for lightweight concrete. Test the first truck and each time cylinders are made.
8. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.

9. Verify that specified mixing has been accomplished.
10. Environmental conditions: determine the temperature per ASTM C1064 for each truckload of concrete during hot weather and cold weather concreting operations:
 - a. When ambient air temperature falls below 4.4°C (40°F), record maximum and minimum air temperatures in each 24 hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.
 - b. When ambient air temperature rises above 29.4°C (85°F), record maximum and minimum air temperature in each 24 hour period; record minimum relative humidity; record maximum wind velocity; record maximum temperature of surface of hardened concrete.
11. Inspect the reinforcing steel placement, including bar size, bar spacing, top and bottom concrete cover, proper tie into the chairs, and grade of steel prior to concrete placement. Submit detailed report of observations.
12. Observe conveying, placement, and consolidation of concrete for conformance to specifications.
13. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair of surface defects.
14. Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.
15. Observe preparations for placement of concrete:
 - a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
 - b. Inspect preparation of construction, expansion, and isolation joints.
16. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.
17. Observe concrete mixing:
 - a. Monitor and record amount of water added at project site.
 - b. Observe minimum and maximum mixing times.
18. Measure concrete flatwork for levelness and flatness as follows:
 - a. Perform floor tolerance measurements F_F and F_L in accordance with ASTM E1155. Calculate the actual overall f- numbers using the inferior/superior area method.

- B. Perform all floor tolerance measurements within 48 hours after slab installation and prior to removal of shoring and formwork.
 - c. Provide the contractor and the co/cor with the results of all profile tests, including a running tabulation of the overall F_F and F_L values for all slabs installed to date, within 72 hours after each slab installation.
19. Other Inspections:
- a. grouting under base plates.
 - b. Grouting anchor bolts and reinforcing steel in hardened concrete.
 - c. Grouting under stone caps and masonry assemblies.
- C. Laboratory Tests Of Field Samples:
- 1. Test compression test cylinders for strength in accordance with astm c39. For each test series, test one cylinder at 7 days and one cylinder at 28 days. Use remaining cylinder as a spare tested as directed by CO/COR. Compile laboratory test reports as follows: compressive strength test to be the result of one cylinder, except when one cylinder shows evidence of improper sampling, molding or testing, in which case it must be discarded and strength of spare cylinder to be used.
 - 2. Make weight tests of hardened lightweight structural concrete in accordance with ASTM C567.
 - 3. Furnish certified compression test reports (duplicate) to CO/COR. In test report, indicate the following information:
 - a. Cylinder identification number and date cast.
 - b. Specific location at which test samples were taken.
 - c. Type of concrete, slump, and percent air.
 - d. Compressive strength of concrete in MPa (psi).
 - e. Weight of lightweight structural concrete in kg/m^3 (pounds per cubic feet).
 - f. Weather conditions during placing.
 - g. Temperature of concrete in each test cylinder when test cylinder was molded.
 - h. Maximum and minimum ambient temperature during placing.
 - i. Ambient temperature when concrete sample in test cylinder was taken.
 - j. Date delivered to laboratory and date tested.

3.7 REINFORCEMENT

- A. Review mill test reports furnished by contractor.
- B. Make one tensile and one bend test in accordance with ASTM A370 from each pair of samples obtained.
- C. Written report must include, in addition to test results, heat number, manufacturer, type and grade of steel, and bar size.
- D. Perform tension tests of mechanical and welded splices in accordance with ASTM A370.

3.8 MASONRY

A. Mortar Tests:

(Note: special testing requirement for analysis of existing mortar required to determine (and subsequently match) material make-up and composition. Likely the historic mortar is a mixture of portland cement and lime putty. Testing requirement is to analyze and best match materials and color. Mortar mix strength to be compatible with that of clay brick.)

One such testing agency is as follows (or approved equal);

Michael Edison; Edison Coatings; (860)-747-2220 www.edisoncoatings.com.

(Note: original mortar was likely portland cement/lime putty mix. This will require testing and analysis for determination of historic color. A softer mixture with higher lime content is preferable to be compatible with brick strength.)

1. Laboratory Compressive Strength Test:

- a. Comply with ASTM C780.
 - b. Obtain samples during or immediately after discharge from batch mixer.
 - c. Furnish molds with 50 mm (2 inch), 3 compartment gang cube.
 - d. Test one sample at 7 days and 2 samples at 28 days.
2. Two tests during first week of operation; one test per week after initial test until masonry completion.

B. Grout tests:

1. Laboratory Compressive Strength Test:

- a. Comply with ASTM C1019.
- b. test one sample at 7 days and 2 samples at 28 days.
- c. Perform test for each 230 m² (2500 square feet) of masonry.

C. Masonry Unit Tests:

Note: previous brick test results will be referenced for determination of type and strength of brick; additional testing and sampling may be required to ensure that materials meet requirements and align with additional supplemental materials to be sourced; one such provider is as follows (or approved equal)

Gavin Historical Bricks; John Gavin, President; (319) 354-5251

info@historicalbricks.com; supplemental brick to match existing historical brick required as part of this effort.

1. Laboratory compressive strength test:

a. Comply with ASTM C140.

b. Test 3 samples for each 460 m² (5000 square feet) of wall area.

D. Prism tests: for each type of wall construction indicated, test masonry prisms per ASTM C1314 for each 460 m² (5000 square feet) of wall area. Prepare one set of prisms for testing at 7 days and one set for testing at 28 days.

E. Field inspection and materials testing:

1. Verify the following prior to grouting:

a. Grout space is clean.

b. Type, spacing, and placement of reinforcement, connectors, and anchors comply with the contract requirements.

3.9 STRUCTURAL STEEL

A. General: provide shop and field inspection and testing services to certify structural steel work is done in accordance with contract documents. Conform to AWS D1.1 structural welding code for welding.

B. Prefabrication inspection:

1. Review design and shop detail drawings for size, length, type and location of all welds to be made.

2. Approve welding procedure qualifications by pre-qualification or by witnessing qualifications tests.

3. Approve welder qualifications by certification or retesting.

4. Approve procedure for control of distortion and shrinkage stresses.

5. Approve procedures for welding in accordance with applicable sections of AWS D1.1.

C. Fabrication and erection:

1. Weld inspection:

- a. Inspect welding equipment for capacity, maintenance and working condition.
- b. Verify specified electrodes and handling and storage of electrodes in accordance with AWS D1.1.
- c. Inspect preparation and assembly of materials to be welded for conformance with AWS D1.1.
- d. Inspect preheating and interpass temperatures for conformance with AWS D1.1.
- e. Measure 25 percent of fillet welds.
- f. Welding magnetic particle testing: test in accordance with ASTM E709 for a minimum of:
 - 1) 20 percent of all shear plate fillet welds at random, final pass only.
 - 2) 20 percent of all continuity plate and bracing gusset plate fillet welds, at random, final pass only.
 - 3) 100 percent of tension member fillet welds (i.e., hanger connection plates and other similar connections) for root and final passes.
 - 4) 20 percent of length of built-up column member partial penetration and fillet welds at random for root and final passes.
 - 5) 100 percent of length of built-up girder member partial penetration and fillet welds for root and final passes.
- g. Welding ultrasonic testing: test in accordance with ASTM E164 and AWS D1.1 for 100 percent of all full penetration welds, braced and moment frame column splices, and a minimum of 20 percent of all other partial penetration column splices, at random.
- h. Welding radiographic testing: test in accordance with ASTM E94, and AWS D1.1 for 5 percent of all full penetration welds at random.
- i. Verify that rejected welds corrections are made in accordance with AWS D1.1.
- j. Testing and inspection do not relieve the contractor of the responsibility for providing materials and fabrication procedures in compliance with the specified requirements.

2. Bolt inspection:

- a. Inspect high-strength bolted connections in accordance with aisc specifications for structural joints using ASTM A325 or A490 bolts.
 - b. slip-critical connections: inspect 10 percent of bolts, but not less than 2 bolts, selected at random in each connection in accordance with aisc specifications for structural joints using ASTM A325 or A490 Bolts. Inspect all bolts in connection when one or more are rejected.
 - c. Fully pre-tensioned connections: inspect 10 percent of bolts, but not less than 2 bolts, selected at random in 25 percent of connections in accordance with aisc specification for structural joints using astm a325 or a490 bolts. Inspect all bolts in connection when one or more are rejected.
 - d. Bolts installed by turn-of-nut tightening may be inspected with calibrated wrench when visual inspection was not performed during tightening.
 - e. Snug tight connections: inspect 10 percent of connections verifying that plies of connected elements have been brought into snug contact.
 - f. Inspect field erected assemblies; verify locations of structural steel for plumbness, level, and alignment.
- D. Submit inspection reports, record of welders and their certification, and identification, and instances of noncompliance to CO/COR.

3.15 TYPE OF TEST

**Approximate Number
Of
Tests Required**

Prerequisite: requirement testing for Presence of Lead Based Paint on paint slurry applied to masonry and for handrails. TBD

A. Earthwork:

Laboratory Compaction Test, Soils:

AASHTO T99, (ASTM D1557) or (ASTM D698) 5

Field Density, Soils (AASHTO T191, T205, or T238) 5

Penetration Test, Soils 2

B. Landscaping:	
Topsoil Test	1
C. Aggregate Base:	
Laboratory Compaction, (AASHTO T180/ ASTM D1557)	3
Field Density, (Aashto T191/ Astm D1556)	3
Aggregate, Base Course Gradation (AASHTO T27)	2
D. Concrete:	
Making And Curing Concrete Test Cylinders (ASTM C31)	7
Compressive Strength, Test Cylinders (ASTM C39)	7
Concrete Slump Test (ASTM C143)	7
Concrete air content test (astm c173)	7
E. Aggregate, normal weight:	
Gradation (ASTM C33)	2
Deleterious substances (ASTM C33)	2
Soundness (ASTM C33)	2
Abrasion (ASTM C33)	2
F. Aggregate, lightweight	
Gradation (ASTM C330)	2
Deleterious substances (ASTM C330)	2
Unit weight (ASTM C330)	2
G. Reinforcing steel:	
Tensile test (ASTM A370)	2
Bend test (ASTM A370)	2
Mechanical splice (ASTM A370)	2
Welded splice test (ASTM A370)	2
H. Masonry:	
making and curing test cubes (ASTM C109)	2
Compressive Strength, Test Cubes (ASTM C109)	2

Sampling And Testing Mortar, Comp. Strength (ASTM C780)	5
Sampling And Testing Grout, Comp. Strength (ASTM C1019)	5
Masonry Unit, Compressive Strength (ASTM C140)	5
Prism Tests (ASTM C1314)	3
I. Structural Steel:	
Ultrasonic Testing Of Welds (ASTM E164)	3
Magnetic Particle Testing Of Welds (ASTM E709)	3
Radiographic Testing Of Welds (ASTM E94)	3
J. Inspection:	
Technical personnel (man-days)	24
1. Technicians to perform tests and inspection listed above. Laboratory will be equipped with concrete cylinder storage facilities, compression machine, cube molds, proctor molds, balances, scales, moisture ovens, slump cones, air meter, and all necessary equipment for compaction control.	

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SECTION 01 57 19
TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section specifies the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of visual aesthetics, noise, and solid waste, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
 - 1. Adversely affect human health or welfare.
 - 2. Unfavorably alter ecological balances of importance to human life.
 - 3. Affect other species of importance to humankind.
 - 4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.

1.2 DEFINITIONS OF POLLUTANTS

- A. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
- B. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
- C. Sediment: Soil and other debris that has been eroded and transported by runoff water.
- D. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from project construction activities.
- E. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and require a permit to discharge water from the governing agency.

F. Rubbish: Combustible and noncombustible wastes such as, but not limited to, paper, plastic, metal and plastic containers and cans, boxes, metal and lumber scrap.

G. Sanitary Wastes: Domestic Sanitary Sewage.

1.3 QUALITY CONTROL

A. Establish and maintain quality control for the environmental protection of all items set forth herein.

B. Record on daily reports any problems in complying with laws, regulations, and ordinances and note any corrective action taken.

1.4 REFERENCES

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. U.S. National Archives and Records Administration (NARA):

33 CFR 328 Definitions, Waters of the United States.

C. Federal Environmental Regulatory Requirements: Comply with applicable regulations. The following is for Contractor's information only:

1. Storm water permits; refer to The Office of Wastewater Management, NPDES Storm Water Program: <http://www.epa.gov/npdes/stormwater>

2. RCRA hazardous and non-hazardous solid waste requirements; refer to EPA's Office of Solid Waste and Emergency Response: <http://www.epa.gov/epaoswer/osw/laws-reg.htm>

3. Oil spill requirements for construction activities; refer to EPA Oil Program web site: <http://www.epa.gov/oilspill/>

4. Air quality requirements for construction activities; refer to EPA'S Air Program Mobile Sources Page: <http://www.epa.gov/ebtpages/airmobilesources.html>

5. National Environmental Policy Act (NEPA) requirements for construction activities.

6. National Historic Preservation Act

D. State and Local Environmental Regulatory Requirements: Comply with applicable regulations. The following is for Contractor's information only:

1. State Office/Department of Environmental Quality.

2. Local Office/Department of Environmental Quality.

3. The Construction Industry Compliance Assistance Center: <http://www.cicacenter.org/index.cfm>
4. The National Environmental Compliance Assistance Clearinghouse: <http://cfpub.epa.gov/clearinghouse/>

1.5 SUBMITTALS

- A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, the Contractor shall furnish the following:
 1. Environmental Protection Plan: After the contract is awarded and prior to the commencement of the work, meet with the Contracting Officer/Contracting Officer Representative (CO/COR) to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, prepare and submit to the CO/COR for approval, a written and/or graphic Environmental Protection Plan including, but not limited to, the following:
 - a. Name(s) and qualifications of person(s) within the Contractor's organization who is (are) responsible for:
 - 1) Ensuring adherence to the Environmental Protection Plan.
 - b. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
 - c. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.
 - d. Procedures to provide environmental protection that complies with the applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
 - e. Permits, licenses, and the location of the solid waste disposal area.

- f. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.
 - g. Environmental Monitoring Plans for the job site including land, water, air, and noise.
 - h. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of construction limits or protected areas. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.
- B. Within 20 days after the date of its submittal, the CO/COR shall approve the Contractor's Comprehensive Environmental Protection Plan, or respond with an explanation for its rejection and resubmittal.
- C. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

1.7 PROTECTION OF ENVIRONMENTAL RESOURCES

- A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract and after the project is complete, based upon leaving the site by complete restoration seeding and/or sodding. Confine construction activities to areas defined by construction limits, the specifications and drawings.
- B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, land forms, wetlands or wetland buffers without prior approval from the CO/COR. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or dictated by special emergency use.
 - 1. Work Area Limits: Prior to any construction, mark/fence/protect the areas that require work to be performed under this contract. Prior to construction, mark/fence/protect monuments, works of art, and any other markers to remain. Convey to all personnel the purpose of marking and protecting all marked and protected objects.
 - 2. Protection of Specific Regulated Elements: Wetlands and wetland buffers and other landscape features shown on the drawings to be

- preserved by marking, fencing, or using any other approved protective techniques.
- a. Protect trees and shrubs to remain on site to protect from damage per contract details.
 - b. All damage to existing trees and shrubs shall be immediately repaired by trimming, cleaning, and painting with antiseptic tree paint. See Section 02 41 10, DEMOLITION AND SITE CLEARING.
 - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
3. Reduction of Exposure of Unprotected Erodible Soils: Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas only as needed to use to work the area to be developed. Form earthwork to final grade as shown as quickly as possible to minimize potential erosion damage. Immediately protect side slopes and back slopes upon completion of rough grading or clearing with appropriate material as defined in the Sediment and Erosion Control Plan.
4. Temporary Protection of Disturbed Areas: Construct diversion ditches, benches, check dams and berms to retard and divert runoff from the construction site to protected drainage areas as intended under paragraph 208 of the Clean Water Act.
- a. Sediment Basins: Trap sediment from construction areas in temporary or permanent sediment basins that accommodate the runoff of a local **10 year** (design year) storm. After each storm, pump the basins dry and remove the accumulated sediment. Control overflow/drainage with paved weirs or by vertical overflow pipes, that drain from the surface of the basin.
 - b. Reuse or conserve the collected topsoil sediment as directed by the CO/COR. Topsoil use and requirements are specified in SECTION 31 20 11, EARTH MOVING SHORT FORM.
(Note: topsoil abatement and removal requirements for presence of lead based paint dictate that top 6" at a 10' distance from Rostrum be removed and disposed of per EPA and OSHA requirements.)
 - c. Institute effluent quality monitoring programs as required by Federal, State, and local environmental agencies.)
5. Erosion and Sedimentation Control Devices: Construct or install all temporary and permanent erosion and sedimentation control features

shown on the Environmental Protection Plan to avoid violating water quality in accordance with federal and state regulations. Maintain temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing, and mulching, straw waddles, fiber rolls, until permanent drainage and erosion control facilities are completed and operative.

6. Manage and control borrow and spoil areas **on and off** Government property to minimize erosion and to prevent soil and/or sediment from entering nearby water courses or lakes.
7. Protect adjacent areas from despoilment by temporary excavations and embankments.
8. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of waste in compliance with Federal, State, and local requirements.
9. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.
10. Handle discarded materials other than those included in the solid waste category as directed by the CO/COR.

C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the listed construction activities that are included in this contract.

1. Washing and Curing Water: Do not allow wastewater directly derived from construction activities to enter water areas. Collect and place wastewater in sediment basins prior to entering retention/detention ponds, allowing the suspended material to settle, the pollutants to separate, or the water to evaporate.

D. Protection of Fish and Wildlife Resources: Keep construction activities under surveillance, management, and control to minimize interference with, disturbance of, or damage to fish and wildlife. Prior to beginning construction operations, list protected species that require specific attention along with measures for their protection.

E. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air

resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of **Kansas Department of Health and Environment Air Quality** and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.

1. **Particulates:** Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials at all times, including weekends, holidays, and hours when work is not in progress.
2. **Particulates Control:** Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance. Sprinklering, or other methods are permitted to control particulates in the work area as approved in the Environmental Protection Plan.
3. **Hydrocarbons and Carbon Monoxide:** Control monoxide emissions from equipment to Federal and State allowable limits.
4. **Odors:** Control odors of construction activities and prevent obnoxious odors from occurring.

F. **Noise Control:** Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the Resident Engineer. Maintain noise-produced work at or below the decibel levels and within the time periods specified.

1. Perform construction activities involving repetitive, high-level impact noise only between **8:30 a.m. and 4:00 p.m.** unless otherwise permitted by local ordinance or the CO/COR. Repetitive impact noise on the property shall not exceed the following Decibel A-scale (dBA) limitations:

Time Duration of Impact Noise	Sound Level in dBA
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:
 - a. Maintain maximum permissible construction equipment noise levels as measured with an A-scale decibel measuring device at 15 m (50 feet) (dBA) :

CATEGORY OF EQUIPMENT			
EARTHMOVING		MATERIALS HANDLING	
EQUIPMENT STYLE	SOUND LEVEL dBA	EQUIPMENT STYLE	SOUND LEVEL dBA
FRONT LOADERS	75	CONCRETE MIXERS	75
BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCAPERS	80	PILE DRIVERS	95
GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80
PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80
PUMPS	75	BLASTING	NA
GENERATORS	75	SAWS	75
COMPRESSORS	75	VIBRATORS	75

- b. Provide soundproof housings or enclosures for noise-producing machinery.
 - c. Use efficient silencers on equipment air intakes.
 - d. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
 - e. Line hoppers and storage bins with sound deadening material.
 - f. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.
3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 75 dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighted sound level of a General Purpose sound level meter at slow response. To minimize the

effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face.

Submit the recorded information to the CO/COR noting any problems and the alternatives for mitigating actions.

- G. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
- H. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition as approved by the CO/COR. The site shall be left meeting the requirements of the local and state environmental requirements associated with the (SWPPP) Storm Water Pollution Protection Plan as submitted. Cleaning shall include off-cemetery disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations, clearing, logging and general construction in accordance with state and local regulations and the contract.

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SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the requirements for the management of non-hazardous building construction and demolition waste.
- B. Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible shall be salvaged, recycled or reused.
- C. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:
 - 1. Waste Management Plan development and implementation.
 - 2. Techniques to minimize waste generation.
 - 3. Sorting and separating of waste materials.
 - 4. Salvage of existing materials and items for reuse or resale.
 - 5. Recycling of materials that cannot be reused or sold.
- D. At a minimum the following waste categories shall be diverted from landfills:
 - 1. Soil **(with exception of abated topsoil removal for presence of lead based paint)**. Said contaminated soil shall be legally disposed of **off-site per local/regional as well as EPA and OSHA requirements**.
 - 2. Inerts (e.g. concrete, masonry and asphalt).
 - 3. Clean dimensional wood and palette wood.
 - 4. Green waste (biodegradable landscaping materials).
 - 5. Engineered wood products (plywood, particle board and I-joists, etc).
 - 6. Metal products (e.g. steel, wire, beverage containers, etc).
 - 7. Cardboard, paper and packaging.
 - 8. Bitumen roofing materials.
 - 9. Plastics (e.g. ABS, PVC).
 - 10. Carpet and/or pad.
 - 11. Gypsum board.
 - 12. Insulation.
 - 13. Paint.

1.2 RELATED WORK

- A. Section 02 41 10, DEMOLITION AND SITE CLEARING.
- B. Section 01 00 00, GENERAL REQUIREMENTS.
- C. Lead Paint: Section 02 83 33.13, LEAD BASED PAINT REMOVAL AND DISPOSAL.

1.3 QUALITY ASSURANCE

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building products. Processes shall be employed to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:
 - 1. Excess or unusable construction materials.
 - 2. Packaging used for construction products.
 - 3. Poor planning and/or layout.
 - 4. Construction error.
 - 5. Over ordering.
 - 6. Weather damage.
 - 7. Contamination.
 - 8. Mishandling.
 - 9. Breakage.
- B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.
- C. Contractor shall develop and implement procedures to reuse and recycle new materials to a minimum of 50 percent.

Note: Intent of historical rehabilitation and restoration of facility is to re-use as much of historical existing material as possible.

- D. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling shall accrue to the contractor.
- E. Contractor shall provide all demolition, removal and legal disposal of materials. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website <http://www.wbdg.org/tools/cwm.php> provides a Construction Waste Management Database that contains

information on companies that haul. Collect, and process recyclable debris from construction projects.

- F. **Contractor shall assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return.** Such areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.

Note: Inventory and Documentation of all materials from dismantled/demolished existing facility is required as well as storage and highly organized coordination of components; coordinate with plans as well as specifications.

- G. Contractor shall provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
- H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

1.4 TERMINOLOGY

- A. **Class III Landfill:** A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. **Clean:** Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. **Construction and Demolition Waste:** Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. **Dismantle:** The process of parting out a building or structure in such a way as to preserve the usefulness of its materials and components.
- E. **Disposal:** Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. **Inert Backfill Site:** A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. **Inert Fill:** A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. **Inert Solids/Inert Waste:** Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality

objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.

- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.
- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.
- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
 - 1. On-site Recycling - Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
 - 2. Off-site Recycling - Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.
- O. Return: To give back reusable items or unused products to vendors for credit.
- P. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto

other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:
- B. Prepare and submit to the Resident Engineer a written demolition debris management plan. The plan shall include, but not be limited to, the following information:
 - 1. Procedures to be used for debris management.
 - 2. Techniques to be used to minimize waste generation.
 - 3. Analysis of the estimated job site waste to be generated:
 - a. List of each material and quantity to be salvaged, reused, recycled.
 - b. List of each material and quantity proposed to be taken to a landfill.
 - c. **List of contaminated material and quantity to be disposed of off-site per abatement as well as EPA and OSHA requirements.**
 - 4. **Comprehensive plans for dismantling existing facilities; assessment of materials for re-use by type, coordination and inventory as well as labeling and identification procedures of all materials, communication plan for review and concurrence with A/E or Owner Representative, protected storage for duration of project, and reconstruction and staging utilizing dismantled materials. Note requirement for "As Constructed" Plans to be prepared by Contractor.**
 - 5. Detailed description of the Means/Methods to be used for material handling.
 - a. On site: Material separation, storage, protection where applicable.
 - b. Off site: Transportation means and destination. Include list of materials.
 - 1) Description of materials to be site-separated and self-hauled to designated facilities.
 - 2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
 - c. The names and locations of mixed debris reuse and recycling facilities or sites.

- d. The names and locations of trash disposal landfill facilities or sites.
 - e. Documentation that the facilities or sites are approved to receive the materials.
- B. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
- C. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

1.6 APPLICABLE PUBLICATIONS

Publications listed below form a part of this specification to the extent referenced. Publications are referenced by the basic designation only. In the event that criteria requirements conflict, the most stringent requirements shall be met.

- A. U.S. Green Building Council (USGBC):
LEED Green Building Rating System for New Construction
- B. **Secretary of Interior's Standards for the Treatment of Historic Properties:**
Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Public Buildings.
- C. The NPS provides a series of Preservation Briefs with "guidance on preserving, rehabilitating and restoring historic buildings" (NPS, 2015d). Several of the briefs, all of which are available online through the NPS website (<http://www.nps.gov/tps/how-to-preserve/briefs.htm>), may be useful as references for the restoration and rehabilitation of the rostrum at Fort Scott National Cemetery. These include but are not limited to:
 - Preservation Brief 1: *Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Brick*
 - Preservation Brief 2: *Repointing Mortar Joints in Historic Masonry Buildings*
 - Preservation Brief 6: *Dangers of Abrasive Cleaning to Historic Buildings*
 - Preservation Brief 16: *The Use of Substitute Materials on Historic Building Exteriors*
 - Preservation Brief 17: *Architectural Character - Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving their Character*
 - Preservation Brief 39: *Holding the Line: Controlling Unwanted Moisture in Historic Buildings*

1.7 RECORDS

- A. Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Records shall be kept in accordance with the LEED Reference Guide and LEED Template (if applicable).

PART 2 - PRODUCTS

2.1 MATERIALS

- A. List of each material and quantity to be salvaged, recycled, reused.
- B. List of each material and quantity proposed to be taken to a landfill.
- C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

PART 3 - EXECUTION

3.1 COLLECTION

- A. Provide all necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
- C. Hazardous wastes shall be separated, stored, disposed of according to local, state, federal regulations.

3.2 DISPOSAL

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.
- B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be disposed of at a landfill or incinerator.

3.3 REPORT

- A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.
- B. Quantify all materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include the net total costs or savings for each salvaged or recycled material.
- C. Quantify all materials disposed of during the period with the receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include the net total costs for each disposal.

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SECTION 02 41 10
DEMOLITION AND SITE CLEARING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies all site preparation work, demolition and removal of buildings, portions of buildings, utilities, other structures and debris from trash dumps shown.

1.2 RELATED WORK

- A. Dismantling of existing Historical Elements: Intent of historical rehabilitation and restoration of facility is to re-use as much of historical existing material as possible as defined by drawings and dictated by Contracting Officer/Contracting Officer's Representative (CO/COR). The historic structure shall be dismantled by hand methods. All existing historic materials shall be reused. Existing materials to be salvaged include: stone, stone steps, interior and exterior brick, iron/steel railing and limestone capstones. The concrete platform cap is not original to the design and shall not be reused. Inventory and Documentation of all materials from dismantled/demolished existing facility is required as well as storage and highly organized coordination of components per section 3.2 DISMANTLING AND DEMOLITION. **Final review and approval of dismantling/salvaging process to be coordinated with Contracting Officer or Contracting Officer's Representative (CO/COR). Note "As Constructed" Requirements for submitting drawings for review by CO/COR as well.**
- B. Safety Requirements: Section 01 00 00, GENERAL CONDITIONS article **ACCIDENT PREVENTION.**
- C. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Reserved items that are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.
- E. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- F. Coordinate with CO/COR and align with requirements established in Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES as well as 01 74 19 CONSTRUCTION WASTE MANAGEMENT for documenting, inventorying, and handling of all dismantled components.

1.3 PROTECTION

- A. Perform demolition and dismantling in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures. Comply with requirements of GENERAL CONDITIONS article, ACCIDENT PREVENTION.
- B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of SECTION 01 00 00, GENERAL REQUIREMENTS article.

1.9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.

- C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.
- D. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.
- E. In addition to previously listed fire and safety rules to be observed in performance of work, include following:
 - 1. No wall or part of wall shall be permitted to fall outwardly from structures.
 - 3. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.
 - 4. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 4500 mm (15 feet) of fire hydrants.
- F. Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Cemetery; any damaged items shall be repaired or replaced at no cost to the owner as

approved by the CO/COR. Coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have CO/COR's approval.

- G. The work shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

1.4 UTILITY SERVICES

- A. Demolish and remove outside utility service lines shown to be removed.
- B. Remove abandoned outside utility lines that would interfere with installation of new utility lines and new construction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SITE CLEARING

- A. General: Remove trees, shrubs, grass, and other vegetation, pavements, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.
 - 1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
- B. Erosion Control: Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Install silt fence and inlet protection as shown and as per requirements of the SWPPP, prior to any soil disturbance activities. Provide temporary seeding as required by the SWPPP.

- C. **Comprehensive Strategy to be followed for dismantling existing facilities: assessment of materials for re-use by type, coordination and inventory as well as labeling and identification procedures of all materials, communication plan for review and concurrence with A/E and/or CO/ COR, protected storage for duration of project, and reconstruction and staging utilizing dismantled materials.**

Reference: The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.

- D. **Topsoil - On-site:** Topsoil is defined as friable clay loam surface soil found in a depth of not less than 150 mm (6 inches). Satisfactory topsoil is reasonably free and/or screened of subsoil, clay lumps, stones, and other objects over 25 mm (1 inch) in diameter, and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.
 - a. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.
2. **Collect and dispose of 6" depth of soil indicated on drawings for removal and comply with local/regional/EPA regulatory requirements for disposal (abatement) per presence of lead based paint.**
3. Stockpile remaining topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles to prevent wind erosion in accordance with the Storm Water Pollution Prevention Plan. Refer to Division 2 Section 32 90 00, PLANTING for soil amendments required prior to spreading topsoil.
 - a. Stockpile shall be contained with erosion and sediment controls (silt fence) and stabilized if undisturbed in accordance with the Storm Water Pollution Prevention Plan.
4. Dispose of unsuitable or excess topsoil as specified for disposal of waste material only after approval of the Architect.

- E. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.
 - 1. Completely remove stumps, roots, and other debris protruding through ground surface.
 - 2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
 - 3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - a. Place fill material in horizontal layers not exceeding 150 mm (6 inches) loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.
- F. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.
- G. Abandonment or removal of certain underground pipe or conduits may be indicated on mechanical or electrical drawings and is included under work of related Division 15 and 16 Sections. Removing abandoned underground piping or conduits interfering with construction is included under this Section, except as indicated to be abandoned in-place.
- H. Continue maintenance of erosion controls in compliance with the Storm Water Pollution Prevention Plan until the work is completed and the threat of erosion is gone by either around surface stabilizer or lawn "grow-in" is at 85% complete. Temporary erosion control devices shall not be removed until the area is certified as being stabilized by the Qualified Inspector.

3.2 DISMANTLING AND DEMOLITION

- A. Completely dismantle structures, including all appurtenances related or connected thereto, as noted below:
 - 1. To full depth within an area defined by hypothetical lines located 1500 mm (5 feet) outside building lines of new structures.
- B. **Inventory and Document all materials from dismantled existing facility. The Rostrum structure will be dismantled by hand, documented, labeled, and meticulously organized for storage in a secure area. Establish records of all components by type (i.e. steel, iron, brick, stone, specialty, etc.) and maintain photo records of all materials as well as**

visible labels. Reconstruction plans for materials in original location are required as well as storage and highly organized coordination of components. Reconstruction plans for materials in original location are required. All new material should be identified and properly documented for future research.

- C. An onsite meeting with CO/COR is required at completion of all dismantling to view all components and storage methods. All materials identified as unusable to be stockpiled for review and final evaluation by CO/COR prior to determination of disposal. Once determination of materials for disposal is in concurrence with Contractor and CO/COR; they will be considered debris.
- D. Debris, including brick, concrete, stone, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the Cemetery Property to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the CO/COR. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations. **Surplus materials such as brick that are rejected for use to be stockpiled neatly at location indicated on plans.**
- E. Remove and legally dispose of all materials per OSHA and EPA requirements including abated lead contaminated soil, other than earth to remain as part of project work, from any trash dumps shown. Materials removed shall become property of contractor and shall be disposed of in compliance with applicable federal, state or local permits, rules and/or regulations. The removal of hazardous material shall be referred to Hazardous Materials specifications. Burning is not permitted on the property.
- F. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the CO/COR. When Utility lines are encountered that are not indicated on the drawings, the CO/COR shall be notified prior to further work in that area.

3.2 CLEAN-UP

- A. On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to CO/COR. Clean-up shall include off the Cemetery Property disposal of all items and materials

not required to remain property of the Government as well as all debris
and rubbish resulting from demolition operations.

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SECTION 02 83 33.13
LEAD-BASED PAINT REMOVAL AND DISPOSAL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies abatement and disposal of lead-based paint (LBP) and controls needed to limit occupational and environmental exposure to lead hazards. The Fort Scott Rostrum railing that has lead-based paint on it and will be removed from the construction site, stripped and removed, prepped and repainted, and re-installed. Removal and disposal of lead-based paint from the railing will be carried out off-site at the Contractor's work shop/work yard. Additionally, the presence of lead based paint may occur in the slurry/coating that was applied to bricks on Rostrum that will need to be tested and removed/disposed of. The Contractor is responsible for following the appropriate protocols and compliance with all relevant regulations.

1.2 RELATED WORK

- A. Section 02 41 00, DEMOLITION AND SITE CLEARING.
B. Section 09 91 00, PAINTING.

1.3 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. Code of Federal Regulations (CFR):
- | | |
|------------------|--|
| CFR 29 Part 1910 | Occupational Safety and Health Standards |
| CFR 29 Part 1926 | Safety and Health Regulations for Construction |
| CFR 40 Part 260 | Hazardous Waste Management System: General |
| CFR 40 Part 261 | Identification and Listing of Hazardous Waste |
| CFR 40 Part 262 | Standards Applicable to Generators of Hazardous Waste |
| CFR 40 Part 263 | Standards Applicable to Transporters of Hazardous Waste |
| CFR 40 Part 745 | Lead-based Paint Renovation Repair & Painting Rule (RRP) |
| CFR 40 Part 268 | Land Disposal Restrictions |

- | | |
|-------------------|--|
| CFR 49 Part 172 | Hazardous Material Table, Special Provisions,
Hazardous Material Communications, Emergency
Response Information, and Training Requirements |
| CFR 49 Part 178 | Specifications for Packaging |
| KAR 28 Article 72 | Kansas Lead-Based Paint Renovation, Repair and
Painting Rule |
- C. National Fire Protection Association (NFPA):
- | | |
|---------------|--|
| NFPA 701-2009 | Methods of Fire Test for Flame-Resistant
Textiles and Films |
|---------------|--|
- D. National Institute for Occupational Safety and Health (NIOSH):
- NIOSH/OSHA Booklet 3142 Lead in Construction
- E. Underwriters Laboratories (UL):
- | | |
|-------------|--|
| UL 586-2008 | High-Efficiency, Particulate, Air Filter Units |
|-------------|--|
- F. American National Standards Institute/AIHA:
- | | |
|-----------|---|
| Z9.2-2012 | Fundamentals Governing the Design and Operation
of Local Exhaust Systems |
|-----------|---|

1.4 DEFINITIONS

- A. Action Level: Employee exposure, without regard to use of respirations, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. As used in this section, "30 micrograms per cubic meter of air" refers to the action level.
- B. Area Monitoring: Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.
- C. Physical Boundary: Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" means the same as "outside lead control area."
- D. Certified Industrial Hygienist (CIH): As used in this section, refers to an Industrial Hygienist employed by the Contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.
- E. Change Rooms and Shower Facilities: Rooms within the designated physical boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

- F. Competent Person: A person capable of identifying lead hazards in the work area and is authorized by the contractor to take corrective action.
- G. Decontamination Room: Room for removal of contaminated personal protective equipment (PPE).
- H. EPA/State Certified Renovator: Where the EPA RRP Rule applies, the individual assigned to the job who is responsible for "RRP Rule Compliance" (see definition). These responsibilities include training of non-certified renovation workers, providing EPA Renovate Right brochure, performing paint testing, ensuring proper work area preparation, and ensuring use of cleaning verification card to confirm work areas are clean after renovations.
- I. EPA/State Certified Firm: Where the EPA RRP rule applies, the certification provided by the EPA/State to a firm performing renovation, repair, and painting work in pre-1978 housing and child-occupied facilities.
- J. Eight-Hour Time Weighted Average (TWA): Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.
- K. High Efficiency Particulate Air (HEPA) Filter Equipment: HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.
- L. Lead: Metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.
- M. Lead Control Area: An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint removal operations. The lead control area is isolated by physical boundaries to prevent entry of unauthorized personnel.
- N. Lead Permissible Exposure Limit (PEL): Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1910.1025. Determine the PEL by the following formula, if an employee is exposed for more than 8 hours in a work day.
$$PEL \text{ (micrograms/cubic meter of air)} = 400/\text{number of hours worked per day}$$
- O. Personnel Monitoring: Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1910.1025. Samples must be representative of the employee's work tasks. Consider breathing zone

as an area within a hemisphere, forward of the shoulders, with a radius of 150 mm to 225 mm (6 to 9 inches) and the center at the nose or mouth of an employee.

- P. Prohibited Work Practices: Where the EPA RRP Rule applies, open-flame burning/torching, heat guns above 1100°F, power tools or abrasive/sand blasting without a containment system equipped with a HEPA vacuum.
- Q. RRP Rule Compliance: The EPA Renovation Repair, and Painting Rule applies to major maintenance and repair activities that disturb lead-based paint in pre-1978 target housing and child-occupied facilities. Major maintenance and repair activities are defined as more than 6 square feet of painted surface disturbance per room for interior work, more than 20 square feet of disturbance for exterior work, and any window replacement

1.5 QUALITY ASSURANCE

- A. Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by 29 CFR 1926.62 (i) (1) (i) and (ii). The examination is not required if adequate records show that employees have been examined as required by 29 CFR 1926.62(i) without the last year.
- B. Medical Records: Maintain complete and accurate medical records of employees in accordance with 29 CFR 1910.20.
- C. CIH Responsibilities: The Contractor must employ a Certified Industrial Hygienist who will be responsible for the following:
 - 1. Certify Training.
 - 2. Review and approve lead-containing paint removal plan for conformance to the applicable referenced standards.
 - 3. Inspect lead-containing paint removal work for conformance with the approved plan.
 - 4. Direct monitoring.
 - 5. Ensure work is performed in strict accordance with specifications at all times.
 - 6. Ensure hazardous exposure to personnel and to the environment is adequately controlled, at all times.
- D. Training: Train each employee performing paint removal, disposal, and air sampling operations prior to the time of initial job assignment, in accordance with 29 CFR 1926.62, as well as EPA RRP Rule, where applicable.

E. Training Certification: Submit certificates signed and dated by the CIH and by each employee stating that the employee has received training.

F. Respiratory Protection Program:

1. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at least annually thereafter as required by 29 CFR 1926.62.
2. Establish and implement a respiratory protection program as required by 29 CFR 1910.134, 29 CFR 1910.1025, and 29 CFR 1926.62.

G. Hazard Communication Program: Establish and implement a Hazard Communication Program as required by 29 CFR 1910.1200.

H. Hazardous Waste Management: The Hazardous Waste Management plan must comply with applicable requirements of Federal, State, and local hazardous waste regulations and address:

1. Identification of hazardous wastes associated with the work.
2. Estimated quantities of wastes to be generated and disposed of.
3. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of waste permits.
4. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.
5. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.
6. Spill prevention, containment, and cleanup contingency measures to be implemented.
7. Work plan and schedule for waste containment, removal and disposal. Wastes must be cleaned and containerized daily.
8. Cost for hazardous waste disposal according to this plan.
9. Personnel training in accordance with 40 CFR Part 265.16.

I. Safety and Health Compliance:

1. In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing, transporting, and disposing of lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1910.1025 and 1926.62, as well as 40 CFR Part 260 through 265. Submit matters

- regarding interpretation of standards to the Contracting Officer for resolution before starting work.
2. Where specification requirements and the referenced documents vary, the most stringent requirements apply.
 3. The following local laws, ordinances, criteria, rules and regulations regarding removing, handling, storing, transporting, and disposing of lead-contaminated materials apply:
 - a. KAR 28-61-1 to KAR 28-72-54.
 - b. Any other local laws, ordinance, criteria, rules and regulations that are relevant or appropriate but not specifically listed here.
 - J. Pre-Construction Conference: Along with the CIH, meet with the Contracting Officer to discuss in detail the lead-containing paint removal work plan, including work procedures and precautions for the work plan.

1.6 SUBMITTALS

- A. Submit the following in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Catalog Data:
 1. Vacuum filters.
 2. Respirators.
- C. Instructions: Paint removal materials. Include applicable material safety data sheets.
- D. Statements Certifications and Statements:
 1. Qualifications of CIH: Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "CIH Responsibilities." Provide previous experience of the CIH. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/re-certification.
 2. Testing Laboratory: Submit the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne concentrations of lead. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the National Institute for Occupational Safety and Health (NIOSH)

Proficiency Analytical Testing (PAT) Program. The laboratory must be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/re-accreditation.

3. Lead-Containing Paint Removal Plan:

- a. Submit a detailed job-specific plan of the work procedures to be used in the removal of lead-containing paint. The plan must include a sketch showing the location, size, and details of lead control areas, location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation system.
- b. Include in the plan, eating, drinking, smoking and restroom procedures, interface of trades, sequencing of lead related work, collected wastewater and paint debris disposal plan, air sampling plan, respirators, protective equipment, and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 30 micrograms per cubic meter of air are not exceeded outside of the lead control area.
- c. Include air sampling, training and strategy, sampling methodology, frequency, duration of sampling, and qualifications of air monitoring personnel in the air sampling portion on the plan.

4. Field Test Reports: Monitoring Results: Submit monitoring results to the Contracting Officer within 3 working days, signed by the testing laboratory employee performing the air monitoring, the employee that analyzed the sample, and the CIH.

5. Records:

- a. Completed and signed hazardous waste manifest from treatment or disposal facility.
- b. Certification of Medical Examinations.
- c. Employee training certification.
- d. Respirator fit test certifications.
- e. Where the EPA RRP Rule applies, the Certified Renovator will keep on-site and provide the following: Renovator and Firm Certifications, results of any paint testing, proof of occupant pre-renovation education, non-certified worker training records, and confirmation of work practice requirement compliance.

PART 2 - PRODUCTS

2.1 GENERAL

- A. This specification covers only the removal of a railing with lead-based paint from the construction site. Lead-based paint removal from the railing and re-finishing the railing will be off-site, in the contractors work shop / work yard, following appropriate methods, procedures and safety measure in compliance with all relevant regulation, for which the Contractor is responsible.
- B. Paint Removal Products: Submit applicable Material Safety Data Sheets/Safety Data Sheets for paint removal products used in paint removal work. Use the least toxic product, suitable for the job and acceptable to the Certified Industrial Hygienist.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Notification: Notify the Contracting Officer prior to the start of any site-work concerning the lead-paint materials.
- B. Lead Control Area Requirements:
 - 1. Establish a lead control area as appropriate for removal of the lead-based painted railing from the construction site. Removal of lead-based paint from the railing and re-finishing the railing will be carried out off-site, in the Contractors work shop / work yard, following appropriate methods, procedures and safety measure in compliance with all relevant regulations. Contractor is responsible for all safety protocols and compliance with relevant regulations at the work shop / work yard.
 - 2. Contain removal operations by the use of a negative pressure full containment system with at least one change room and with HEPA filtered exhaust.
- C. Protection of Existing Work to Remain: Railing removal will be carried out without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition.
- D. Boundary Requirements: Provide physical boundaries around construction site lead control area, as appropriate. by roping off the area [designated on the drawings to be provided by the Contractor] and appropriate signage, or providing curtains, portable partitions or other enclosures to ensure that airborne concentrations of lead will

not reach 30 micrograms per cubic meter of air outside of the lead control area. The Contractor is responsible for appropriate boundary maintenance and compliance with all relevant laws and regulations at the work shop / work yard where lead paint removal is performed.

- E. Heating, Ventilating and Air Conditioning (HVAC) Systems: Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead control areas. Seal intake and exhaust vents in the lead control area with 6-mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead control area.
- F. Change Room and Shower Facilities: Provide clean change rooms and shower facilities within the physical boundary around the designated lead control area in accordance with requirements of 29 CFR 1926.62.
- G. Mechanical Ventilation System:
 - 1. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.
 - 2. To the extent feasible, use fixed local exhaust ventilation connected to HEPA filters or other collection systems, approved by the industrial hygienist. Design, construct, install, and maintain local exhaust ventilation in accordance with ANSI Z9.2.
 - 3. If air from exhaust ventilation is re-circulated into the work place, the system must have a high efficiency filter with reliable back-up filter and controls to monitor the concentration of lead in the return air and to bypass the recirculation system automatically if it fails. Air may be re-circulated only where exhaust to the outside is not feasible.
- H. Personnel Protection: Personnel must wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead control area. No one will be permitted in the lead control area unless they have been given appropriate training and protective equipment.
- I. Warning Signs: Provide warning signs at approaches to lead control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs must comply with the requirements of 29 CFR 1926.62 when the PEL is reached or exceeded.
- J. Where the EPA RRP Rule applies, the Certified Renovator will document that the area has been prepared in accordance with the RRP rule.

3.2 WORK PROCEDURES

- A. Perform removal of lead-containing paint in accordance with approved lead-containing paint removal plan. Use procedures and equipment required to limit occupational and environmental exposure to lead when lead-containing paint is removed in accordance with 29 CFR 1926.62 and EPA RRP Rule (where applicable), except as specified herein. Dispose of removed paint chips and associated waste in compliance with Environmental Protection Agency (EPA), federal, state, and local requirements.
- B. Personnel Exiting Procedures:
 - 1. Whenever personnel exit the lead-controlled area, they must perform the following procedures and cannot leave the work place wearing any clothing or equipment worn during the work day:
 - a. Vacuum themselves off.
 - b. Remove protective clothing in the decontamination room, and place them in an approved impermeable disposal bag.
 - c. Shower.
 - d. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.
- C. Monitoring: Monitor airborne concentrations of lead in accordance with 29 CFR 1910.1025 and as specified herein. Perform air monitoring, testing, and reporting by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH:
 - 1. The CIH or the IH Technician under the direction of the CIH must be on the job site directing the monitoring, and inspecting the lead-containing paint removal work to ensure that the requirements of the Contract have been satisfied during the entire lead-containing paint removal operation.
 - 2. Take personal air monitoring samples for each lead-related task on employees who are anticipated to have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.
 - 3. Submit results of air monitoring samples, signed by the CIH, after the air samples are taken. Notify the Contracting Officer immediately of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area.

D. Monitoring During Paint Removal Work:

1. Perform personal and area monitoring during the entire paint removal operation. Sufficient area monitoring must be conducted at the physical boundary to ensure unprotected personnel are not exposed above 30 micrograms per cubic meter of air at all times. Stop work if the outside boundary lead levels are at or exceed 30 micrograms per cubic meter of air; the CIH must immediately correct the condition(s) causing the increased levels and notify the Contracting Officer immediately.
2. The CIH must review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Resume removal work when approval is given by the CIH. Contractor must control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air at all times. As a minimum, conduct area monitoring daily on each shift in which lead paint removal operations are performed in areas immediately adjacent to the lead control area.
3. For outdoor operations, at least one sample on each shift must be taken on the downwind side of the lead control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas. CIH must certify that the area has been cleaned of lead contamination.
4. Submit results of air monitoring samples, signed by the CIH, after the air samples are taken. Notify the Contracting Officer immediately of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area.

3.3 LEAD-CONTAINING PAINT REMOVAL

- A. Remove paint within the areas designated on the drawings in order to completely expose the substrate. Take whatever precautions are necessary to minimize damage to the underlying substrate.
- B. Indoor Lead Paint Removal: Select paint removal processes to minimize contamination of work areas with lead-contaminated dust or other lead-contaminated debris/waste. This paint removal process should be described in the lead-containing paint removal plan. Perform wet manual sanding and scraping to the maximum extent feasible.

- C. Mechanical Paint Removal and Blast Cleaning: Perform mechanical paint removal and blast cleaning in lead control areas using negative pressure full containments with HEPA filtered exhaust. Collect paint residue and spent grit (used abrasive) from blasting operations for disposal in accordance with EPA, state and local requirements.
- D. Outside Lead Paint Removal: Select removal processes to minimize contamination of work areas with lead-contaminated dust or other lead-contaminated debris/waste. This paint removal process should be described in the lead-containing paint removal plan. Perform wet manual sanding and scraping to the maximum extent feasible.

3.4 SURFACE PREPARATIONS

- A. Avoid flash rusting or other deterioration of the substrate. Provide surface preparations for painting in accordance with Section 09 91 00, PAINTING.

3.5 CLEANUP AND DISPOSAL

- A. Cleanup: Maintain surfaces of the lead control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; prevent dust from being re-distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the paint removal operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA filtered vacuum cleaner and wet mopping the area. Where the EPA RRP Rule applies, the Certified Renovator will perform the cleaning verification process.
- B. Certification: The CIH must certify in writing that the inside and outside the lead control area air monitoring samples are less than 30 micrograms per cubic meter of air, the respiratory protection for the employees was adequate, the work procedures were performed in accordance with 29 CFR 1926.62, and that there were no visible accumulations of lead-contaminated paint and dust on the worksite. Do not remove the lead control area or roped-off boundary and warning signs prior to the Contracting Officer's receipt of the CIH's certification. Re-clean areas showing dust or residual paint chips.
- C. Testing of Lead-Containing Paint Residue and Used Abrasive Where indicated or when directed by the Contracting Officer, test lead containing paint residue and used abrasive in accordance with 40 CFR 261 for hazardous waste.

- D. Disposal: The Contractor is responsible for all disposal of lead-contaminated waste at the work yard/ work shop off-site. The following procedures are for lead-contaminated waste that is created on-site.
1. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and lead-contaminated clothing, which may produce airborne concentrations of lead particles.
 2. Store removed paint, lead-contaminated clothing and equipment, and lead-contaminated dust and cleaning debris into U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums. Properly label each drum to identify the type of waste (49 CFR 172) and the date lead-contaminated wastes were first put into the drum. Obtain and complete the Uniform Hazardous Waste Manifest forms from the Site Staff Civil Engineer. Comply with land disposal restriction notification requirements as required by 40 CFR 268:
 - a. At least 14 days prior to delivery, notify the Contracting Officer who will arrange for job site inspection of the drums and manifests.
 - b. Ensure that drums do not remain on the jobsite longer than 90 calendar days from the date affixed to each drum.
 - c. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and lead-contaminated clothing which may produce airborne concentrations of lead particles. Label the containers in accordance with 29 CFR 1926.62, as well as EPA and DOT requirements. Dispose of lead-contaminated waste material at approved hazardous waste treatment, storage, or disposal facility off Government property.
 - d. Store waste materials in U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums. Properly label each drum to identify the type of waste (49 CFR 172) and the date the drum was filled. The Contracting Officer or an authorized representative will assign an area for interim storage of waste-containing drums. Do not store hazardous waste drums in interim storage longer than 90 calendar days from the date affixed to each drum.
 - e. Handle, store, transport, and dispose lead or lead-contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

E. Disposal Documentation Submit written evidence that the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead disposal by the EPA and state or local regulatory agencies. Submit one copy of the completed manifest, signed and dated by the initial transporter in accordance with 40 CFR 262.

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SECTION 03 30 53
(SHORT-FORM) CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies cast-in-place structural concrete and material and mixes for other concrete.

1.2 RELATED WORK

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

1.3 TOLERANCES

- A. ACI 117.
- B. Slab Finishes: ACI 117, f-number method in accordance with ASTM E1155.

1.4 REGULATORY REQUIREMENTS

- A. ACI sp-66 - ACI Detailing Manual.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.

1.5 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements.

1.6 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT

- A. products and materials with post-consumer content and recovered materials content:
 - 1. Contractor is obligated by contract to satisfy federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conserve/tools/cpg/products/>.
 - 2. Materials or products specified by this section may be obligated to satisfy this federal mandate and comprehensive procurement guidelines program.
 - 3. The EPA website also provides tools such as a product supplier directory search engine and product resource guides.

- B. Fulfillment of regulatory requirements does not relieve the contractor of satisfying sustainability requirements as it relates to recycled content; additional product and material selections with recycled content may be required, as determined by contractor's sustainability action plan.

1.7 SUBMITTALS

- A. Submit in accordance with section 01 33 23, shop drawings, product data, and samples.
- B. Concrete mix design.
- C. Integral color mix design: as per plans and details, submit from manufacturer's full range of color additives for selection by CO/COR via submittal for use in specialty concrete items (concrete cap, for example) basis of design is liquid color flo iron oxide additive per solomon colors for cap.
one approved provider: Salomon Colors, Inc. 4050 Color Plant Road, Springfield, IL 62702 phone **1-800-624-0261** www.solomoncolors.com (or approved equal)
- D. Shop drawings:
 - 1. Submit steel reinforcement shop drawings and product data to include all information necessary for fabrication and placement of reinforcement.
 - 2. Indicate grades of reinforcing steel.
 - 3. Clearly indicate the splice length for every size and type of bar used.
 - 4. Indicate the type, size and location of all accessories required for the proper assembly, placement and support of the reinforcement.
- E. Manufacturer's certificates: air-entraining admixture, chemical admixtures, curing compounds.

1.8 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American concrete institute (ACI):

117-10	tolerances for concrete construction and materials and commentary
211.1-91 (R2009)	selecting proportions for normal, heavyweight, and mass concrete
211.2-98 (R2004)	selecting proportions for structural lightweight concrete
301-10	structural concrete
305R-10	guide to hot weather concreting
306R-10	guide to cold weather concreting
Sp-66-04	ACI detailing manual
318/318M-11	building code requirements for structural concrete and commentary
347r-04	guide to formwork for concrete
C. American Society for Testing And Materials (ASTM):	
A185/A185M-07	steel welded wire reinforcement, plain, for concrete
A615/A615M-12	deformed and plain carbon steel bars for concrete reinforcement
A996/A996M-09B	rail steel and axle steel deformed bars for concrete reinforcement
C31/C31M-12	making and curing concrete test specimens in the field
C33/C33M-13	concrete aggregates
C39/C39M-12a	compressive strength of cylindrical concrete specimens
C94/C94M-13	ready mixed concrete
C143/C143M-12	slump of hydraulic cement concrete
C150/C150M-12	portland cement
C171-07	sheet materials for curing concrete
C172/C172M-10	sampling freshly mixed concrete
C173/C173M-12	air content of freshly mixed concrete by the volumetric method
C192/C192M-12A	making and curing concrete test specimens in the laboratory
C231/C231M-10	air content of freshly mixed concrete by the pressure method
C260/C260M-10A	air-entraining admixtures for concrete
C330/C330M-09	lightweight aggregates for structural concrete

C494/C494m-13	chemical admixtures for concrete
C618-12A	coal fly ash and raw or calcined natural pozzolan for use in concrete
D1751-04 (R2008)	preformed expansion joint filler for concrete paving and structural construction (non-extruding and resilient bituminous types)

PART 2 - PRODUCTS

2.1 FORMS

- A. Wood, plywood, metal, or other materials, approved by CO/COR, of grade or type suitable to obtain type of finish specified.
- B. Form releasing agents to be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents must not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds. If special form liners are to be used, follow the recommendation of the form coating manufacturer. Submit manufacturer's recommendation on method and rate of application of form releasing agents.

2.2 MATERIALS

- A. Portland cement: ASTM C150, type I or II.
- B. Fly ash: ASTM C618, class c or f including supplementary optional requirements relating to reactive aggregates and alkalis, and loss on ignition (LOI) not to exceed 5 percent.
- C. Coarse aggregate: ASTM C33, size 67. Size 467 may be used for footings and walls over 300 mm (12 inches) thick. Provide size 7 coarse aggregate for applied topping and metal pan stair fill.
- D. Fine aggregate: ASTM C33.
- E. Lightweight aggregate for structural concrete: ASTM C330, table 1
- F. mixing water: fresh, clean, and potable.
- G. Air-entraining admixture: ASTM C260.
- H. Chemical admixtures: ASTM C494.
- I. Vapor barrier: ASTM E1745, 0.38 mm (15 mil).
- J. Reinforcing steel: ASTM A615 or ASTM A996, deformed. See structural drawings for grade.
- K. Welded wire fabric: ASTM A185.
- L. Expansion joint filler: ASTM D1751.
- M. Sheet materials for curing concrete: ASTM C171.

- N. Abrasive aggregates: aluminum oxide grains or emery grits.
- O. Liquid hardener and dustproofer: fluosilicate solution or magnesium fluosilicate or zinc fluosilicate. Magnesium and zinc may be used separately or in combination as recommended by manufacturer.
- P. Liquid densifier/sealer: 100 percent active colorless aqueous siliconate solution.
- Q. Grout, non-shrinking: premixed ferrous or non-ferrous, mixed and applied in accordance with manufacturer's recommendations. Grout cannot show settlement or vertical drying shrinkage at 3 days or thereafter based on initial measurement made at time of placement. Grout must produce a compressive strength of minimum 18 MPA (2500 psi) at 3 days and minimum 35 MPA (5000 psi) at 28 days.

2.3 CONCRETE MIXES

- A. Design of concrete mixes using materials specified as set forth under option c of ASTM C94.
- B. Compressive strength at 28 days: minimum 30 MPA (4000 psi).
- C. Establish strength of concrete by testing prior to beginning concreting operation. Test consists of average of three cylinders made and cured in accordance with ASTM C192 and tested in accordance with ASTM C39.
- D. Maximum slump for vibrated concrete is 100 mm (4 inches) tested in accordance with ASTM C143.
- E. Cement and water factor (see table I):

Table I - Cement and Water Factors For Concrete

Concrete: strength	Non-air-entrained		Air-entrained	
Min. 28 day comp. Str. MPA (psi)	Min. Cement Kg/m ³ (lbs/c. Yd)	Max. Water cement ratio	Min. Cement Kg/m ³ (lbs/c. Yd)	Max. Water Cement ratio
35 (5000) ^{1,3}	375 (630)	0.45	385 (650)	0.40
30 (4000) ^{1,3}	325 (550)	0.55	340 (570)	0.50
25 (3000) ^{1,3}	280 (470)	0.65	290 (490)	0.55
25 (3000) ^{1,2}	300 (500)	*	310 (520)	*

1. If trial mixes are used, the proposed mix design must achieve a compressive strength 8.3 MPA (1200 psi) in excess of F'c. For concrete strengths above 35 MPA (5000 psi), the proposed mix design

- must achieve a compressive strength 9.7 MPA (1400 psi) in excess of F'_c .
2. Lightweight structural concrete. Pump mixes may require higher cement values.
 3. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.
- * determined by laboratory in accordance with aci 211.1 for normal concrete or ACI 211.2 for lightweight structural concrete.
- F. Air-entrainment is required for all exterior concrete. Air content must conform with ACI 318 table 4.4.1.

2.4 BATCHING AND MIXING

- A. Store, batch, and mix materials as specified in ASTM C94.
1. Job-mixed: mix in a batch mixer in manner specified for stationary mixers in ASTM C94.
 2. Ready-mixed: comply with astm c94, except use of non-agitating equipment for transporting concrete to the site will not be permitted. With each load of concrete delivered to project, ready-mixed concrete producer must furnish, in duplicate, certification as required by ASTM C94.
 3. Mixing structural lightweight concrete: charge mixer with 2/3 of total mixing water and all of the aggregate. Mix ingredients for not less than 30 seconds in a stationary mixer or not less than 10 revolutions at mixing speed in a truck mixer. Add remaining mixing water and other ingredients and continue mixing. Above procedure may be modified as recommended by aggregate producer.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Installation conforms to ACI 347. Sufficiently tight to hold concrete without leakage, sufficiently braced to withstand vibration of concrete, and to carry, without appreciable deflection while remaining within allowable construction tolerances, all dead and live loads to which they may be subjected.
- B. Treating and wetting: treat or wet contact forms as follows:
1. Coat plywood and board forms with non-staining form sealer. In hot weather cool forms by wetting with cool water just before concrete is placed.

2. Clean and coat removable metal forms with light form oil before reinforcement is placed. In hot weather, cool metal forms by thoroughly wetting with water just before placing concrete.
 3. Use sealer on reused plywood forms as specified for new material.
- C. Inserts, sleeves, and similar items: flashing reglets and drip channels, masonry ties, anchors, inserts, wires, hangers, sleeves, boxes for floor hinges and other items specified as furnished under this and other sections of specifications are required to be in their final position at time concrete is placed - properly located, accurately positioned, built into construction, and maintained securely in place.
- D. Construction tolerances:
1. Set and maintain concrete formwork to assure erection of completed work within tolerances specified to accommodate installation or other rough and finish materials.
 2. Cast-in-place concrete installed as part of, or in the complexes surrounding, rostrum, columbaria or memorial wall elements (to have concrete (on or above finished grade) constructed to dimensions indicated on drawings within 6 mm (1/4 inch) of location and elevation.
 3. Properly brace the forms so the set concrete is correct within the allowable construction tolerances when the forms are removed.
 4. Upon removal of the forms, a professional surveyor must survey the placed concrete and provide information to the CO/COR where the work is not in conformance with the design drawings, within the allowable construction tolerances. The work cannot progress until the exposed concrete for the foundations are brought into compliance.
 5. Remedial work necessary for correcting installations that is in excess of allowable tolerances are the responsibility of the contractor.
 6. Erected work that exceeds specified tolerance limits must be remedied or removed and replaced, at no additional cost to the government.
 7. Any remediation work is subject to approval of the co/cor in advance of the work.
 8. Permissible surface irregularities for various classes of materials are defined as "finishes" in specification sections covering individual materials. They are to be distinguished from tolerances

specified which are applicable to surface irregularities of structural elements.

3.2 REINFORCEMENT

- A. Details of concrete reinforcement, unless otherwise shown, in accordance with ACI 318 and ACI SP-66. Support and securely tie reinforcing steel to prevent displacement during placing of concrete.

3.3 PLACING CONCRETE

- A. Remove water from excavations before concrete is placed. Remove hardened concrete, debris and other foreign materials from interior of forms, and from inside of mixing and conveying equipment. Obtain approval of CO/COR before placing concrete. Provide screeds at required elevations for concrete slabs.
- B. Roughen and clean set concrete free from laitance, foreign matter, and loose particles, before placing new concrete on or against concrete which has set.
- C. Convey concrete from mixer to final place of deposit by method which will prevent segregation or loss of ingredients. Do not deposit in work concrete that has attained its initial set or has contained its water or cement more than 1 1/2 hours. Do not allow concrete to drop freely more than 1500 mm (5 feet) in unexposed work nor more than 900 mm (3 feet) in exposed work. Place and consolidate concrete in horizontal layers not exceeding 300 mm (12 inches) in thickness. Consolidate concrete by spading, rodding, and mechanical vibrator. Do not secure vibrator to forms or reinforcement. Provide vibration continuously with placing of concrete.
- D. Hot weather placing of concrete: follow recommendations of ACI 305R to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete.
- E. Cold weather placing of concrete: follow recommendations of ACI 306R, to prevent freezing of thin sections less than 300 mm (12 inches) and to permit concrete to gain strength properly, except that use of calcium chloride cannot be used without written approval from co/cor.

3.4 PROTECTION AND CURING

- A. Protect exposed surfaces of concrete from premature drying, wash by rain or running water, wind, mechanical injury, and excessively hot or cold temperature. Curing method is subject to approval by co/cor.

3.5 FORM REMOVAL

- A. Forms remain in place until concrete has a sufficient strength to carry its own weight and loads supported. Removal of forms at any time is the contractor's sole responsibility.

3.6 SURFACE PREPARATION

- A. Immediately remove loose materials, after forms have been removed and work has been examined and approved by CO/COR, and patch all stone pockets, surface honeycomb, or similar deficiencies with cement mortar made with 1 part portland cement and 2 to 3 parts sand.
- B. For exposed surfaces of concrete for the columbarium and memorial walls and walls in their complexes, follow the procedures identified in paragraph finishes for exterior exposed areas (finished).
- C. For columbarium and memorial walls and their complexes, immediately after forms are removed, take steps to prepare and smooth the exposed portions of the concrete. Remove the form marks, including joint marks, fins, burrs and similar projections to produce a smooth surface. Complete the surface finish to result in a uniform textured surface with homogeneous color, unless surface is to be otherwise treated. Work must be as approved during the review of the mock-up.

3.7 FINISHES

- A. Slab finishes:
 - 1. Scratch finish: slab surfaces to receive a bonded applied cementitious application must be thoroughly raked or wire broomed after partial setting (within 2 hours after placing) to roughen surface and ensure a permanent bond between base slab and applied cementitious materials.
 - 2. Floating: allow water brought to surface by float used for rough finishing to evaporate before surface is again floated or troweled. Do not sprinkle dry cement on surface to absorb water.
 - 3. Float finish: screen and float ramps, stair treads, and platforms, both interior and exterior, equipment pads, and slabs to receive

non-cementitious materials, except as specified, to a smooth dense finish. Check for alignment using a straightedge or template after first floating and while surface is still soft. Correct high spots by cutting down with a trowel or similar tool and correct low spots by filling in with material of same composition as floor finish. Remove any surface projections on floated finish by rubbing or dry grinding. Refloat the slab to a uniform sandy texture.

4. Steel trowel finish: applied toppings, concrete surfaces to receive resilient floor covering or carpet, future floor roof and all monolithic concrete floor slabs exposed in finished work and for which no other finish is shown or specified must be steel troweled. Delay final steel troweling to secure a smooth, dense surface as long as possible, generally when the surface can no longer be dented with finger. During final troweling, tilt steel trowel at a slight angle and exert heavy pressure on trowel to compact cement paste and form a dense, smooth surface. Finished surface must be free of trowel marks, uniform in texture and appearance.
5. Broom finish: finish all exterior slabs, ramps, and stair treads with a bristle brush moistened with clear water after the surfaces have been floated.
6. Finished slab flatness (F_f) and levelness (F_l) values must comply with the following minimum requirements:

Slab On Grade & Shored Suspended Slabs		Unshored Suspended Slabs	
Specified overall value	F_f 25/ F_l 20	Specified overall value	F_f 25
Minimum local value	F_f 17/ F_l 15	Minimum local value	F_f 17

3.8 SURFACE TREATMENTS

- A. Mix and apply surface treatments in accordance with manufacturer's printed instructions.
- B. Liquid densifier/sealer: use on all exposed concrete floors and concrete floors to receive carpeting.
- C. Non-slip finish: except where safety nosing and tread coverings are shown, apply non-slip abrasive aggregate to treads and platforms of all concrete steps and stairs, and to surfaces of exterior concrete ramps and platforms. Broadcast aggregate uniformly over concrete surface. Trowel concrete surface to smooth dense finish. After curing, rub the

treated surface with abrasive brick and water sufficiently to slightly expose abrasive aggregate.

3.9 APPLIED TOPPING

- A. Separate concrete topping with thickness and strength shown with only enough water to insure a stiff, workable, plastic mix.
- B. Continuously place applied topping until entire section is complete, struck off with straightedge, compact by rolling or tamping, float and steel trowel to a hard smooth finish.

3.10 RETAINING WALLS

- A. Provide concrete for retaining walls as shown and air-entrained.
- B. Install and construct expansion and contraction joints, waterstops, weep holes, reinforcement and railing sleeves as shown on drawings (?).
- C. Finish exposed surfaces to match adjacent concrete surfaces, new or existing.
- D. Place porous backfill as shown on drawings (?).

3.11 PRECAST CONCRETE ITEMS

- A. Cast precast concrete items, not specified elsewhere, using 25 MPA (3000 psi) air-entrained concrete to shapes and dimensions shown. Finish surfaces to match corresponding adjacent concrete surfaces. Reinforce with steel as necessary for safe handling and erection.

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**SECTION 04 05 13
MASONRY MORTARING**

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Section specifies mortar materials and mixes.

1.2 RELATED WORK:

- A. Mortar used in Section:
1. SECTION 04 05 16, MASONRY GROUTING.
 2. SECTION 04 20 00, UNIT MASONRY.
- B. Mortar Color: SECTION 09 06 00, SCHEDULE FOR FINISHES.

1.3 TESTING LABORATORY-CONTRACTOR RETAINED

- A. Engage a commercial testing laboratory approved by CO/COR to perform tests specified below.
- B. Submit information regarding testing laboratory's facilities and qualifications of technical personnel to CO/COR.

One such provider:

Mortar: Michael Edison; Edison Coatings; (860)-747-2220;
www.edisoncoatings.com. (Note that original mortar was likely Portland cement / lime putty mix. This will require testing and analysis for determination of historic color. A softer mixture with higher lime content is preferable to be compatible with brick strength.) Intent is to match strength of mortar to that of clay brick.

1.4 TESTS

- A. Test materials proposed for use for compliance with specifications in accordance with test methods contained in referenced specifications and as follows:
- B. Mortar:
1. Test for compressive strength and water retention; ASTM C270.
 2. Mortar compressive strengths 28 days as follows:
Type S: Minimum 12400 kPa (1800 psi) at 28 days. Verify to align with Clay Brick strength and mortar testing.
 3. **Testing of existing mortar at historical structure for consistency with color and material composition (to be replicated as closely as possible using current resources and products).**
 4. Mortar mix selected would be compatible with strength of brick; which also requires testing for verification.

C. Cement:

1. Test for water soluble alkali (nonstaining) when nonstaining cement is specified.
2. Nonstaining cement shall contain not more than 0.03 percent water soluble alkali.

D. Sand: Test for deleterious substances, organic impurities, soundness and grading.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Certificates:

1. Testing laboratory's facilities and qualifications of its technical personnel.
2. Indicating that following items meet specifications:
 - a. Portland cement.
 - b. Masonry cement.
 - c. Mortar cement.
 - d. Hydrated lime.
 - e. Fine aggregate (sand).
 - f. Color admixture.

C. Laboratory Test Reports:

1. Mortar, each type.
2. Admixtures.

D. Manufacturer's Literature and Data:

1. Cement, each kind.
2. Hydrated lime.
3. Admixtures.
4. Liquid acrylic resin.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver masonry materials in original sealed containers marked with name of manufacturer and identification of contents.
- B. Store masonry materials under waterproof covers on planking clear of ground, and protect damage from handling, dirt, stain, water and wind.

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
- | | |
|---------------|---|
| C40-11 | Organic Impurities in Fine Aggregates for Concrete |
| C91-12 | Masonry Cement |
| C109-11 | Compressive Strength of Hydraulic Cement Mortars
(Using 2-in. or 50-MM Cube Specimens) |
| C144-04 | Aggregate for Masonry Mortar |
| C150-12 | Portland Cement |
| C207-06(2011) | Hydrated Lime for Masonry Purposes |
| C270-12 | Mortar for Unit Masonry |
| C595-13 | Blended Hydraulic Cement |
| C780-10 | Preconstruction and Construction Evaluation of
Mortars for Plain and Reinforced Unit Masonry |
| C979-10 | Pigments for Integrally Colored Concrete |
| C1329-12 | Mortar Cement |

PART 2 - PRODUCTS

2.1 HYDRATED LIME

- A. ASTM C207, Type S.

2.2 AGGREGATE FOR MASONRY MORTAR

- A. ASTM C144 and as follows:
1. Light colored sand for mortar for laying face brick.
 2. White plastering sand meeting sieve analysis for mortar joints for pointing and laying of structural facing tile units except that 100 percent passes No. 8 sieve, and not more than 5 percent retained on No. 16 sieve.
- B. Test sand for color value in accordance with ASTM C40. Sand producing color darker than specified standard is unacceptable.

2.3 BLENDED HYDRAULIC CEMENT

- A. ASTM C595, Type IS, IP.

2.4 MASONRY CEMENT

- A. ASTM C91. Type N, S, or M.
- B. Use white masonry cement whenever white mortar is specified.

2.5 MORTAR CEMENT

- A. ASTM C1329, Type N, S or M.

2.6 PORTLAND CEMENT

- A. ASTM C150, Type I.
- B. Use white Portland cement wherever white mortar is specified.

2.7 LIQUID ACRYLIC RESIN

- A. A formulation of acrylic polymers and modifiers in liquid form designed for use as an additive for mortar to improve physical properties.

2.8 WATER

- A. Potable, free of substances that are detrimental to mortar, masonry, and metal.

2.9 POINTING MORTAR

- A. For Cast Stone: Proportion by volume; One part white Portland cement, two parts white sand, and 1/5 part hydrated lime.

2.10 MASONRY MORTAR

- A. Conform to ASTM C270.
- B. Admixtures:
 - 1. Do not use mortar admixtures, except color admixtures if approved by Resident Engineer.
 - 2. Submit laboratory test report showing effect of proposed admixture on strength, water retention, and water repellency of mortar.
 - 3. Do not use antifreeze compounds.
- C. Colored Mortar:
 - 1. Maintain uniform mortar color for exposed work throughout.
 - 2. Match mortar color in approved sample or mock-up.
Mortar colors to match historical type used on original structure.
 - 3. Color of mortar for exposed work in alteration work to match color of existing mortar unless specified otherwise in section 09 06 00, SCHEDULE FOR FINISHES.

D. Color Admixtures:

1. Proportion as specified by manufacturer.
2. For color, see Section 09 06 00, SCHEDULE FOR FINISHES.

2.11 COLOR ADMIXTURE

- A. Pigments: ASTM C979.
- B. Use mineral pigments only. Organic pigments are not acceptable.
- C. Pigments inert, stable to atmospheric conditions, nonfading, alkali resistant and water insoluble.

PART 3 - EXECUTION

3.1 MIXING

- A. Mix in a mechanically operated mortar mixer.
 1. Mix mortar for at least three minutes but not more than five minutes.
- B. Measure ingredients by volume. Measure by the use of a container of known capacity.
- C. Mix water with dry ingredients in sufficient amount to provide a workable mixture which will adhere to vertical surfaces of masonry units.
- D. Mortar that has stiffened because of loss of water through evaporations:
 1. Re-tempered by adding water to restore to proper consistency and workability.
 2. Discard mortar that has reached its initial set or has not been used within two hours.
- E. Pointing Mortar:
 1. Mix dry ingredients with enough water to produce a damp mixture of workable consistency which will retain its shape when formed into a ball.
 2. Allow mortar to stand in dampened condition for one to 1-1/2 hours.
 3. Add water to bring mortar to a workable consistency prior to application.

3.2 MORTAR USE LOCATION

- A. Use **Type S** mortar for masonry below grade and engineered reinforced unit masonry work.
- B. For brick veneer over frame back up walls, use **Type S** masonry cement or mortar cement mortar.
- C. Use **Type S** mortar for other masonry work, except as otherwise specified.
- D. Use **Type S** mortar for tuck pointing work.

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SECTION 04 05 16
MASONRY GROUTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section specifies grout materials and mixes.

1.2 RELATED WORK

A. Grout used in Section:

1. SECTION 04 20 00, UNIT MASONRY.

B. Grout Color: SECTION 09 06 00, SCHEDULE FOR FINISHES.

1.3 TESTS

A. Certified test reports for grout and materials specified.

B. Identify materials by type, brand name and manufacturer or by origin.

C. After tests have been made and materials approved, do not change without additional test and approval of CO/COR.

D. Testing:

1. Grout:

a. Test for compressive strength; ASTM C1019.

b. Grout compressive strength of Type S: Minimum 12400 kPa (1800 psi) at 28 days. Verify to align with Clay Brick strength and historic mortar testing (likely a mixture of Portland Cement and Lime Putty).

c. **Testing of existing mortar at historical structure required for consistency with color and material composition (to be replicated as closely as possible using current resources and products).**

d. CO/COR to review and approve grout and mortar testing and preparation process and make final decision as to product following testing and analysis.

e. Engage a commercial testing laboratory approved by CO/COR to perform tests specified below.

1. Submit information regarding testing laboratory's facilities and qualifications of technical personnel to CO/COR.

One such provider:

Mortar: Michael Edison; Edison Coatings; (860)-747-2220;
www.edisoncoatings.com. (Note that original mortar was likely Portland cement / lime putty mix. This will require testing and analysis for determination of historic color. A softer mixture

with higher lime content is preferable to be compatible with brick strength.) Intent is to match strength of mortar to that of clay brick.

e. State Historic Preservation Officer may require review/approval.

f. Previous Testing of Clay Brick shows average strength of Brick to be 5395 PSI (compressive). See data end of this specification section.

2. Cement:

a. Test for water soluble alkali (non-staining) when non-staining cement is specified.

b. Non-staining cement shall not contain more than 0.03 percent water soluble alkali.

3. Sand: Test for deleterious substances, organic impurities, soundness and grading.

1.4 SUBMITTALS

A. Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Certificates:

1. Indicating that following items meet specifications:

a. Portland cement.

b. Masonry cement.

c. Grout.

d. Hydrated lime.

e. Fine aggregate (sand).

f. Coarse aggregate for grout.

g. Color admixture.

C. Laboratory Test Reports:

1. Grout, each type.

2. Admixtures.

D. Manufacturer's Literature and Data:

1. Cement, each kind.

2. Hydrated lime.

3. Admixtures.

4. Liquid acrylic resin.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver masonry materials in original sealed containers marked with name of manufacturer and identification of contents.

- B. Store masonry materials under waterproof covers on planking clear of ground, and protect damage from handling, dirt, stain, water and wind.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - C40-11 Organic Impurities in Fine Aggregates for Concrete
 - C91-12 Masonry Cement
 - C150-12 Portland Cement
 - C207-06(2011) Hydrated Lime for Masonry Purposes
 - C404-11 Aggregate for Masonry Grout
 - C476-10 Grout for Masonry
 - C595-13 Blended Hydraulic Cement
 - C979-10 Pigments for Integrally Colored Concrete
 - C1019-11 Sampling and Testing Grout

PART 2 - PRODUCTS

2.1 HYDRATED LIME

- A. ASTM C207, Type S.

2.2 AGGREGATE FOR MASONRY GROUT

- A. ASTM C404, Size 8.

2.3 BLENDED HYDRAULIC CEMENT

- A. ASTM C595, Type IS, IP.

2.4 MASONRY CEMENT

- A. ASTM C91. Type N, S, or M.
- B. Use white masonry cement whenever white mortar is specified.

2.5 PORTLAND CEMENT

- A. ASTM C150, Type I.
- B. Use white Portland cement wherever white mortar is specified.

2.6 LIQUID ACRYLIC RESIN

- A. A formulation of acrylic polymers and modifiers in liquid form designed for use as an additive for mortar to improve physical properties.

2.7 WATER

- A. Potable, free of substances that are detrimental to grout, masonry, and metal.

2.8 GROUT

- A. Conform to ASTM C476 except as specified.
- B. Grout type proportioned by volume as follows:
 - 1. Fine Grout:
 - a. Portland cement or blended hydraulic cement: one part.
 - b. Hydrated lime: 0 to 1/10 part.
 - c. Fine aggregate: 2-1/4 to three times sum of volumes of cement and lime used.
 - 2. Coarse Grout:
 - a. Portland cement or blended hydraulic cement: one part.
 - b. Hydrated lime: 0 to 1/10 part.
 - c. Fine aggregate: 2-1/4 to three times sum of volumes of cement and lime used.
 - d. Coarse aggregate: one to two times sum of volumes of cement and lime used.
 - 3. Sum of volumes of fine and coarse aggregates: Do not exceed four times sum of volumes of cement and lime used.

2.9 COLOR ADMIXTURE

- A. Pigments: ASTM C979.
- B. Use mineral pigments only. Organic pigments are not acceptable.
- C. Pigments inert, stable to atmospheric conditions, nonfading, alkali resistant and water insoluble.
- D. Grout colors to match historical type used on original structure.

PART 3 - EXECUTION

3.1 MIXING

- A. Mix in a mechanically operated grout mixer.
 - 1. Mix grout for at least five minutes.
- B. Measure ingredients by volume.
- C. Mix water with grout dry ingredients in sufficient amount to bring grout mixture to a pouring consistency.

3.2 GROUT USE LOCATIONS

- A. Use fine grout for filling wall cavities and cells of concrete masonry units where the smallest dimension is 50 mm (2 inches) or less.
- B. Use either fine grout or coarse grout for filling wall cavities and cells of concrete masonry units where the smallest dimension is greater than 50 mm (2 inches).
- C. Do not use grout for filling bond beam or lintel units.

Exhibit 7

Brick Test Report, Fort Scott National Cemetery
(Provided by Clemson University)

CLEMSON
UNIVERSITY
THE BISHOP MATERIALS LABORATORY

THE BISHOP MATERIALS LABORATORY

100 Clemson Research Blvd.
Anderson, SC 29626
(864) 656-1034
Fax: (864) 656-1024
www.bishopmaterials.com

AAP
AASHTO R18
ACCREDITED LABORATORY

Results of Tests on Brick conducted in accordance with ASTM C67-11 Standard Method for Sampling and

Testing Brick and Structural Clay Tile

03/09/2012

Name:	Smith Group J/R 201 Depot Street, Second Floor Ann Arbor, MI 48104	Plant:	Smith Group J/R
Phone:	734-662-4457	Report Number:	SG-0001
Fax:	734-760-8438	Sampled Date:	03/01/2012
		Lot:	
		Product Code:	

Sample Description: Rostrum - Fort Scott National Cemetery

						Test Date
Absorption	1	2	3	4	5	Average
24 Hour Submersion in Cold Water (%)	13.12	10.44	8.52	7.77	10.62	10.09 03/07/2012
5 Hour Submersion in Boiling Water (%)	19.88	18.05	15.55	15.53	16.38	17.08
Saturation Coefficient (Ratio of 24H to 5H)	0.66	0.58	0.55	0.50	0.65	0.59
Compressive Strength	1	2	3	4	5	Average
psi	4,381	6,919	5,675	4,750	5,249	5,395 03/07/2012
MPa	30.2	47.7	39.1	32.8	36.2	37.2

John Sanders

John Sanders, Ph.D., PE, Associate Director for Operations

Gary W. Parker

Gary W. Parker, Laboratory Supervisor

Lab Reference: 4306.6161

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SECTION 04 20 00
UNIT MASONRY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies requirements for construction of masonry unit walls.

1.2 RELATED WORK

- A. Mortars and grouts: section 04 05 13, masonry mortaring, Section 04 05 16, MASONRY GROUTING.
- B. Color and texture of masonry units: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Samples:

1. Face brick, sample panel, 200 mm by 400 mm (8 inches by 16 inches,) showing full color range and texture of bricks, bond, and proposed mortar joints.

Note: that project is to re-use existing salvaged brick from dismantling and demolishing existing historic structure and supplement with additional units to match historic brick in size and appearance.

Note: testing of existing brick required to meet performance for Strength. 4000 psi minimum for all clay brick requirement.

See previous (Clemson University) test results for clay brick at end of this specification section.

Suppliers of historical brick appropriate as a resource for project (or other approved equal):

Masonry: Gavin Historical Bricks; John Gavin, President.(319) 354-5251 info@historicalbricks.com; supplemental brick to match existing historical brick required as part of this effort.

Potential limestone sources (or other approved equal):

U.S. Stone Industries, 3515 W 75th Street Suite 105 Prairie Village, KS 66208 (913) 529-4154 usstoneindustries.com

Note: US Stone offers the benefit of being able to match limestone samples.

2. Anchors, and ties, one each and joint reinforcing 305 mm (12 inches) long.

C. Shop Drawings:

1. Indicate special masonry shapes. Provide full information on clay bricks as well as limestone elements.
2. Indicate reinforcement, applicable dimensions and methods of hanging soffit or lintel masonry and reinforcing masonry for embedment of anchors for hung fixtures.
3. Submit shop drawings for fabrication, bending, and placement of reinforcing bars prepared in accordance with ACI 315.

D. Certificates:

1. Submit certificates signed by manufacturer, including name and address of contractor, project location, and the quantity, and date or dates of shipment of delivery to which certificate applies.
2. Indicate that the following items meet specification requirements:
 - A. Face brick.
 - B. Limestone coping, steps, caps, and other specialties.
3. Identify testing laboratories facilities and qualifications of its principals and key personnel to perform tests specified.

E. Manufacturer's Literature And Data:

1. Anchors, ties, and reinforcement.
2. Shear keys.
3. Reinforcing bars.

1.5 SAMPLE PANEL

- A. Before starting masonry, lay up a sample panel in accordance with Masonry Standards Joint Committee (msjc) and Brick Industry Association (bia).
 1. **Use masonry units from random cubes of units delivered on site and historical salvaged dismantled brick.**
 2. Include reinforcing, ties, and anchors.
- B. Use sample panels approved by CO/COR for standard of workmanship of new masonry work.
- C. Use sample panel to test cleaning methods.
- D. Sample panel size: minimum 1220mm x 1220mm (4' x 4').

1.6 WARRANTY

- A. Warranty exterior masonry walls and stone steps, caps, and specialties against moisture leaks and subject to terms of "warranty of construction", far clause 52.246-21, **except that warranty period to be five years.**

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

- B. American Society for Testing And Materials (ASTM):

A615/A615M-12	Deformed and plain carbon-steel bars for concrete reinforcement
A675/A675M-03 (2009)	Steel bars, carbon, hot-wrought, special quality, mechanical properties
A951/A951M-11	Steel wire for masonry joint reinforcement
C67-12	Sampling and testing brick and structural clay tile
C90-12	Load bearing concrete masonry units
C216-12a	Facing brick (solid masonry units made from clay or shale)
C476-10	Grout for masonry
C612-10	Mineral fiber block and board thermal insulation
D1056-07	Flexible cellular materials - sponge or expanded rubber
C568/C568M-10	Limestone dimension stone

- C. American Welding Society (AWS):

D1.4/D1.4M-11	structural welding code - reinforcing steel
---------------	---

- D. Brick Industry Association - technical notes on brick construction (BIA):

11-2001	Brick masonry, Part I
11A-1988	Brick masonry, Part II
11B-1988	Brick masonry, Part III execution
11C-1998	For brick masonry engineered brick masonry, Part IV

11D-1988 Brick masonry engineered brick masonry, Part IV
continued

11E-1991 Brick masonry, Part V

E. Masonry Industry Council:

Hot and Cold Weather Masonry Construction Manual, 1999

F. Masonry Standards Joint Committee; Specifications for Masonry
Structures (TMS 602-11/ACI 530.1-11/ASCE 6-11) (MSJC)

G. American Concrete Institute (ACI):

SP-66(2004) ACI Detailing Manual

1.8 Pre-Installation Conference

- A. Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include re and all parties whose work is effected or related to the work of this section.

PART 2 - PRODUCTS

2.1 BRICK

A. Face Brick:

1. ASTM C216, Grade SW, Type FBS. Note: match existing historical brick dismantled from existing structure.
2. Brick when tested in accordance with ASTM C67: classified slightly efflorescent or better.
3. Size:
 - a. Modular to match existing brick.

B. Stone Masonry:

1. ASTM C568/C568M-10limestone dimension stone cut limestone to match details and dimensions shown on plans and details.
2. Match exiting material and dimension for caps and steps (if required).
3. Full shop drawing approval required for stone elements by CO/COR.
4. Size:
 - a. To match existing elements and/or plans and details shown.

2.2 REINFORCEMENT

- A. Steel reinforcing bars: ASTM a615, deformed bars, 420 MPa (grade 60) for bars No. 10 to No. 57 (No. 3 to No. 18), except as otherwise indicated.
- B. Where 6 mm diameter (no. 2) bars are shown, provide plain, round, carbon steel bars, ASTM A675, 550 MPa (grade 80).
- C. Joint Reinforcement:
 - 1. Form from wire complying with ASTM A951.
 - 2. Galvanized after fabrication.
 - 3. Width of joint reinforcement 40 mm (1 5/8-inches) less than nominal width of masonry wall or partition.
 - 4. Cross wires welded to longitudinal wires.
 - 5. Joint reinforcing at least 3000 mm (10 feet) in length.
 - 6. Joint reinforcing in rolls is not acceptable.
 - 7. Joint reinforcing that is crimped to form drip is not acceptable.
 - 8. Maximum spacing of cross wires 400 mm (16 inches) to longitudinal wires.
 - 9. Ladder design:
 - a. **Longitudinal wires deformed 4 mm (0.16 inch) diameter.**
 - b. **Cross wires 4 mm (0.16 inch) diameter.**
 - 10. Trussed design:
 - A. Longitudinal and cross wires not less than 4 mm (0.16 inch nominal) diameter.
 - B. Longitudinal wires deformed.

2.3 ANCHORS, TIES, AND REINFORCEMENT

- A. Adjustable veneer anchor for frame walls:
 - 1. Two piece, adjustable anchor and tie.
 - 2. Anchor and tie may be either type; use only one type throughout.
 - 3. Loop type:
 - a. Anchor: screw-on galvanized steel anchor strap 2.75 mm (0.11 inch) by 19 mm (3/4 inch) wide by 225 mm (9 inches) long, with 9 mm (0.35 inch) offset and 100 mm (4 inch) adjustment. Provide 5 mm (0.20 inch) hole at each end for fasteners.
 - b. Ties: triangular tie, fabricated of 5 mm (0.20 inch) diameter galvanized cold drawn steel wire. Ties long enough to engage the

anchor and be embedded not less than 50 mm (2 inches) into the bed joint of the masonry veneer.

4. Angle Type:

- a. Anchor: Minimum 2 mm (16 gage) thick galvanized steel angle shaped anchor strap. Provide hole in vertical leg for fastener. Provide hole near end of outstanding leg to suit upstanding portion of tie.

- B. Rigid Anchors: Fabricate from steel bars bent to configuration indicated.

2.4 PREFORMED COMPRESSIBLE JOINT FILLER

- A. Thickness and depth to fill the joint as specified.
- B. Closed Cell Neoprene: ASTM D1056, type 2, class a, grade 1.
- C. Non-Combustible Type: ASTM C612, type V, 1800 degrees F.

2.5 ACCESSORIES

- A. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, of length required to extend from exterior face of stone to cavity behind, in color selected from manufacturer's standard.
- B. Cavity Drain Material: Recycled polyester/polyethylene mesh trapezoidal shaped to maintain cavity air flow and drainage while suspending mortar droppings at unequal heights.
- C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- D. Masonry Cleaner:
 - 1. Detergent type cleaner selected for each type of masonry used.
 - 2. Acid cleaners are not acceptable.
 - 3. Use soap-less type specially prepared for cleaning brick or concrete masonry as appropriate.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

- A. Protection:
 - 1. Cover tops of walls with non-staining waterproof covering, when work is not in progress; secure to prevent wind blow off.

2. On new work protect base of wall from mud, dirt, mortar droppings, and other materials that will stain face, until final landscaping or other site work is completed.

B. Cold Weather Protection:

1. Masonry may be laid in freezing weather when methods of protection are utilized.
2. Comply with MSJC and HOT AND COLD WEATHER MASONRY CONSTRUCTION MANUAL.

3.2 CONSTRUCTION TOLERANCES

- A. Lay masonry units plumb, level and true to line within the tolerances as per MSJC requirements and as follows:
- B. Maximum variation from plumb:
 1. In 3,000 mm (10 feet) - 6 mm (1/4 inch).
 2. In 6,000 mm (20 feet) - 10 mm (3/8 inch).
- C. Maximum variation from level:
 1. In any bay or up to 6,000 mm (20 feet) - 6 mm (1/4 inch).
 2. In 12,000 mm (40 feet) or more - 13 mm (1/2 inch).
- D. Maximum variation from linear building lines:
 1. In any bay or up to 6,000 mm (20 feet) - 13 mm (1/2 inch).
 2. In 12,000 mm (40 feet) or more - 19 mm (3/4 inch).
- E. Maximum variation in cross-sectional dimensions of columns and thickness of walls from dimensions shown:
 1. Minus 6 mm (1/4 inch).
 2. Plus 13 mm (1/2 inch).
- F. Maximum variation in prepared opening dimensions:
 1. Accurate to minus 0 mm (0 inch).
 2. Plus 6 mm (1/4 inch).

3.3 INSTALLATION GENERAL

- A. Keep finish work free from mortar smears or spatters, and leave neat and clean.
- B. Anchor masonry as specified in paragraph, anchorage.
- C. Wall openings:
 1. Fill hollow metal frames built into masonry walls and partitions solid with mortar as laying of masonry progresses.
 2. If items are not available when walls are built, prepare openings for subsequent installation.

D. Tooling Joints:

1. Do not tool until mortar has stiffened enough to retain thumb print when thumb is pressed against mortar.
2. Tool while mortar is soft enough to be compressed into joints and not raked out.
3. Finish joints in exterior face masonry work with a jointing tool, and provide smooth, water-tight concave joint unless specified otherwise.
4. Tool exposed interior joints in finish work concave unless specified otherwise.
5. **Match tooling as used at historical existing Rostrum; verify by using photographic or project record documents.**

E. Lintels:

1. Lintels are not required for openings less than 1,000 mm (3 feet 4 inches) wide that have hollow metal frames.
2. Openings 610 mm (2 feet 0 inches) wide to 1600 mm (5 feet 4 inches) wide with no structural steel lintel or frames, require a lintel formed of concrete masonry lintel or bond beam units filled with grout per ASTM C476 and reinforced with 1- #15m (1-#5) rod top and bottom for each 100 mm (4 inches) of nominal thickness unless shown otherwise.
3. Use steel lintels, for openings over 1600 mm (5 feet 4 inches) wide, and brick masonry unless shown otherwise.
4. Provide length for minimum bearing of 100 mm (4 inches) at ends.
5. **Due to historical requirements for consideration, all lintels to be hidden from view if used and contained within mortar and grouting.**

F. Wetting And Wetting Test:

1. Test and wet brick in accordance with BIA 11b.
2. Do not wet concrete masonry units before laying.

3.4 ANCHORAGE

A. Veneer To Frame Or Masonry Walls:

1. **Use adjustable veneer anchors.**
2. Fasten anchor to stud through sheathing with self-drilling and tapping screw, one at each end of loop type anchor. In masonry backup stagger ties in alternate courses.
3. Space anchors not more than 400 mm (16 inches) on center vertically at each stud or 600 mm (24 inches) maximum horizontally.

3.5 REINFORCEMENT

A. Joint Reinforcement:

1. Use as joint reinforcement in cavity walls, and single wythe concrete masonry unit walls or partitions.
2. Reinforcing may be used instead of individual ties for anchoring brick facing to cmu backup in exterior masonry walls.
3. Brick veneer over frame backing walls does not require joint reinforcement.

B. Steel Reinforcing Bars:

1. Install in cells of hollow masonry units where required for vertical reinforcement and in bond beam units for lintels and bond beam horizontal reinforcement. Install in wall cavities of reinforced masonry walls where shown.

3.6 BRICK EXPANSION

A. Provide brick expansion (bej) joints where shown on drawings **or where historically located.**

B. Keep joint free of mortar and other debris.

C. Where joints occur in masonry walls:

1. Install preformed compressible joint filler in brick wythe.
2. Install cross shaped shear keys in concrete masonry unit wythe with preformed compressible joint filler on each side of shear key unless otherwise specified.
3. Install filler, backer rod, and sealant on exposed faces.

D. Use standard notched concrete masonry units (sash blocks) made in full and half-length units where shear keys are used to create a continuous vertical joint.

E. Interrupt steel joint reinforcement at expansion and control joints unless otherwise shown.

F. Fill opening in exposed face of expansion and control joints with sealant as specified in section 07 92 00, joint sealants.

3.7 BUILDING EXPANSION AND SEISMIC JOINTS

A. Keep joint free of mortar. Remove mortar and other debris.

B. Install non-combustible, compressible type joint filler to fill space completely except where sealant is shown on joints in exposed finish work.

3.8 BRICKWORK

- A. Lay clay brick in accordance with BIA technical note 11 series.
- B. Laying:
 - 1. Lay brick in running bond with course of masonry bonded at corners unless shown otherwise. **Match bond (numerous types) of existing historic structure as well as detailing. Coordinate with shop drawings and field measurements of existing rostrum.**
 - 2. **Maintain bond pattern throughout; where not planned for other masonry detailing/ornamental pattern.**
 - 3. Do not use brick smaller than half-brick at any angle, corner, break or jamb.
 - 4. Where length of cut brick is greater than one half but less than a whole brick, maintain the vertical joint location of such units.
 - 5. Lay exposed brickwork joints symmetrical about center lines of openings.
 - 6. Before starting work, lay facing brick on foundation wall and adjust bond to openings, angles, and corners.
 - 7. Lay brick for sills with wash and drip.
 - 8. Build solid brickwork as required for anchorage of items.
- C. Joints:
 - 1. Exterior and interior joint widths: lay for three equal joints in 200 mm (eight inches) vertically, unless shown otherwise.
- D. Weep Holes:
 - 1. Install weep holes at 600 mm (24 inches) on center in bottom of vertical joints of exterior masonry veneer or cavity wall facing over foundations, bond beams, and other water stops in the wall.
 - 2. Form weep holes using wicks made of mineral fiber insulation strips turned up 200 mm (8 inches) in cavity. Anchor top of strip to backup to securely hold in place.
 - 3. Install cavity drain material.
- E. Cavity Type Exterior Walls:
 - 1. Keep air space clean of mortar accumulations and debris.
 - a. Clean cavity by use of hard rubber, wood or metal channel strips having soft material on sides contacting wythes.
 - b. Lift strips with wires before placing next courses of horizontal joint reinforcement or individual ties or adjustable cavity wall ties.

2. Lay the interior wythe of the masonry wall full height where dampproofing is required on cavity face. Coordinate to install dampproofing prior to laying outer wythe.
3. Insulated Cavity Type Exterior Walls:
 - a. Install the insulation against the cavity face of inner masonry wythe.
 - b. Place insulation between rows of ties or joint reinforcing or bond to masonry surface with a bonding agent as recommended by the manufacturer of the insulation.
 - c. Lay the outer masonry wythe up with an air space between insulation and masonry units.
4. Veneer Framed Walls:
 - a. Build with 100 mm (4 inches) of face brick over sheathed stud wall with air space.
 - b. Keep air space clean of mortar accumulations and debris.

3.9 GROUTING

- A. Preparation:
 1. Clean grout space of mortar droppings before placing grout.
 2. Close cleanouts.
- B. Placing:
 1. Consolidate each lift of grout after free water has disappeared but before plasticity is lost.
 2. Interruptions: when grouting must be stopped for more than an hour, top off grout 40 mm (1-1/2 inch) below top of last masonry course.

3.10 PLACING REINFORCEMENT

- A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on the contract drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.
- B. Position reinforcement accurately at the spacing indicated. Support and secure vertical bars against displacement. Horizontal reinforcement may be placed as the masonry work progresses. Where vertical bars are shown in close proximity, provide a clear distance between bars of not less than the nominal bar diameter or 25 mm (1 inch), whichever is greater.

- C. Splice reinforcement bars where shown; do not splice at other places unless accepted by the CO/COR. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.
- D. Provide not less than minimum lap as indicated on shop drawings, or if not indicated, as required by governing code.
- E. Embed metal ties in mortar joints as work progresses, with a minimum mortar cover of 15 mm (5/8 inch) on exterior face of walls and 13 mm (1/2 inch) at other locations.
- F. Embed prefabricated horizontal joint reinforcement as the work progresses, with a minimum cover of 15 mm (5/8 inch) on exterior face of walls and 13 mm (1/2 inch) at other locations. Lap joint reinforcement not less than 150 mm (6 inches) at ends. Use prefabricated "L" and "T" sections to provide continuity at corners and intersections. Cut and bend joint reinforcement as recommended by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
- G. Anchoring: anchor reinforced masonry work to supporting structure as indicated.

3.12 CLEANING AND REPAIR

- A. General:
 - 1. Clean exposed masonry surfaces on completion.
 - 2. Protect adjoining construction materials and landscaping during cleaning operations.
 - 3. Cut out defective exposed new joints to depth of approximately 19 mm (3/4 inch) and repoint.
 - 4. Remove mortar droppings and other foreign substances from wall surfaces.
- B. Brickwork:
 - 1. First wet surfaces with clean water; then wash down with a solution of soap-less detergent. Do not use muriatic acid.
 - 2. Brush with stiff fiber brushes while washing, and immediately thereafter hose down with clean water.
 - 3. Free clean surfaces of traces of detergent, foreign streaks, or stains of any nature.

Exhibit 7

Brick Test Report, Fort Scott National Cemetery
(Provided by Clemson University)

CLEMSON
UNIVERSITY
THE BISHOP MATERIALS LABORATORY

THE BISHOP MATERIALS LABORATORY

100 Clemson Research Blvd.
Anderson, SC 29626
(864) 656-1034
Fax: (864) 656-1034
www.bishopmaterials.com



Results of Tests on Brick conducted in accordance with ASTM C67-11 Standard Method for Sampling and

Testing Brick and Structural Clay Tile

03/09/2012

Name:	Smith Group J/R 201 Depot Street, Second Floor Ann Arbor, MI 48104	Plant:	Smith Group J/R
Phone:	734-662-4457	Report Number:	SG-0001
Fax:	734-760-8438	Sampled Date:	03/01/2012
		Lot:	
		Product Code:	

Sample Description: Rostrum - Fort Scott National Cemetery

						Test Date
Absorption	1	2	3	4	5	Average
24 Hour Submersion in Cold Water (%)	13.12	10.44	8.52	7.77	10.62	10.09
5 Hour Submersion in Boiling Water (%)	19.88	18.05	15.55	15.53	16.38	17.08
Saturation Coefficient (Ratio of 24H to 5H)	0.66	0.58	0.55	0.50	0.65	0.59
Compressive Strength	1	2	3	4	5	Average
psi	4,381	6,919	5,675	4,750	5,249	5,395
MPa	30.2	47.7	39.1	32.8	36.2	37.2

John Sanders

John Sanders, Ph.D., PE, Associate Director for Operations

Gary W. Parker

Gary W. Parker, Laboratory Supervisor

Lab Reference: 4306.6161

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SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies items and assemblies fabricated from structural steel shapes and other materials as shown and specified.
- B. Items specified:
 - 1. Handrails and anchorages for handrails.
 - 2. Metal structural connections and anchors for pergola (timber) framing.

1.2 RELATED WORK

- A. Colors, finishes, and textures: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Prime and finish painting: Section 09 91 00, PAINTING.

1.3 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS AND PRODUCT DATA.
- B. Shop Drawings:
 - 1. Indicate each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors. **Include full documentation of existing "as built" historical handrail components from dismantled rostrum.**
 - 2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
 - 3. Provide templates and rough-in measurements as required.
- C. Manufacturer's Certificates:
 - 1. Anodized finish as specified (if applicable); align with painting requirements and field welding as delineated.
- D. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

1.5 QUALITY ASSURANCE

- A. Each manufactured product must meet or exceed the requirements specified, and be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Each product type to be the same and be made by the same manufacturer.
- C. Assembled product to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Society of Mechanical Engineers (ASME):
 - B18.6.1-81(R2008) Wood Screws
 - B18.2.2-10 Nuts for General Applications
- C. American Society for Testing and Materials (ASTM):
 - A36/A36M-12 Carbon Structural Steel
 - A123/A123M-12 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - A307-12 Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength
 - A500/A500M-10a Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - A653/A653M-11 Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
 - C1107/C1107M-13 Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
 - E488-10 Strength of Anchors in Concrete Elements
 - F436-11 Hardened Steel Washers
- D. American Welding Society (AWS):
 - D1.1/D1.1M:2010 Structural Welding Code Steel
 - D1.2/D1.2M:2008 Structural Welding Code Aluminum
 - D1.3/D1.3M:2008 Structural Welding Code Sheet Steel

- E. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500-06-2006 Metal Finishes Manual
- F. Structural Steel Painting Council (SSPC):
SSPC-SP 1 Solvent Cleaning
SSPC-SP 2 Hand Tool Cleaning
SSPC-SP 3 Power Tool Cleaning

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Steel: ASTM A36.
- B. Structural Tubing: ASTM A500.
- C. Primer and Finish Paint: As specified in SECTION 09 91 00, PAINTING.
- D. Modular Channel Units:
1. Factory fabricated, channel shaped, cold formed sheet steel shapes, complete with fittings bolts and nuts required for assembly.
 2. Form channel with in-turned pyramid shaped clamping ridges on each side.
 3. Provide case hardened steel nuts with serrated grooves in the top edges designed to be inserted in the channel at any point and be given a quarter turn so as to engage the channel clamping ridges. Provide each nut with a spring designed to hold the nut in place.
 4. Factory finish channels and parts with oven baked primer when exposed to view. Channels fabricated of ASTM A653, G90 galvanized steel may have primer omitted in concealed locations. Finish screws and nuts with zinc coating.
- E. Grout: ASTM C1107, pourable type.

2.2 HARDWARE

- A. Rough Hardware:
1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process. Galvanized G-90 where specified.
 2. Use G90 galvanized coating on ferrous metal for exterior work unless non-ferrous metal is used.
- B. Anchor Bolts: ASTM A307; same material, color, and finish as the metal to which applied when exposed.

- C. Sleeve Anchors: Design values listed must be as tested according to ASTM E488.
- D. Lag Screws and Bolts: ASME B18.2.1, type and grade best suited for the purpose.
- E. Toggle Bolts: ASME B18.2.1.
- F. Bolts, Nuts, Studs and Rivets: ASME B18.2.2 or ASTM A307.
- G. Washers: ASTM F436, type to suit material and anchorage.

2.3 FABRICATION

A. General:

1. Provide for items that do not form a part of the structural steel framework including miscellaneous mountings and frames.
2. Provide angles and plates, ASTM A36, for embedment as indicated.
3. Galvanize embedded items exposed to the elements according to ASTM A123.

B. Material:

1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
2. Use material free of defects which could affect the appearance or service ability of the finished product.

C. Size:

1. Size and thickness of members as shown.

D. Connections:

1. Except as otherwise specified, connections may be made by welding or bolting.
2. Field riveting will not be approved.
3. Design size, number and placement of fasteners, to develop a joint strength of not less than the design value.
4. Holes, for rivets and bolts: Accurately punch or drill; burrs removed.
5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use bolts of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.

7. Use stainless steel connectors for removable member's machine screws or bolts.

E. Fasteners and Anchors:

1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
4. Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
5. Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self-drilling and tapping screws or bolts.

F. Workmanship:

1. General:
 - a. Fabricate items to design shown.
 - b. Furnish members in longest lengths commercially available within the limits shown and specified.
 - c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
 - d. Provide holes, sinkages, and reinforcement shown and required for fasteners and anchorage items.
 - e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
 - f. Prepare members for the installation and fitting of hardware.
 - g. Cut openings in gratings and floor plates for the passage of ducts, sumps, pipes, conduits and similar items. Provide reinforcement to support cut edges.
 - h. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.

2. Welding:
 - a. Weld in accordance with AWS standards as listed in article Applicable Publications.
3. Joining:
 - a. Miter or butt members at corners.
 - b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.
4. Anchors:
 - a. Provide as indicated/shown on drawings and details.
5. Cutting and Fitting:
 - a. Accurately cut, machine and fit joints, corners, copes, and miters.
 - b. Fit removable members to be easily removed.
 - c. Design and construct field connections in the most practical place for appearance and ease of installation.
 - d. Fit pieces together as required.
 - e. Fabricate connections for ease of assembly and disassembly without use of special tools.
 - f. Joints firm when assembled.
 - g. Conceal joining, fitting and welding on exposed work as far as practical.
 - h. Do not show rivets and screws prominently on the exposed face.
 - i. Fabricate fit of components and the alignment of holes to eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.

G. Finish:

1. Finish exposed surfaces in accordance with NAAMM Metal Finishes Manual.
2. Steel and Iron: NAAMM AMP 504.
 - a. Zinc coated (Galvanized): ASTM A123, G90 unless noted otherwise.
 - b. Surfaces exposed in the finished work:
 - 1) Finish smooth rough surfaces and remove projections.
 - 2) Fill holes, dents and similar voids and depressions with epoxy type patching compound.
 - c. Shop Prime Painting:
 - 1) Surfaces of Ferrous Metal:
 - a) Provide as defined in SSPC-SP2 and SP3.

- H. Spot prime all abraded and damaged areas of zinc coating which expose the bare metal, using zinc rich paint on hot-dip zinc coat items and zinc dust primer on all other zinc coated items.

2.4 SUPPORTS

A. General:

1. Fabricate ASTM A36 structural steel shapes as shown.
2. Use clip angles or make provisions for welding hangers and braces to overhead construction.
3. Field connections may be welded or bolted.

2.5 HANDRAILS

- A. Design Criteria: 900 N (200 pounds) in any direction at any point.
- B. Provide continuous welded joints, dressed smooth and flush.
- C. Standard flush fittings, designed to be welded, may be used.
- D. Exposed threads will not be approved.
- E. Form handrail brackets to size and design shown.
- F. Close free ends of rail with flush metal caps welded in place except where flanges for securing to walls with bolts are shown.
- G. Make provisions for attaching handrail brackets to wall, posts, and handrail as shown.
- H. Re-use Salvaged dismantled components; supplement and replace as needed to meet requirements. Components require stripping / sandblasting of existing paint to remove lead based content, re-priming, and painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set work accurately, inalignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Items set into concrete or masonry.
 1. Provide temporary bracing for such items until concrete or masonry is set.
 2. Place in accordance with setting drawings and instructions.
 3. Build strap anchors, into masonry as work progresses.
- C. Field weld in accordance with AWS.
 1. Design and finish as specified for shop welding.
 2. Use continuous weld unless specified otherwise.

- D. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to building construction as specified. Power actuated drive pins may be used except for removable items and where members would be deformed or substrate damaged by their use.
- E. Spot prime all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.

3.2 INSTALLATION OF SUPPORTS

- A. Anchorage to Structure:
 - 1. Secure angles or channels and clips to overhead structural steel or timbers by continuous welding unless bolting is shown.
 - 2. Secure supports to concrete inserts by bolting or continuous welding.
 - 3. Secure supports to top of concrete columns when inserts do not exist with expansion bolts and to slabs, with expansion bolts unless shown otherwise.
 - 4. Secure steel plate or hat channels to studs as detailed on shop drawings.

3.3 STEEL COMPONENTS FOR MILLWORK ITEMS

- A. Coordinate and deliver to Millwork fabricator for assembly where millwork items are secured to metal fabrications.

3.4 CLEAN AND ADJUSTING

- A. Adjust movable parts including hardware to operate as designed without binding or deformation of the members centered in the opening or frame and, where applicable, contact surfaces fit tight and even without forcing or warping the components.
- B. Clean after installation exposed prefinished and plated items and items fabricated from aluminum and copper alloys, as recommended by the metal manufacture and protected from damage until completion of the project.

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SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section specifies wood blocking, sheathing, furring, nailers, and rough hardware.

1.2 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements.

1.3 SUBMITTALS

- A. Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Provide documentation of conformance with performance requirements of this section.
- C. Prepare shop drawings showing framing connection details, fasteners, connections and dimensions.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect lumber and other products from dampness both during and after delivery at site.
- B. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.
- C. Stack plywood and other board products so as to prevent warping.
- D. Locate stacks on well drained areas, supported at least 150 mm (6 inches) above grade and cover with well-ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Forest and Paper Association (AF&PA):
Wood Structural Design Data
- C. American Lumber Standard Committee, Incorporated (ALSC):
ALSC Board of Review

D. American Plywood Association (APA):

E30-2011 Engineered Wood Construction Guide

E. American Society of Mechanical Engineers (ASME):

B18.2.1-2012 Square, Hex, Heavy Hex and Askew Head Bolts and
Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag
Screws

B18.2.2-2010 Hex Nuts for General Applications

B18.6.1-81 (R2008) Wood Screws

B18.6.4-98 (R2005) Thread Forming and Thread Cutting Tapping
Screws and Metallic Drive Screws

F. American Society for Testing and Materials (ASTM):

A307-10 Carbon Steel Bolts and Studs, 60,000 PSI
Tensile Strength

C954-11 Steel Drill Screws for the Application of
Gypsum Panel Products or Metal Plaster Bases to
Steel Studs from 0.033 in. (0.84 mm) to 0.112
in. (2.84 mm) in Thickness

C1002-07 Steel Self-Piercing Tapping Screws for the
Application of Gypsum Panel Products or Metal
Plaster Bases to Wood Studs or Steel Studs

D6007-02 Determining Formaldehyde Concentration in Air
from Wood Products Using a Small Scale Chamber

E1333-10 Determining Formaldehyde Concentrations in Air
and Emission Rates from Wood Products Using a
Large Chamber

F844-07a Washers, Steel, Plan (Flat) Unhardened for
General Use

F1667-11a e1 Nails, Spikes, and Staples

G. American Wood Protection Association (AWPA)

H. FM Global Group (FM):

FM 4435 Approval Standard for Edge Systems Used with
Low Slope Roofing Systems

I. Green Seal (GS):

GS-36 (2013) Commercial Adhesives

J. South Coast Air Quality Management District (SCAQMD):

SCAQMD Rule 1168 (1989; R2005) Adhesive and Sealant Applications

K. U.S. Department of Commerce/National Institute of Science and
Technology:

PS 1-09

Structural Plywood

PS 20-10

American Softwood Lumber Standard

L. WRCLA Western Red Cedar Lumber Association

<http://www.wrcla.org/>

PART 2 - PRODUCTS

2.1 LUMBER

- A. Unless otherwise specified, each piece of lumber to bear a grade mark, stamp, or other identifying marks indicating grades of material, and rules or standards under which produced.
 - 1. Identifying marks in accordance with rule or standard under which material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
 - 2. Inspection agency for lumber approved by the Board of Review, American Lumber Standards Committee, to grade species used.
- B. Structural Members: Species and grade as listed in the AF&PA, National Design Specification for Wood Construction having design stresses as shown.
- C. Lumber Other Than Structural:
 - 1. Unless otherwise specified, species graded under the grading rules of an inspection agency approved by Board of Review, American Lumber Standards Committee.
 - 2. Framing lumber: Minimum extreme fiber stress in bending of 1100.
 - 3. Furring, blocking, nailers and similar items 100 mm (4 inches) and narrower Standard Grade; and, members 150 mm (6 inches) and wider, Number 2 Grade.
- D. Sizes:
 - 1. Conforming to Prod. Std. PS20.
 - 2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.
- E. Moisture Content:
 - 1. At time of delivery and maintained at the site.
 - 2. Boards and lumber 50 mm (2 inches) and less in thickness: 19 percent or less.
 - 3. Lumber over 50 mm (2 inches) thick: 25 percent or less.

F. Preservative Treatment:

1. Do not treat Heart Redwood and Western Red Cedar.
2. Products containing chromium or arsenic will not be permitted.
3. Provide products with waterborne or boron-based preservatives.

G. Waterborne Wood Preservatives:

1. Contractor to verify compatibility of treatment system with finish system.
2. Recommend alkyd based primer with a white semi-opaque stain. (as specified in SECTION 09 91 00)

H. Fire-retardant Treatment:

1. Fire-retardant-treated wood products to be free of halogens, sulfates, ammonium phosphate and formaldehyde.
2. Fire retardant treatment of wood products to conform to the requirements of AWPA Standard U1, Commodity Specification H and AWPA Standard T1, Section H.

2.2 ROUGH HARDWARE

A. Anchor Bolts: ASTM A307, size as indicated, complete with nuts and washers.

B. Washers:

1. ASTM F844.
2. Use zinc or cadmium coated steel or cast iron for washers exposed to weather.

C. Screws:

1. Wood to Wood: As specified.
2. Wood to Steel: As specified.

D. Nails:

1. ASTM F1667:
 - a. Common: Type I, Style 10.
 - b. Concrete: Type I, Style 11.
 - c. Barbed: Type I, Style 26.
 - d. Underlayment: Type I, Style 25.
 - e. Masonry: Type I, Style 27.

2.3 BLOCKING

- A. General: Provide miscellaneous lumber as indicated and lumber support or attachment for other construction, including the following (if applicable):
 - 1. Blocking.
 - 2. Nailers.
 - 3. Furring.
- B. Provide Standard or No. 2 Grade lumber.

PART 3 - EXECUTION

3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS

- A. Conform to applicable requirements of the following:
 - 1. Comply with APA standards for installation of plywood.
- B. Anchors in Masonry: Except where indicated otherwise, embed anchor bolts not less than 400 mm (15 inches) in masonry unit walls and provide each with a nut and a 50 mm (2 inch) diameter washer at bottom end. Fully grout bolts with mortar.
- C. Anchors in Concrete:
 - 1. Except where indicated otherwise, embed anchor bolts not less than 200 mm (8 inches) in poured concrete walls and provide each with a nut and a 50 mm (2 inch) diameter washer at bottom end.
 - 2. A bent end may be substituted for the nut and washer; bend to be not less than 90 degrees.
 - 3. Powder-actuated fasteners spaced 900 mm (3 feet) O.C. may be provided instead of bolts for single thickness plates on concrete.
- D. Wood Roof Nailers, Edge Strips, Crickets, Curbs, and Cants: Provide sizes and configurations indicated or specified and anchored securely to continuous construction.
 - 1. Roof Edge Strips and Nailers: Provide at perimeter of roof, around openings through roof, and where roofs abut walls, curbs, and other vertical surfaces.
 - 2. Except where indicated otherwise, nailers to be 150 mm (6 inches) wide and the same thickness as the insulation. Anchor nailers securely to underlying construction.
- E. Wood Blocking: Provide proper sizes and shapes at proper locations for the installation and attachment of wood and other finish materials, fixtures, equipment, and items indicated or specified.
- F. Wood Furring (if applicable).

1. Provide where shown and as necessary for facing materials specified.
2. Except as shown otherwise, furring strips to be nominal one by 3, continuous, and spaced 400 mm (16 inches) O.C. erect furring vertically or horizontally as necessary.
3. Nail furring strips to masonry.
4. Do not use wood plugs.
5. Provide furring strips around openings, behind bases, and at angles and corners.
6. Furring to be plumb, rigid, and level and shimmed as necessary to provide a true, even plane with surfaces suitable to receive the finish required.

3.2 PROTECTION

- A. Protect rough carpentry from weather.
- B. If rough carpentry becomes wet, apply EPA-registered borate treatment complying with EPA registered label.

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SECTION 07 11 13
BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies materials and workmanship for bituminous dampproofing on concrete and masonry surfaces.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Product description.
 2. Application instructions.

1.3 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
- D226-09.....Asphalt-Saturated Organic Felt Used in Roofing
and Waterproofing
- D449-03(R2008).....Asphalt Used in Dampproofing and Waterproofing
- D1227-95(R2007).....Emulsified Asphalt Used as a Protective Coating
for Roofing

PART 2 - PRODUCTS

2.1 ASPHALT (HOT APPLIED)

- A. ASTM D449, Type I.

2.2 ASPHALT SATURATED FELT

- A. ASTM D226, Type I, 7 kg (# 15).

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Surfaces to receive dampproofing shall be clean and smooth.
- B. Remove foreign matter, loose particles of mortar or other cementitious droppings.
- C. Clean and wash soil or dirt particles from surface.
- D. Remove free water; surfaces may remain damp.

3.2 APPLICATION

- A. Comply with Manufacturer written instructions for methods and rates of dampproofing application, cleaning and installation of any protection course.
- B. Apply each coat at the rate of not less than 1 L/m² (2-1/2 gallons per 100 square feet) and allow not less than 24 hours drying time after application.

3.3 LOCATION

- A. Apply to surfaces where shown.
- B. Apply to exterior surface of inner wythe of masonry cavity walls where shown. Coordinate application with masonry work.

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SECTION 09 06 00
SCHEDULE FOR FINISHES

NCA Facility: Fort Scott National Cemetery
Location: Fort Scott, Kansas
Project No. and Name: 893CM3014 Rostrum Rennovations
BID DOCUMENTS Submittal
Date: June 25, 2016

**INSTRUCTIONS FOR PREPARATON OF
SECTION 09 06 00-SCHEDULE FOR FINISHES**

2.1 DIVISION 03 - CONCRETE

A. SECTION 03 30 53, CAST IN PLACE CONCRETE (SHORT FORM)

Surface	Finish Description
Cast in Place Concrete (Structural)	Form finished and rubbed interior, broom finished exterior.
Cast in Place Concrete Cap (Structural)	Integral Colored Concrete, Basis of Design White 600 by Solomon Colors, tooled ornamental edges and chamfers, drip channel, crickets , jointing per drawings. Fine Broom or float finished.

2.2 DIVISION 04 - MASONRY

A. SECTION 04 05 13, MASONRY MORTARING and SECTION 04 05 31, MASONRY TUCK POINTING

Finish Code	Manufacturer	Mfg. Color Name
Match Existing Historical Mortar	TBD	Match Existing; requires testing for materials and color.

B. SECTION 04 20 00, UNIT MASONRY

FACE BRICK (FB)				
Finish Code	Size	Pattern	Manufacturer	Mfg. Color Name/No.
Match Existing XX	8 ¼" L X 3 ¾" W X 2 3/8" H	Match Existing generally, coordinate with drawings.	TBD; Supplemental Brick required will need sourcing.	Submittal and As-builts/ Shop drawings required.

2.3 DIVISION 05 - METALS

E. SECTION 05 50 00, METAL FABRICATIONS

Item	Finish
Metal Hardware for Pergola Construction	Interior components Galvanized, Exterior Exposed Dipped Flat Black.
Handrails	Flat Black Primed and Field Painted to Match existing.

2.4 DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

Item	Finish
Timber Pergola	Western Red Cedar with Alkyd Primer and Solid Body White Stain.

1. Paint Code	Gloss	Manufacturer	Mfg. Color Name/No.
Handrails	Flat	TBD	Black, TBD
2. Stain Code (S)	Gloss and Transparency	Manufacturer	Mfg. Color Name/No.
Pergola	1	TBD	White
3. Primer Code (PC)	Flat / Satin	Manufacturer	Mfg. Color Name/No.
Pergola	Alkyd Based	TBD	Solid White

2.5- Section 09 91 00, PAINT AND COATINGS

PART III - EXECUTION

3.1 FINISH SCHEDULES & MISCELLANEOUS ABBREVIATIONS

FINISH SCHEDULE & MISCELLANEOUS ABBREVIATIONS	
Term	Abbreviation
Brick Face	BR
Concrete	C
Existing	E
Exterior	EXT

Exterior Paint	EXT-P
Exterior Stain	EXT-ST
Granite	GT
Marble	MB
Material	MAT
Mortar	M
Natural Finish	NF
Paint	P
Stain	ST
Wood	WD

3.2 FINISH SCHEDULE SYMBOLS

Symbol Definition

** Same finish as adjoining walls
 - No color required
 E Existing
 XX To match existing
 EFTR Existing finish to remain
 RM Remove

--- E N D---

SECTION 09 91 00
PAINTING

PART 1-GENERAL

1.1 DESCRIPTION

- A. Section specifies field painting.
- B. Section specifies prime coats which may be applied in shop under other sections.
- C. Painting includes primer, stains, varnishes, and coatings specified.

1.2 RELATED WORK

- A. Shop prime painting of steel and ferrous metals: Division 05 - METALS,
- B. Section 06 10 00 ROUGH CARPENTRY
- C. Type of Finish, Color, and Gloss Level of Finish Coat: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements.

1.4 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT

- A. Products and Materials with Post-Consumer Content and Recovered Materials Content:
 - 1. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conserve/tools/cpg/products/>.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Before work is started, or sample panels are prepared, submit manufacturer's literature, the current Master Painters Institute (MPI) "Approved Product List" indicating 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 subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI "Approved Product List" where applicable is acceptable.

C. Samples:

1. After painters' materials have been approved and before work is started submit samples showing each type of finish and color specified.
2. Samples to show color: Composition board, 150 by 150 (6 inch by 6 inch).
3. Panel to show primer and stain finishes: Wood of same species and grain pattern as wood approved for use, 100 by 250 by 3 mm (4 inch by 10 inch face by 1/4 inch) thick minimum, and where both flat and edge grain will be exposed, 250 mm (10 inches) long by sufficient size, 50 by 50 mm (2 by 2 inch) minimum or actual wood member to show complete finish.

D. Manufacturers' Certificates indicating compliance with specified requirements:

1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
2. High temperature aluminum paint.
3. Epoxy coating.
4. Intumescent clear coating or fire retardant paint.
5. Plastic floor coating.

1.6 DELIVERY AND STORAGE

A. Deliver materials to site in manufacturer's sealed container marked to show following:

1. Name of manufacturer.
2. Product type.
3. Batch number.
4. Instructions for use.
5. Safety precautions.

B. In addition to manufacturer's label, provide a label legibly printed as following:

1. Federal Specification Number, where applicable, and name of material.
 2. Surface upon which material is to be applied.
 3. If paint or other coating, state coat types; prime, body or finish.
- C. Maintain space for storage, and handling of painting materials and equipment in a neat and orderly condition to prevent spontaneous combustion from occurring or igniting adjacent items.
- D. Store materials at site at least 24 hours before using, at a temperature between 18 and 30 degrees C (65 and 85 degrees F).

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. Master Painters Institute (MPI):
- | | |
|------------|--|
| No. 4-13 | Interior/ Exterior Latex Block Filler |
| No. 5-13 | Exterior Alkyd Wood Primer |
| No. 8-13 | Exterior Alkyd, Flat MPI Gloss Level 1 (EO) |
| No. 31-13 | Polyurethane, Moisture Cured, Clear Gloss (PV) |
| No. 36-13 | Knot Sealer |
| No. 71-13 | Polyurethane, Moisture Cured, Clear, Flat (PV) |
| No. 94-13 | Exterior Alkyd, Flat (EO) |
| No. 95-13 | Fast Drying Metal Primer |
| No. 134-13 | Primer, Galvanized, Water Based |
- C. Steel Structures Painting Council (SSPC):
- | | |
|--------------|---------------------|
| SSPC SP 1-04 | Solvent Cleaning |
| SSPC SP 2-04 | Hand Tool Cleaning |
| SSPC SP 3-04 | Power Tool Cleaning |

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wood Sealer: Thinned with thinner recommended by manufacturer at rate of about one part of thinner to four parts of varnish.
- B. Plastic Tape:
 - 1. Pigmented vinyl plastic film in colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES or specified.
 - 2. Pressure sensitive adhesive back.
 - 3. Widths as shown.
- C. Interior/Exterior Latex Block Filler: MPI 4.
- D. Exterior Alkyd Wood Primer: MPI 5.
- E. Exterior Alkyd Enamel (EO): MPI 9.
- F. Knot Sealer: MPI 36.
- G. Polyurethane, Moisture Cured, Clear, Flat (PV): MPI 71.
- H. Exterior Alkyd, Flat (EO): MPI 94.
- I. Fast Drying Metal Primer: MPI 95.
- J. Primer, Galvanized, Water Based (per 05-50-00)

2.2 PAINT PROPERTIES

- A. Use ready-mixed (including colors), except two component epoxies, polyurethanes, polyesters, paints having metallic powders packaged separately and paints requiring specified additives.
- B. Where no requirements are given in the referenced specifications for primers, use primers with pigment and vehicle, compatible with substrate and finish coats specified.

2.3 REGULATORY REQUIREMENTS

- A. Paint materials must conform to the restrictions of the local Environmental and Toxic Control jurisdiction or the requirements of this section, whichever is most stringent.
 - 1. Lead-Based Paint:
 - a. Lead based paint is not permitted to be used.
 - b. For lead-paint removal, see Section 02 83 33.13, LEAD-BASED PAINT REMOVAL AND DISPOSAL.
 - 2. Asbestos: Materials must not contain asbestos.
 - 3. Chromate, Cadmium, Mercury, and Silica: Materials must not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.

4. Human Carcinogens: Materials must not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
5. Use high performance acrylic paints in place of alkyd paints, where possible.
6. VOC content for solvent-based paints must not exceed specified performance requirement; aromatic hydro carbons contained in solvent-based paints must not exceed one percent by weight.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

- A. Safety: Observe required safety regulations and manufacturer's warning and instructions for storage, handling and application of painting materials.
 1. Take necessary precautions to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.
 2. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at end of each day's work.
- B. Atmospheric and Surface Conditions:
 1. Do not apply coating when air or substrate conditions are:
 - a. Less than 3 degrees C (5 degrees F) above dew point.
 - b. Below 10 degrees C (50 degrees F) or over 35 degrees C (95 degrees F), unless specifically pre-approved by the Contracting Officer and the product manufacturer.
 2. Do not exceed application conditions recommended by the manufacturer.
 3. Do no exterior painting when it is windy and dusty.
 4. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
 5. Apply only on clean, dry and frost free surfaces except as follows:
 - a. Apply water thinned acrylic and cementitious paints to damp (not wet) surfaces where allowed by manufacturer's printed instructions.
 - b. Dampened with a fine mist of water on hot dry days concrete and masonry surfaces to which water thinned acrylic and cementitious paints are applied to prevent excessive suction and to cool surface.

3.2 SURFACE PREPARATION

A. Method of surface preparation is optional, provided results of finish painting produce solid even color and texture specified with no overlays.

B. General:

1. Remove prefinished items not to be painted such as lighting fixtures, escutcheon plates, hardware, trim, and similar items for reinstallation after paint is dried.
2. Remove items for reinstallation and complete painting of such items and adjacent areas when item or adjacent surface is not accessible or finish is different.
3. See other sections of specifications for specified surface conditions and prime coat.
4. Clean surfaces for painting with materials and methods compatible with substrate and specified finish. Remove any residue remaining from cleaning agents used. Do not use solvents, acid, or steam on concrete and masonry.
5. In cases where hardware assembly requires installation of components, prime and paint full sections prior to installation.

C. Wood:

1. Sand to a smooth even surface and then dust off.
2. Sand surfaces showing raised grain smooth between each coat.
3. Wipe surface with a tack rag prior to applying finish.
4. Surface painted with an opaque finish:
 - a. Coat knots, sap and pitch streaks with Knot Sealer before applying paint.
 - b. Apply two coats of Knot Sealer over large knots.
5. After application of prime or first coat of stain, fill cracks, nail and screw holes, depressions and similar defects with wood filler paste. Sand the surface to make smooth and finish flush with adjacent surface.
6. Before applying finish coat, reapply wood filler paste if required, and sand surface to remove surface blemishes. Finish flush with adjacent surfaces.
7. Fill open grained wood such as oak, walnut, ash and mahogany with Wood Filler Paste, colored to match wood color.
 - a. Thin filler in accordance with manufacturer's instructions for application.

- b. Remove excess filler, wipe as clean as possible, dry, and sand as specified.

D. Ferrous Metals:

1. Remove oil, grease, soil, drawing and cutting compounds, flux and other detrimental foreign matter in accordance with SSPC-SP 1 (Solvent Cleaning).
2. Remove loose mill scale, rust, and paint, by hand or power tool cleaning, as defined in SSPC-SP 2 (Hand Tool Cleaning) and SSPC-SP 3 (Power Tool Cleaning). Exception: where high temperature aluminum paint is used, prepare surface in accordance with paint manufacturer's instructions.
3. Fill dents, holes and similar voids and depressions in flat exposed surfaces of hollow steel doors and frames, access panels, roll-up steel doors and similar items specified to have semi-gloss or gloss finish with TT-F-322D (Filler, Two-Component Type, For Dents, Small Holes and Blow-Holes). Finish flush with adjacent surfaces.
 - a. This includes flat head countersunk screws used for permanent anchors.
 - b. Do not fill screws of item intended for removal such as glazing beads.
4. Spot prime abraded and damaged areas in shop prime coat which expose bare metal with same type of paint used for prime coat. Feather edge of spot prime to produce smooth finish coat.
5. Spot prime abraded and damaged areas which expose bare metal of factory finished items with paint as recommended by manufacturer of item.

E. Zinc-Coated (Galvanized) Metal, Surfaces Specified Painted:

1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion in accordance with SSPC-SP 1 (Solvent Cleaning).
2. Spot coat abraded and damaged areas of zinc-coating which expose base metal on hot-dip zinc-coated items with Organic Zinc Rich Coating. Prime or spot prime with MPI 134 (Waterborne Galvanized Primer) depending on finish coat compatibility.

3.3 PAINT PREPARATION

- A. Thoroughly mix painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition.
- B. Do not thin unless necessary for application and when finish paint is used for body and prime coats. Use materials and quantities for thinning as specified in manufacturer's printed instructions.
- C. Remove paint skins, then strain paint through commercial paint strainer to remove lumps and other particles.
- D. Mix two component and two part paint and those requiring additives in such a manner as to uniformly blend as specified in manufacturer's printed instructions unless specified otherwise.
- E. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

3.4 APPLICATION

- A. Start of surface preparation or painting will be construed as acceptance of the surface as satisfactory for the application of materials.
- B. Unless otherwise specified, apply paint in three coats; prime, body, and finish. When two coats applied to prime coat are the same, first coat applied over primer is body coat and second coat is finish coat.
- C. Apply each coat evenly and cover substrate completely.
- D. Allow not less than 48 hours between application of succeeding coats, except as allowed by manufacturer's printed instructions, and approved by Contracting Officer/ Contracting Officer's Representative.
- E. Finish surfaces to show solid even color, free from runs, lumps, brush marks, laps, holidays, or other defects.
- F. Apply by brush, roller or spray, except as otherwise specified.
- G. Do not spray paint in existing occupied spaces unless approved by CO/ COR, except in spaces sealed from existing occupied spaces.
 - 1. Apply painting materials specifically required by manufacturer to be applied by spraying.
 - 2. In areas, where paint is applied by spray, mask or enclose with polyethylene, or similar air tight material with edges and seams continuously sealed including items specified in WORK NOT PAINTED, motors, controls, telephone, and electrical equipment, fronts of sterilizes and other recessed equipment and similar prefinished items.

- H. Do not paint in closed position operable items such as access doors and panels, window sashes, overhead doors, and similar items except overhead roll-up doors and shutters.

3.5 PRIME PAINTING

- A. After surface preparation, prime surfaces before application of body and finish coats, except as otherwise specified.
- B. Spot prime and apply body coat to damaged and abraded painted surfaces before applying succeeding coats.
- C. Additional field applied prime coats over shop or factory applied prime coats are not required except for exterior exposed steel. Apply an additional prime coat.
- D. Prime rebates for stop and face glazing of wood, and for face glazing of steel.
- E. Wood and Wood Particleboard:
 - 1. Use same kind of primer specified for exposed face surface.
 - a. Exterior wood: MPI 7 (Exterior Oil Wood Primer) for new construction and MPI 5 (Exterior Alkyd Wood Primer) for repainting bare wood primer except where Interior Wood Stain, Semi-Transparent (WS) is scheduled.
 - b. Transparent finishes as specified under Transparent Finishes on Wood.
 - 2. Apply one coat of primer MPI 7 (Exterior Oil Wood Primer) or MPI 5 (Exterior Alkyd Wood Primer) or sealer MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) as soon as delivered to site to surfaces of unfinished woodwork, except concealed surfaces of shop fabricated or assembled millwork and surfaces specified to have varnish, stain or natural finish.
 - 3. Back prime and seal ends of exterior woodwork, and edges of exterior plywood specified to be finished.
- F. Metals:
 - 1. Steel and Iron: MPI 95 (Fast Drying Metal Primer).
 - 2. Zinc-coated Steel and Iron: MPI 134 (Waterborne Galvanized Primer).
 - 3. Machinery Not Factory Finished: MPI 9 (Exterior Alkyd Enamel (EO)).

3.6 EXTERIOR FINISHES

- A. Apply following finish coats where specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Steel and Ferrous Metal,
 - 1. Two coats of MPI 8 (Exterior Alkyd, Flat (EO) on exposed surfaces, except on surfaces over 94 degrees C (200 degrees F).

3.8 REFINISHING EXISTING PAINTED SURFACES

- A. Clean, patch and repair existing surfaces as specified under surface preparation.
- B. Remove and reinstall items as specified under surface preparation.
- C. Remove existing finishes (via sandblasting or stripping at off site location) or apply separation coats to prevent non-compatible coatings from having contact.
- D. Note that lead paint removal of handrails is a requirement of project to comply with SECTION 02 83 33.13 LEAD-BASED PAINT REMOVAL AND DISPOSAL
- E. Patched or Replaced Areas in Surfaces and Components: Apply spot prime and body coats as specified for new work to repaired areas or replaced components.
- F. Except where scheduled for complete painting apply finish coat over plane surface to nearest break in plane, such as corner, reveal, or frame.
- G. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- H. Coat knots and pitch streaks showing through old finish with Knot Sealer before refinishing.
- I. Sand or dull glossy surfaces prior to painting.
- J. Sand existing coatings to a feather edge so that transition between new and existing finish will not show in finished work.

3.9 PAINT COLOR

- A. Color and gloss of finish coats is specified in SECTION 09 06 00, SCHEDULE FOR FINISHES. .
- B. Coat Colors:
 - 1. Color of priming coat: Lighter than body coat.
 - 2. Color of body coat: Lighter than finish coat.

3. Color prime and body coats to not show through the finish coat and to mask surface imperfections or contrasts.

3.10 PROTECTION CLEAN UP, AND TOUCH-UP

- A. Protect work from paint droppings and spattering by use of masking, drop cloths, removal of items or by other approved methods.
- B. Upon completion, clean paint from hardware, glass and other surfaces and items not required to be painted of paint drops or smears.
- C. Before final inspection, touch-up or refinished in a manner to produce solid even color and finish texture, free from defects in work which was damaged or discolored.

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APPENDIX

Coordinate the following abbreviations used in Section 09 91 00, PAINTING, with other Sections, especially Section 09 06 00, SCHEDULE FOR FINISHES and other COATING SECTIONS listed. Use the same abbreviation and terms consistently.

Paint or coating	Abbreviation
Acrylic Emulsion	AE (MPI 10 - flat/MPI 11 - semigloss/MPI 119 - gloss)
Alkyd Gloss Enamel	G (MPI 48)
Alkyd Flat Enamel	Flat MPI Gloss Level 1 (EO)
Exterior Oil	EO (MPI 9 - gloss/MPI 8 - flat/MPI 94 - semigloss)
Rubber Paint	RF (CID-A-A-3120 - Paint for Swimming Pools (RF))
Water Paint, Cement	WPC (CID-A-A-1555 - Water Paint, Powder).
Wood Stain	WS
- - - E N D - - -	

SECTION 31 20 11
EARTH MOVING (SHORT FORM)

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the requirements for furnishing all equipment, materials, labor and techniques for earthwork including excavation, fill, backfill and site restoration utilizing fertilizer, seed and/or sod.

1.2 DEFINITIONS

- A. Unsuitable Materials:
 - 1. Fills: Topsoil, frozen materials; construction materials and materials subject to decomposition; clods of clay and stones larger than 75 mm (3 inches); organic materials, including silts, which are unstable; and inorganic materials, including silts, too wet to be stable. Refer to *Paragraph 2.1.A, Structural Fills*, this section for acceptable material.
- B. Earthwork: Excavation and filling operations required within the new construction area.
- C. Degree of Compaction: Degree of compaction is expressed as a percentage of maximum density obtained by the test procedure presented in ASTM D698.
- D. The term fill means fill or backfill as appropriate.

1.3 RELATED WORK

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Safety Requirements: Section 01 00 00, GENERAL REQUIREMENTS, Article, ACCIDENT PREVENTION.
- C. Protection of existing utilities, fire protection services, existing equipment, roads, and pavements: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Subsurface Investigation: Section 01 00 00, GENERAL REQUIREMENTS, Article, PHYSICAL DATA.

1.4 CLASSIFICATION OF EXCAVATION

- A. Unclassified Excavation: Removal and disposal of pavements and other man-made obstructions visible on the surface; utilities, and other items including underground structures indicated to be demolished and

removed; together with any type of materials regardless of character of material and obstructions encountered. Site grading and excavations for the foundations will likely encounter bedrock. Weathered rock can typically be excavated with large excavation equipment fitted with rock teeth using concentrated effort or ripped with large bulldozers. Layers of intact rock may be present within the weathered zones, which could require breaking with pneumatic rock breakers. Excavations in weathered rock may result in larger excavations than in soils, which subsequently require more backfill.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

1. Furnish, soil samples, suitable for laboratory tests, of proposed off-site or on-site fill material to Inspection and Testing Agency. A sample of each material type shall be submitted for evaluation. All material shall be approved in advance by Inspection and Testing Agency.

1.6 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. American Nursery and Landscape Association (ANLA):

2004 American Standard for Nursery Stock

C. American Association of State Highway and Transportation Officials (AASHTO):

T99-01 (R2004) Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 inch) drop

T180-01 (2004) Moisture-Density Relations of Soils Using a 4.54-kg [10 lb] Rammer and a 457 mm (18 inch) drop

D. American Society for Testing and Materials (ASTM):

D698-07 Laboratory Compaction Characteristics of Soil Using Standard Effort

D1557-07 Laboratory Compaction Characteristics of Soil Using Modified Effort

E. Standard Specifications of (Insert name of local state) State
Department of Transportation, latest revision.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Fills: Materials approved from on-site and off-site sources
meeting the requirements of the following table:

Fill Type¹	USCS Classification	Placement Location
Lean Clay	CL (LL<50)	All locations and elevations
Fat Clay ²	CH (LL \geq 50)	Greater than 2' below footings and foundations
Well-graded Granular	GM ³	All locations and elevations
On-Site Soils	CH	Greater than 2' below foundation and footings

1. Fill shall consist of approved materials that are free of organic matter and debris. **Materials may be utilized as fill material for footings and/or foundations and exterior to the structure.**
2. Delineation of moderate to highly plastic clays should be performed in the field by a qualified geotechnical engineer or their representative, and could require additional laboratory testing.
3. Similar to AB-3 crushed limestone aggregate or crushed stone containing at least 18% low plasticity fines may also be used.

B. Structural Fill Compaction Requirements

Item		Description
Fill Lift Thickness ¹		9 inches or less in loose thickness
Compaction Requirements ²		95% of the material's maximum standard Proctor dry density ³
Moisture Content Clay Soil	LL<40	-2% to +2% of optimum moisture content value ³
	LL>40	0 to 4% above the optimum moisture content value ³
Moisture Content Granular Material		Workable moisture levels ⁴

1. Reduced lift thicknesses are recommended in confined areas (e.g., utility trenches, foundation excavations, and foundation backfill) and when hand-operated compaction equipment is used.
2. **Engineered fill shall be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.**
3. As determined by the standard Proctor test (ASTM D 698).
4. Moisture levels shall be low enough to allow for satisfactory compaction to be achieved without the cohesionless fill material pumping when proofrolled.

- C. **Planting Soil Infill Mixture:** A Peat/Sand Soil mixture shall be placed as an infill within the structure and as indicated on the plans. Refer to Planting Specification 32 90 00.
- D. **Fertilizer:** Delivered to site in unopened containers that clearly display the manufacturer's label, indicating the analysis of the contents. Refer to *Planting Specification 32 90 00*, Paragraphs 2.9 and 2.10 for product requirements.
- E. **Seed:** Delivered to site in unopened containers that clearly display the manufacturer's label, indicating the analysis of the contents. Refer to SECTION 32 90 00 PLANTING SPECIFICATION, Paragraph 2.13 for product requirements.

PART 3 - EXECUTION

3.1 SITE PREPARATION

- A. Clearing: Clearing within the limits of earthwork operations as described or designated by the Contracting Officer/ Contracting Officers Representative. Work includes removal of trees, shrubs, fences, foundations, incidental structures, paving, utilities, debris, trash and any other obstructions. Attention should be given to removing all loose or poorly compacted existing fill materials that may be within the project area. Excavations created by demolition and removal work shall be backfilled with engineered fill that is placed and compacted as required. Remove materials from the Cemetery Property.
- B. Special Topsoil Removal Requirements- Per Lead Paint Abatement requirements, topsoil to be stripped and removed / disposed from site at a depth of 6" and a distance of 10' from existing structure. See associated Specification Section 02 83 33.13 LEAD-BASED PAINT REMOVAL AND DISPOSAL for reference.
- C. Supplemental / Replacing Topsoil Topsoil: Unless otherwise indicated on the drawings, the limits of earthwork operations shall extend anywhere the existing grade is filled or cut or where construction operations have compacted or otherwise disturbed the existing grade or turf. Topsoil shall be fertile, friable, natural topsoil of loamy character and characteristic of the locality. Topsoil shall be capable of growing healthy horticultural crops of grasses. Deliver and store topsoil and protect as directed by the CO/ COR. Eliminate foreign material, such as weeds, roots, stones, subsoil, frozen clods, and similar foreign materials, larger than 0.014 m³ (1/2 cubic foot) in volume, from soil as it is stockpiled. Retain topsoil on the station. Remove foreign materials larger than 50 mm (2 inches) in any dimension from topsoil used in final grading. Topsoil work, such as stripping, stockpiling, and similar topsoil work, shall not, under any circumstances, be carried out when the soil is wet so that the tilth of the soil will be destroyed.
 - 1. Replaced/ supplemental top soil shall be tested for chemicals, pesticides and fertilizers if topsoil is to be removed from lands formerly utilized as farmland, to verify suitability for use as topsoil in the cemetery where new lawn areas are to be established.

2. Topsoil may not contain organic material.
- D. Disposal: All materials removed from the property shall be disposed of at a legally approved site, for the specific materials, and all removals shall be in accordance with all applicable Federal, State and local regulations. No burning of materials is permitted onsite.

3.2 EXCAVATION

- A. Equipment: The use of low ground pressure construction equipment would aid in reducing subgrade disturbance. The use of remotely operated equipment, such as a backhoe, would be beneficial to perform cuts and reduce subgrade disturbance.
- B. Shoring, Sheet piling and Bracing: Temporary excavations will be required during grading operations. The grading contractor is responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom as well as to protect workmen, banks, adjacent paving, structures, and utilities. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.
 1. Extend shoring and bracing to the bottom of the excavation. Shore excavations that are carried below the elevations of adjacent existing foundations.
 2. If the bearing of any foundation is disturbed by excavating, improper shoring or removal of shoring, placing of backfill, and similar operations, provide a concrete fill support under disturbed foundations, as directed by Resident Engineer, at no additional cost to the Government. Do not remove shoring until permanent work in excavation has been inspected and approved by Resident Engineer.
- C. Excavation Drainage: The contractor is responsible for selecting and implementing the appropriate dewatering procedures. Operate pumping equipment and/or provide other materials, means and equipment as required, to keep excavations free of water and subgrades dry, firm, and undisturbed until approval of permanent work has been received from Resident Engineer. Approval by the CO/COR is also required before placement of the permanent work on all subgrades. When subgrade for foundations has been disturbed by water, remove the disturbed material to firm undisturbed material after the water is brought under control.

Replace disturbed subgrade in trenches by mechanically tamped sand or gravel.

D. Blasting: Blasting shall not be permitted.

E. Footings and Foundations:

1. If the structure foundations are either supported either **completely** on intact bedrock or **completely** on soil, then the shallow foundations may bear directly on these materials. However, if the building foundations will be supported partially on soil and partially on bedrock, then when rock is encountered in footing excavations, the footings shall be over-excavated 2 feet below the design bearing level into the bedrock. The over-excavation should also extend laterally a minimum of 16" (minimum 2/3 of over-excavation depth) to provide adequate room for installation of a bond break with the sides of the footing excavation. The over-excavation into the bedrock should be backfilled with compacted, densely-graded granular material.
2. Alternatively, in lieu of over-excavating bedrock and backfilling with soil, soils can be over-excavated vertically until bedrock is encountered, and then backfilled with lean concrete.
3. Excavation shall be accomplished as required by drawings and specifications.
 - a. Use granular fill for bedding where rock or rocky materials are excavated.

F. Site Earthwork: Excavation shall be accomplished as required by drawings and specifications. Remove subgrade materials that are determined by the Inspection and Testing Agency as unsuitable and replace with acceptable material.

G. Finished elevation of subgrade shall be as follows:

1. Pavement Areas - bottom of the footing/foundation or base course as applicable.
2. Planting and Lawn Areas - 100 mm (4 inches) below the finished grade, unless otherwise specified or indicated on the drawings.

3.3 FILLING AND BACKFILLING

A. General: Do not fill or backfill until all debris, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from the excavation. Proof-roll exposed subgrades with a fully loaded dump truck. Use excavated materials or borrow for fill and backfill, as

applicable. Do not use unsuitable excavated materials. Do not backfill until foundation walls have been completed above grade and adequately braced, waterproofing or dampproofing applied, and pipes coming in contact with backfill have been installed, and inspected and approved by Resident Engineer.

- B. Proof-rolling Existing Subgrade: Proof-roll with a fully loaded dump truck. Make a minimum of one pass in each direction. Remove unstable uncompactable material as determined by the Inspection and Testing Agency and replace with granular fill material completed to mix requirements specified.
- C. Filling Over-excavated Bedrock: The over-excavation into the bedrock should be backfilled with compacted, densely-graded granular material.
- D. Placing: Place material in horizontal layers not exceeding 9 inches in loose depth and then compacted. Do not place material on surfaces that are muddy, frozen, or contain frost.
- E. Compaction: Use approved equipment (hand or mechanical) well suited to the type of material being compacted. Do not operate mechanized vibratory compaction equipment within 3000 mm (10 feet) of new or existing building walls without the prior approval of the Resident Engineer. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Compact each layer **until there is no evidence of further compaction** to not less than 95 percent of the maximum density determined in accordance with the following test method ASTM D698.

3.4 GRADING

- A. General: Uniformly grade the areas within the limits of this section, including adjacent transition areas. Smooth the finished surface within specified tolerance. Provide uniform levels or slopes between points where elevations are indicated, or between such points and existing finished grades. Provide a smooth transition between abrupt changes in slope.
- B. Cut rough or sloping rock to level beds for foundations. In unfinished areas fill low spots and level off with coarse sand or fine gravel.
- C. Slope backfill outside the structure away from the structure walls for a minimum distance of 1800 mm (6 feet).

- D. The finished grade shall be 150 mm (6 inches) below bottom line of windows or other building wall openings unless greater depth is shown.
- E. Place crushed stone or gravel fill under concrete slabs on grade tamped and leveled. The thickness of the fill shall be 150 mm (6 inches), unless otherwise indicated.
- F. Finish subgrade in a condition acceptable to the Resident Engineer at least one day in advance of the paving operations. Maintain finished subgrade in a smooth and compacted condition until the succeeding operation has been accomplished. Scarify, compact, and grade the subgrade prior to further construction when approved compacted subgrade is disturbed by contractor's subsequent operations or adverse weather.
- G. Grading for Paved Areas: Provide final grades for both subgrade and base course to +/- 6 mm (0.25 inches) of indicated grades.

3.5 LAWN AREAS

- A. General: Harrow and till to a depth of 100 mm (4 inches), new or existing lawn areas to remain, which are disturbed during construction. Establish existing or design grades by dragging or similar operations. Do not carry out lawn areas earthwork out when the soil is wet so that the tilth of the soil will be destroyed. Plant bed must be approved by Resident Engineer before seeding or sodding operation begins.
- B. Finished Grading: Begin finish grading after rough grading has had sufficient time for settlement. Scarify subgrade surface in lawn areas to a depth of 100 mm (4 inches). Apply topsoil so that after normal compaction, dragging and raking operations (to bring surface to indicated finish grades) there will be a minimum of 100 mm (4 inches) of topsoil over all lawn areas; make smooth, even surface and true grades, which will not allow water to stand at any point. Shape top and bottom of banks to form reverse curves in section; make junctions with undisturbed areas to conform to existing topography. Solid lines within grading limits indicate finished contours. Existing contours, indicated by broken lines are believed approximately correct but are not guaranteed.
- C. Fertilizing: Incorporate fertilizer into the soil to a depth of 100 mm (4 inches) at a rate of 12 kg/100 m² (25 pounds per 1000 square feet).
- D. Seeding: Seed at a rate of 2 kg/100 m² (4 pounds per 1000 square feet) and accomplished only during periods when uniform distribution may be assured. Lightly rake seed into bed immediately after seeding. Roll

seeded area immediately with a roller not to exceed 225 kg/m (150 pounds per foot) of roller width.

- E. Watering: The Resident Engineer is responsible for having adequate water available at the site. As sodding is completed in any one section, the entire sodded area shall be thoroughly irrigated by the contractor, to a sufficient depth, that the underside of the new sod pad and soil, immediately below sod, is thoroughly wet. Resident Engineer will be responsible for sod after installation and acceptance.

3.6 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL

- A. Disposal: Transport surplus satisfactory soil to designated storage areas on Cemetery property. Stockpile or spread soil as directed by CO/COR.
 - 1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Cemetery property.
- B. Place excess excavated materials suitable for fill and/or backfill on site where directed.
- C. Remove from site and dispose of any excess excavated materials after all fill and backfill operations have been completed.
- D. Segregate all excavated contaminated soil designated by the Resident Engineer from all other excavated soils, and stockpile on site on two 0.15 mm (6 mil) polyethylene sheets with a polyethylene cover. A designated area shall be selected for this purpose. Dispose of excavated contaminated material in accordance with State and Local requirements.

3.6 CLEAN-UP

- A. Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment. Provide site clear, clean, free of debris, and suitable for subsequent construction operations. Remove debris, rubbish, and excess material from the Cemetery Property.

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SECTION 32 90 00
PLANTING

PART 1 - GENERAL

1.1 DESCRIPTION AND REQUIREMENTS

- A. This work consists of furnishing and installing all planting materials required for landscaping at all NCA construction projects hereinafter specified in locations as shown. The landscape contractor shall be required to visit the site prior to submitting Bid Proposal to become familiar with all conditions affecting the proposed work. The contractor shall identify and review all underground utility locations prior to commencing work and shall exercise caution when working close to utilities and shall notify the Contracting Officer (CO) or Contracting Officer's Representative (COR) of apparent conflicts with construction and utilities so that adjustment can be planned prior to installation.
- B. Agronomic consultation on the appropriateness of all plant materials proposed for installation during this project must be obtained from the MSN Agronomist and/or NCA Chief Agronomist via coordination through the CO and/or COR prior to project initiation and actual plant installation. In general, all plant material must be regionally adapted to the climate of the site, be of appropriate mature dimensions to fit the planting location and be low maintenance species. This requirement will generally exclude or severely limit the use of rose plants, wild flowers and ground covers.
- C. Any exceptions to these species exclusions must be approved by the MSN Agronomist and/or NCA Chief Agronomist via coordination through the CO / COR prior to project initiation.

1.2 EQUIPMENT

Maintain all equipment, tools and machinery while on the project in sufficient quantities and capacity for proper execution of the work.

1.3 RELATED WORK

- A. Section 31 20 00, EARTH MOVING (SHORT FORM), Stripping Topsoil and removal/replacement
- B. Section 01 45 29, TESTING LABORATORY SERVICES, Topsoil Testing.
- C. Section 31 20 00, EARTH MOVING (SHORT FORM), Topsoil Materials.
- D. Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

1.4 SUBMITTALS

A. Samples: Submit the following samples for approval before work is started:

Inert Mulch	2.3 kg (5 pounds) of each type to be used.
Organic Mulch (Straw)	2.3 kg (5 pounds) of each type to be used.
All pesticides required such as preemergence or post emergence herbicides, insecticides, or fungicides.	EPA approved labeling and MSDS sheet for each such product selected for use.

B. Certificates of Conformance or Compliance: Before delivery, notarized certificates attesting that the following materials meet the requirements specified shall be submitted to the Contracting Officer's Representative for approval:

1. Plant Materials (Department of Agriculture certification by State Nursery Inspector from the state in which the plant material originates declaring material to be free from insects and disease).
2. Fertilizers.
3. Lime
4. Peat
5. Seed

C. Manufacturer's Literature and Data:

1. Erosion control materials
2. Hydro mulch (if applicable)
5. Pre-emergent herbicide

D. Licenses: Licenses of Arborist shall be submitted (one copy), to the Contracting Officer's Representative.

E. Soil laboratory testing results and any soil amendment recommendations from the Contractor. Submit soil test results for each variable soil type and condition that exists for off- site supplemental topsoil provided.

1. Organic Soil Amendment and Imported Topsoil: The Contractor shall provide a 5 pound representative sample from each proposed source for testing, analysis, and approval. Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the Contracting Officer's Representative. Testing reports shall include the following tests and recommendations.

- a. Mechanical gradation (sieve analysis) and chemical (pH soluble salts) shall be performed by public extension service agency or a certified

- private testing laboratory in accordance with the current standards of the Association of Official Agricultural Chemists. A hydrometer shall be used to determine percent of clay and silt.
- b. Percent of organics shall be determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 110 °C, plus or minus 5°C.
 - c. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Soluble Salts, and acidity (pH).
 - d. Tests, as specified, for gradation, organics, soil chemistry and pH shall be performed by a testing laboratory retained by the Department of Veterans Affairs as described in SECTION 01 45 29, TESTING LABORATORY SERVICES.
 - e. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary, and for fertilizing and liming applications to support successful turfgrass growth.
 - f. All tests shall be performed in accordance with the current standards of the Association of Official Agricultural Chemists.
2. Supplemental topsoil (in place): Following the incorporation of amendments and additives, the Contractor shall provide a minimum of six (6) samples per forty thousand (40,000) square feet, six inch (6") depth by three inch (3") diameter core samples of amended soil taken from the site for testing, analysis, and approval. The location of each sample shall be as directed by the Contracting Officer's Representative from areas designated to receive turfgrass or be established to turfgrass on the Contract Drawings. No seeding or hydroseeding operations shall occur until acceptance of the amended soil samples has been obtained. Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the Contracting Officer's Representative. Tests shall be as directed in paragraph 1.4 E.1.d. of this Section.
3. Seed: Submit a manufacturer's Certificate of Compliance to the Specifications with each shipment of each type of seed. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates.
4. Fertilizer: Submit four (4) certificates of analysis for each type of fertilizer.

5. Hydro Mulching: Prior to the start of hydro mulching, submit a certified statement for approval as to the number of pounds of materials to be used per gallon of water.

1.5 DELIVERY AND STORAGE

A. Delivery:

1. Deliver fertilizer and lime to the site in the original, unopened containers bearing the manufacturer's warranted chemical analysis, name, trade name or trademark, and in conformance to state and federal law. In lieu of containers, fertilizer and lime may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.

B. Storage:

1. Keep seed, lime, and fertilizer in dry storage away from contaminants.

1.6 PLANTING AND TURFGRASS INSTALLATION SEASONS AND CONDITIONS

- A. Perform turfgrass installation operations within the following dates, but not before irrigation system installed, tested, and approved.

From April 1 to July 15 for spring and from August 15th to October 15th for fall.

- B. No work shall be done when the ground is frozen, snow covered, too wet or in an otherwise unsuitable condition for planting. Special conditions may exist that warrants a variance in the specified planting dates or conditions. Submit a written request to the Contracting Officer's Representative stating the special conditions and proposal variance for approval.

1.7 LANDSCAPE PLANT AND TURF ESTABLISHMENT PERIOD

- A. The Establishment Period for landscape plants and turfgrass shall begin immediately after installation, with the approval of the RE, PM or COTR and continue for a period of time during the growing season sufficiently long (optimally a minimum of 3 months) for the turfgrass and landscape plant materials to achieve an establishment condition and appearance satisfactory to the MSN Agronomist and NCA. These conditions and appearance are described as follows: Turfgrass shall have obtained a minimum of 98% surface cover that is generally weed-free and Landscape Plant Materials shall be fully rooted, actively growing and healthy and planting beds generally weed-free. The contractor shall be responsible for the health and maintenance of plants and turfgrass during the establishment period. Plants and turfgrass will not be accepted until after completion of an acceptable establishment period. During the Landscape Plant and Turfgrass Establishment Period the Contractor shall:

1. Water all plants and turfgrass to maintain a moist soil surface at all times until the plants and turfgrass are well established. An adequate supply of moisture must also be maintained within the root zone. Apply water at a moderate rate so as not to displace the mulch, create any water ponding or runoff from the soil supporting the plants and turfgrass. The actual quantity of applied water required to achieve and maintain these conditions is best determined on site by the MSN Agronomist in consultation with the CO/COR.
2. Reseed and replace mulch as required.
3. Provide the following during turfgrass establishment:
 - a. Eradicate all weeds. Water, fertilize, overseed, and perform any other operation necessary to promote the growth of turfgrass.
 - b. Mow the turfgrasses as often as necessary to maintain the NCA specified mowing height for each type of turfgrass prior to final acceptance. Begin mowing when cool season turfgrass is 100 mm (4 inches) high. For warm season turfgrasses mow at heights as appropriate for species and cultivar as directed by the RE/COTR in consultation with the MSN Agronomist. Final mowing height is 65 mm (3.0 inch) for cool season turfgrasses and as appropriate for warm season turfgrasses and mow as often as necessary to maintain the proper height while never removing more than 1/3 of the total height of grass leaves in a single mowing. Mow any portion of the newly developing turfgrass stand that requires mowing without waiting for other areas of slowly developing seedlings to catch-up.
7. Replace dead, missing or defective plant material during the establishment period and an active growing season. Immediately replace each plant with one of the same size and species.
8. Replant any areas void of turfgrass during an active growing season only.
 - a. Sod shall be evaluated for species and health thirty (30) days after laying the last piece of sod and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from the sod operation shall be living sod uniform in color and leaf texture. Bare spots shall be a maximum two (2) square inches. Joints between sod pieces shall be tight and free from weeds and other undesirable growth.
 - b. Seeding shall be evaluated for species and health thirty (30) days after final planting and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from the seeding operation shall be 98% coverage uniform in color and leaf texture. Bare spots shall be a maximum of one-half (0.5) square foot.

Unsatisfactory areas shall be reseeded within seven (7) days during an active growing season.

9. Complete remedial measures directed by the RE/COTR in consultation with the MSN Agronomist to ensure plant and turfgrass survival.

10. Repair damage caused while making plant or turfgrass replacements.

1.8 LANDSCAPE PLANT AND TURFGRASS ACCEPTANCE.

A. Landscape plant and turfgrass acceptance will occur after completion of the LANDSCAPE PLANT AND TURFGRASS ESTABLISHMENT PERIOD. The Contractor shall have completed, located, and installed all plants and turfgrass according to the plans and specifications. All plants and turfgrass are expected to be living and in a healthy condition at the time of inspection and acceptance. The Contractor shall make a written request two weeks prior to final inspection of the landscape plants and turfgrass. Upon inspection when work is found to not meet the specifications, the PLANT AND TURFGRASS ESTABLISHMENT PERIOD shall be extended at no additional cost to the Government until work has been satisfactorily completed, inspected and accepted.

B. Criteria for acceptance of turfgrass shall be as follows:

1. A satisfactory stand of grass plants from the sod operation shall be living sod uniform in color and leaf texture and well rooted into the soil below so that gentle pulling of the turfgrass leaves by hand does not dislodge the sod. Bare spots shall be a maximum two (2) square inches. Joints between sod pieces shall be tight and free from weeds and other undesirable growth.
2. A satisfactory stand of turfgrass plants from the seeding operation shall be 98% coverage uniform in color and leaf texture. Bare spots shall be a maximum of one-half (0.5) square foot.

1.9 PLANT AND TURFGRASS WARRANTY

A. All work shall be in accordance with the terms of the Paragraph, "Warranty" of Section 00 72 00, GENERAL CONDITIONS, including the following supplements:

1. A One Year Plant and Turfgrass Warranty will begin on the date that the Government accepts the plants and turfgrass but not before the end of the Landscape Plant and Turfgrass Establishment Period.
2. The Contractor will replace any dead plant material and any areas void of turfgrass immediately during the warranty period and during an active growing season. A one year warranty for the plants and turfgrass that are replaced will begin on the day the replacement work is completed and accepted.
3. Replacement of relocated plants, that the Contractor did not supply, is not required unless they die from improper handling and care during

transplanting. Loss through Contractor improper handling, care, or negligence requires replacement in kind and size.

4. The Government will reinspect all replacement plants and turfgrass at the end of the One Year Warranty. The Contractor will replace any dead, missing, or defective plant material and turfgrass immediately and during an active growing season. The Warranty will end on the date of this inspection provided the Contractor has complied with the work required by this specification.
5. The Contractor shall remove stakes, guy straps and any required tree wrappings from plants having been installed for one year, unless otherwise directed by the CO/COR in consultation with the MSN Agronomist.

1.10 APPLICABLE PUBLICATIONS

- A. NCA Handbook 3420 - Turfgrass Maintenance in VA National Cemeteries re-certified 2011. The Agronomic and Horticultural practices specified in this handbook shall serve as the contractor's official reference guide to all establishment and preliminary maintenance practices employed during this construction project.
- B. The publications listed below, form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- C. American National Standards Institute (ANSI) Publications:
ANSI Z60.1-04 Nursery Stock
ANSI Z133.1-06 Tree Care Operations-Pruning, Trimming, Repairing, Maintaining, and Removing Trees and Cutting Brush-Safety Requirements
- D. Hortus Third, most current edition. A Concise Dictionary of Plants Cultivated in the U.S. and Canada.
- E. American Society for Testing and Materials (ASTM) Publications:
C136-06 Sieve Analysis of Fine and Coarse Aggregates
C516-08 Vermiculite Loose Fill Thermal Insulation
C549-06 Perlite Loose Fill Insulation
D977-05 Emulsified Asphalt (AASHTO M140)
D1557-09 Test Methods for Laboratory Compaction of Soil
D2028-97 (Rev. 2004) ... Cutback Asphalt (Rapid-curing Type)
D2103-08 Polyethylene Film and Sheeting
D5851 (Rev 2006) Planning and Implementing a Water Monitoring Program
- F. Turfgrass Producers International: Turfgrass Sodding.
- G. U. S. Department of Agriculture Federal Seed Act.

PART 2 - PRODUCTS

2.1 GENERAL

All plant and turfgrass material will conform to the varieties specified or shown in the plant list and be true to botanical name as listed in Hortus Third.

2.2 ORGANIC SOIL AMENDMENT

- A. All areas to receive turfgrass seeding, sodding or sprigging may require an organic soil amendment to increase organic content and water retention as well as enhance turfgrass growth. If supplemental or replaced topsoil has an organic matter content below 4% it should be amended in-place after grading activities are completed to effectively create a satisfactory topsoil horizon.
- B. Organic soil amendment will be spread and incorporated into the finished subgrade at the depths indicated on the Contract Drawings in order to raise the organic content of the soil to a minimum of four percent (4%) and a maximum of six percent (6%). Contractor will allow for additional depth of the organic soil amendment to bring all grades to the required finished grades as per the grading plans.
1. Organic Soil Amendment shall be dark brown or black in color and capable of enhancing plant growth. Ninety-eight percent (98%) of the material should pass a one inch (1") screen. There shall be no admixture of refuse (i.e. noticeable inert contamination) or other materials toxic to plant growth.
 2. Acceptable types of Organic Soil Amendments include peat moss, humus or peat, well rotted manure, various mature composts, and commercially available combinations thereof. Acceptable compost may be derived from natural organic sources such as food or animal residuals, yard trimmings, or biosolids. Organic Soil Amendment shall be free of all woody fibers, seeds, and leaf structures, plastic and other petroleum products, and free of toxic and non-organic matter. Unacceptable sole sources of organic matter include untreated sludge from wastewater treatment plants, fresh manure, sawdust, and immature composts.
 3. Organic Soil Amendment shall conform to the following minimum material requirements:

Test Parameter	Acceptable Ranges
Organic Matter	27% to 80%
pH	5.5-8.5

Ash	20-65%
Nitrogen	0.4%-3.5%
Phosphorus	0.2%-1.5%
Potassium	0.4%-1.5%
C:N Ratio	25-30:1
CEC	50-150 meq/100 g
	Heavy Metals Less than max. limits established by EPA 503
Inert Contents	< 1% by weight
Water-Holding Capacity	150-200%
Pathogen/Weed Seed Destruction	Proof of EPA minimum Heating requirements

4. Organic content to be determined by the loss of ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 110 °C, plus or minus 5°C.
5. No topsoil stripped and stockpiled on the site may be used. Supplemental soil to be brought in to replace contaminated soil and provided that supplemental soil, after initial testing and addition of necessary additives, it meets the above specification. The Contractor shall provide additional Organic Soil Amendment as required to complete the required work.
6. All Organic Soil Amendment proposed for use shall be tested for conformance to the specifications and results provided to the CO/COR/MSN Agronomist.

2.3 LABELS

Each plant, or group and bundles or containers of the same species, variety, and size of plant, shall be legibly tagged with a durable, waterproof and weather-resistant label indicating the correct plant name and size specified in the plant list. Labels shall be securely attached and not be removed.

2.5 TOPSOIL

- A. (Supplemental)Topsoil shall be a well-graded soil of good uniform quality. It shall be a natural, friable soil representative of productive soils in the vicinity. Topsoil shall be free of admixture of subsoil, foreign matter, objects larger than 25 mm (one inch) in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and shall have a pH value of not less than 6.0 nor more than 7.0, and should be best suited to the region, climate and plant material specific to the project.

- B. Obtain material from stockpiles established under SECTION 31 20 00, EARTH MOVING (SHORT FORM), subparagraph, Stripping Topsoil that meet the general requirements as stated above. Amend topsoil not meeting the pH range specified by the addition of pH Adjusters.
- C. Once existing topsoil is stripped and removed/ disposed of, **Contractor shall furnish additional topsoil.** At least 10 days prior to topsoil delivery, notify the Contracting Officer's Representative of the source(s) from which topsoil is to be furnished. Obtain topsoil from well drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES. Amend topsoil not meeting the pH range specified by the addition of pH adjusters.

2.6 LIME

Lime shall be agricultural limestone containing not less than 90 percent calcium and magnesium carbonates. Lime must be ground to such fineness that not less than 90% must pass No. 8 mesh and not less than 25% must pass No. 100 mesh. Moisture is not to exceed 10%.

2.7 SOIL CONDITIONERS

- A. Peat shall be a natural product of sphagnum moss peat or peat reed-sedge peat/peat humus derived from a fresh-water site conforming to Fed. Spec. Q-P-166, except as otherwise specified. Peat shall be shredded and granulated to pass through a 13 mm / ½ inch mesh screen and conditioned in storage piles for at least six months after excavation.
- B. Coarse Sand: Coarse concrete sand, ASTM C-33 Fine Aggregate, shall be clean, sharp, and free of limestone, shale and slate particles and of toxic materials.
- C. Perlite shall conform to ASTM C549.
- D. Vermiculite shall be horticultural grade and free of any toxic materials and conform to ASTM C516.
- E. Pine Bark shall be horticultural-grade milled pine bark, with 80 percent of the material by volume sized between 0.1 and 15.0 mm. (.004in. and .59in.).
1. Pine bark shall be aged sufficiently to break down all woody material.
Pine bark shall be screened
 2. pH shall range between 4.0 and 7.0.
 3. Submit manufacturer's literature for approval.
- F. Organic Matter shall be commercially prepared compost, composted sufficiently to be free of all woody fibers, seeds, and leaf structures, and free of toxic and nonorganic matter.

2.8 PLANTING SOIL MIXTURE

The planting soil mixture shall be composed of 6 parts topsoil, and 1 part peat moss.

2.9 PLANT FERTILIZERS

- A. Provide plant fertilizer that is commercial grade and uniform in composition and conforms to applicable state and federal regulations.
- B. For new plant material, provide a uniform free-flowing granular complete analysis fertilizer containing a minimum of 10% by weight of nitrogen, phosphoric acid and potash with a minimum of 50% of the nitrogen from a controlled release source such as sulfur coated urea.
- C. For existing trees, provide a uniform free-flowing granular fertilizer bearing the manufacturer's warranted statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of 10% nitrogen (of which 50 percent shall be from a controlled release source such as sulfur coated urea.), 10% available phosphoric acid, and 10% potash.

2.10 TURFGRASS FERTILIZER

Provide turfgrass fertilizer that is commercial grade, free flowing, uniform in composition, and conforms to applicable state and federal regulations. Granular fertilizer shall bear the manufacturer's warranted statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of 20% nitrogen (of which 50 percent shall be from a controlled release source such as sulfur coated urea), 5% available phosphoric acid, and 15% potash. Liquid starter fertilizer for use in the hydro mulch slurry will be commercial type with 50 percent of the nitrogen from a controlled release source.

2.11 MULCH

- A. Mulch shall be free from deleterious materials and shall be stored as to prevent inclusion of foreign material.
- B. Inert mulch materials shall be riverbank stone, granite chips, marble chips, volcanic rock or similar and shall range in size from 25 mm (one inch) to 65 mm (2-1/2 inches) in accordance with ASTM C 136.
- C. Organic mulch materials shall be wood based products such as chips, nuggets or shredded hardwood:
 - 1. Straw for turfgrass seed bed mulch shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold or other objectionable material. Straw shall be in an air-dry condition and suitable for placing with blower equipment.

2. Wood cellulose fiber mulch for use with hydraulic application (Hydro mulch) with fertilizer shall consist of specially prepared wood cellulose fiber, processed to contain no growth or germination-inhibiting factors, and dyed an appropriate color to facilitate visual metering of the application of materials. Do not apply any turfgrass seed in this type mixture. On an air-dry weight basis, the wood cellulose fiber shall contain a maximum of 12 percent moisture, plus or minus three percent at the time of manufacture. The pH range shall be from 3.5 to 5.0. The wood cellulose fiber shall be manufactured so that:
 - a. After addition and agitation in slurry tanks with fertilizers, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogenous slurry.
 - b. When hydraulically sprayed on the ground, the material will form a blotter like cover.
 - c. The cover will allow the absorption of moisture and allow rainfall or applied water to percolate to the underlying soil.

2.12 WATER

Water shall not contain elements toxic to plant life. It shall be obtained from Domestic Water Supply at Existing Farmhouse or supplied by contractor as specified in Section 01 00 00, GENERAL REQUIREMENTS, paragraph, Temporary Services at contractor's cost.

2.13 SEED

- A. Seed shall be state-certified seed of the latest season's crop and shall be delivered in original sealed packages bearing the producer's warranted analysis for percentages of mixtures, purity, germination, weed seed content, and inert material. Seed shall be labeled in conformance with U. S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. Onsite seed mixing shall be done only in the presence of the Contracting Officer's Representative. All turfgrass seeding operations shall be done separately and prior to the application of any mulch material.
- B. Minimum Acceptable Seed Quality standards for all turfgrass seed utilized are as follows: Purity 95%, Germination 85%, Weed Seed Content less than 0.5%, Noxious Weeds 0.0%, Inert Material less than 3%, Germination Test Date no older than 6 months.
- C. All turfgrass seed mixtures, or sod composition shall conform to the species and cultivar requirements detailed here: The seed mixtures listed

below are representative of an almost endless list of acceptable seed mixtures that roughly approximate these guidelines.

Cool Season Turfgrass Seed Mixtures: Seed is % by weight

SEEDING RATE = 6 lb/1000 sq.ft.

Primary Mixture* - 20% Annual Ryegrass, 10% Chewings Red Fescue, 10% Perennial Ryegrass, 60% Tall Fescue (blend of 3 cultivars) per plans.

Each of these species components should be a blend composed of a minimum of 2 regionally adapted cultivars.

Any deviation from these turfgrass species requirements must be approved in writing by the NCA Chief Agronomist and/or appropriate MSN Agronomist in coordination with the CO and/or COR.

2.14 SOD

Sod shall be nursery grown, certified sod as classified in the TPI Guideline Specifications to Turfgrass Sodding. Sod must also conform to the turfgrass species limitations as outlined in seeding mixtures in 2.20C above in this specification.

2.15 HERBICIDES AND OTHER PESTICIDES

All herbicides and other pesticides shall be properly labeled and registered with the U.S. Environmental Protection Agency. Keep all pesticides in the original labeled containers indicating the analysis and method of use.

PART 3 - EXECUTION

3.1 LAYOUT

Stake plant material locations and bed outlines on project site for approval by the Contracting Officer's Representative before any plant pits or beds are dug. The Contracting Officer's Representative may approve adjustments to plant material locations to meet field conditions.

3.2 FINE GRADING AND ORGANIC SOIL AMENDMENT INCORPORATION

A. Contractor shall obtain Contracting Officer's Representative's written approval of previously completed rough grading work prior to commencing organic soil amendment incorporation work.

B. Immediately prior to dumping and spreading the approved organic soil amendment, the subgrade shall be cleaned of all stones greater than two inches (2") and all debris or rubbish. Such material shall be removed from the site. Prior to spreading of the organic soil amendment, subgrades which

are too compact to drain water and too compact based upon compaction tests shall be ripped with a claw one foot (1') deep, pulled by a bulldozer two feet (2') on center, both directions. Contractor shall then regrade surface.

C. Organic soil amendment material shall be placed and uniformly spread over approved finish sub-grades to a depth sufficiently greater than the specified depth so that after natural settlement and light rolling, the specified minimum compacted depth will have been provided and the completed work will conform to the lines, grades and elevations indicated. Incorporate organic soil amendment by disc harrowing, rototilling or other means in a uniform manner. The depth of incorporation shall be based upon the organic content of the tested and approved organic soil amendment, so as to produce a finished soil with an organic matter content of between four (4) and six percent (6%). Supply additional organic soil amendment material, after in-place testing and approval (see paragraph 1.4. E.1d), as may be needed to give the required organic matter content and finished grades under the Contract without additional cost to the Government.

D. Disturbed areas outside the limit of work shall be spread with four inch (4") minimum depth of organic soil amendment material to the finished grade.

E. No subsoil or organic soil amendment material shall be handled in any way if it is in a wet or frozen condition.

F. Sufficient grade stakes shall be set for checking the finished grades. Stakes must be set in the bottom of swales and at the top of slopes. Connect contours and spot elevations with an even slope.

G. After organic soil amendment material has been incorporated into the subsoil, it shall be carefully prepared by scarifying or harrowing and hand raking. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove all stones over one and one half inch (1-1/2") diameter from the amended soil bed. The amended soil shall also be free of smaller stones in excessive quantities as determined by the Contracting Officer's Representative.

3.11 TILLAGE FOR TURFGRASS AREAS

Thoroughly till the soil to a depth of at least 150 mm (6 inches) by scarifying, disking, harrowing, or other approved methods. This is particularly important in areas where heavy equipment has been used. Remove all debris and stones larger than 25 mm (one inch) remaining on the surface after tillage in preparation for finish grading. To minimize erosion, do not till areas of 3:1 slope ratio or greater. Scarify these areas to a 50 mm (one inch) depth and remove debris and stones.

3.12 FINISH GRADING

After tilling the soil for bonding of topsoil with the subsoil, spread the topsoil evenly to a minimum depth of 150 mm (6 inches). Incorporate topsoil at least 50 to 75 mm (2 to 3 inches) into the subsoil to avoid soil layering. Do not spread topsoil when frozen or excessively wet or dry. Correct irregularities in finished surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic. Complete lawn work only after areas are brought to finished grade.

3.13 APPLICATION OF FERTILIZER AND LIME FOR TURFGRASS AREAS

- A. Apply turfgrass fertilizer at a rate that will deliver 1 pound of nitrogen per 1000 sq.ft. In addition, adjust soil acidity as recommended by soil test results and add any soil conditioners as specified herein for suitable topsoil under PART 2, Paragraph 2.2AandB, and 2.5 TOPSOIL.
- B. Spread lime as recommended by the soil test results.
- C. Incorporate lime into the soil to a depth of at least 100 mm (4 inches) as part of the finish grading operation. Starter fertilizer should be lightly mixed with the top ½ inch of soil. Immediately restore the soil to an even condition before any seeding or sod placement.

3.14 MECHANICAL SEEDING

- A. Broadcast seed by approved application equipment at the rate as outlined in section 2.20C in this spec above. All turfgrass seed shall be planted prior to the application of any mulch material. The seed shall be uniformly distributed in a minimum of 2 directions at right angles to each other. Drag the seeded area to inter-mingle the seed and surface soil by means of spike-tooth harrow, cultipacker, or other approved device.
- B. Immediately after dragging, firm the entire area with a roller not exceeding 225 kg/m (150 pounds per foot) of roller width.
- C. Immediately after preparing the seeded area, evenly spread an organic mulch of straw by hand or by approved mechanical blowers at the rate of 0.5 kg/m² (2 tons per acre). Application shall allow some sunlight to penetrate and air to circulate but also reduce soil and seed erosion and conserve soil moisture. Anchor mulch by a mulch tiller, asphalt emulsion, twine, or netting. When asphalt emulsion is used, apply either simultaneously or in a separate application. Take precautionary measures to prevent asphalt materials from marking or defacing structures, pavements, utilities, or plantings.

3.15 HYDRO-MULCHING

When hydro-mulching, mix the slow release starter fertilizer, approved wood cellulose mulch material in the required amount of water to produce a homogenous slurry and then uniformly apply slurry under pressure to deliver the recommended quantity of fertilizer per 1000 sq.ft.

3.16 SODDING

- A. Accomplish sodding in accordance with the ASPA Guideline Specifications for sodding. Lay sod at right angles to slope or the flow of water. On slope areas, start at the bottom of the slope.
- B. After completing the sodding operation, blend the edges of the sodded area smoothly into the surrounding area. All sod should be rolled with a light-weight roller after being laid to eliminate air spaces between the sod and the firmed soil.

3.17 WATERING

- A. Apply water to the turfgrass areas immediately following installation at a rate sufficient to ensure thorough wetting of the soil to a depth of at least 50 mm (2 inches). Supervise watering operation to prevent run-off. Supply all pumps, hoses, pipelines, and sprinkling equipment. Repair all areas damaged by water operations. Keep soil surface constantly moist, not wet, until turfgrass plants are well established.
- B. Contractor shall deep water all trees twice each week during the Plant Establishment Period, providing water penetration throughout the root zone to the full depth of the planting pits, as verified in the field by the Contracting Officer's Representative. Watering shall cease at the first hard frost in the fall and shall resume upon ground thaw in the spring.

3.18 PROTECTION OF TURFGRASS AREAS

Immediately after installation of the turfgrass areas, protect against traffic or other use by erecting barricades, as required, and placing approved signs at appropriate intervals until final acceptance.

3.19 EROSION CONTROL MATERIAL

- A. Install and maintain erosion control material meeting the requirements of this specification on the designated areas as shown and specified. Prepare, fertilize and vegetate the area(s) to be covered, as specified, before the erosion material is placed. Immediately following the planting operations lay the material evenly and smoothly and in contact with the soil throughout.

Omit the straw mulch from all seeded areas receiving the erosion control material.

- B. Maintenance shall consist of repairs made necessary by erosion, wind, or any other cause. Maintain, protect, repair, or replace the erosion control material until the Termination of the Plant and Warranty Period.

3.20 RESTORATION AND CLEAN-UP

Where existing or new turfgrass areas have been damaged or scarred during planting and construction operations, restore disturbed area to their original condition. Keep at least one paved pedestrian access route and one paved vehicular access route to each building clean at all times. In areas where planting and turfgrass work have been completed, clear the area of all debris, spoil piles, and containers. Clear all other paved areas when work in adjacent areas are completed. Remove all debris, rubbish and excess material from the station.

3.21 ENVIRONMENTAL PROTECTION

All work and Contractor operations shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

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SECTION 33 46 13
FOUNDATION DRAINAGE

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies foundation drainage system, including installation, backfill, and cleanout extensions, to place of connection to municipal storm sewer or onsite facilities.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples: For each type of filter fabric, pipe, and fitting indicated
- C. Product Data: Certifications from the manufacturers attesting that materials meet specification requirements.

1.3 RELATED WORK

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Safety requirements: **Section 00 72 00, GENERAL CONDITIONS, Article, ACCIDENT PREVENTION.**
- C. Protection of existing utilities, fire protection services, existing equipment, roads, and pavements: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Subsurface Investigation: Section 01 00 00, GENERAL REQUIREMENTS, Article, PHYSICAL DATA.

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred in the text by basic designation only.
- B. American Association of State Highway and Transportation Officials (AASHTO):
 - M006-08-UL.....Standard Specification for Fine Aggregate for Hydraulic Cement Concrete, Single User Digital Publication
 - M252-08-UL.....Corrugated Polyethylene Drainage Pipe
 - M288-06-UL.....Geotextile Specification for Highway Applications
- C. American Society for Testing and Materials (ASTM):

D448-08.....Standard Classification for Sizes of Aggregate for Road and Bridge Construction

D2321-08.....Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

D2751-(2005).....Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings

D2729-03.....Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

D2737-03.....Standard Specification for Polyethylene (PE) Plastic Tubing

D3034-08.....Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

D4216-06.....Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly (Vinyl Chloride) (CPVC) Building Products Compounds

F477-08.....Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

F758-95(2000)e1Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage.

F949-(2006a).....Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

PART 2 - PRODUCTS

2.1 MATERIALS

Pipe for foundation drainage system shall be of the type and size indicated. Appropriate transitions, adapters, or joint details shall be used where pipes of different types or materials are connected.

A. Perforated Drainage Pipe:

1. Perforated, PE pipe and fittings per ASTM D2737, in DN 100 to DN 150 (NPS 4 to NPS 6). Joints shall be coupling type.

B. Cleanout Extension: ASTM A74, cast iron pipe or ASTM A746 ductile iron.

Gravity Sewer pipes shall have a neoprene gasket joints and long sweep elbow fittings.

C. Filter Fabric

Filter fabric shall be a pervious sheet of polyester, nylon, or polypropylene filaments woven or otherwise formed into a uniform pattern with distinct and measurable openings. The filter fabric shall provide an equivalent opening size (AOS) no finer than the US Standard Sieve No. 100 and no coarser than the US Standard Sieve No. 70. AOS is defined as the number of the US Standard sieve having openings closest in size to the filter fabric openings. [The percent open area provided shall not be less than 10 percent and not more than 30 percent. Percent open area is defined as the summation of open areas divided by the total area of the filter fabric and expressed as a percent.] [The filaments shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, or vinylidene-chloride, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure.] The fabric shall have a minimum physical strength of 55 pounds per inch in any direction when tested in accordance with ASTM D 5034 using the grab test method with 1 square inch jaws and a constant rate of travel of 12 inches per minute. Elongation at failure shall be between [30] and [70] percent. The fabric shall be constructed so that the filaments will retain their relative position with respect to each other. [The edges of the fabric shall be selvaged or otherwise finished to prevent the outer material from pulling away from the fabric.]

One Such Product is Mirafi RSi Series Geosynthetics; www.mirafi.com; 706-693-4400.

F. Drainage Material:

1. Bedding: Crushed stone, 20 mm (3/4 inch) to 25 mm (No. 4) per ASTM D448.
2. Fill to 300 mm (1 foot) above pipe: Crushed stone, 20 mm (3/4 inch) to 25 mm (No. 4) per ASTM D448.

G. Concrete Sand: AASHTO M006.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Trenching and Excavation

Perform required trenching and excavation in accordance with Section 31 00 00 EARTHWORK. Keep trenches dry during installation of drainage system.

Changes in direction of drain lines shall be made with 1/8 bends. Use wye fittings at intersections.

B. Bedding

Place graded bedding, minimum 6 inches in depth, in the bottom of trench for its full width and length compacted as specified prior to laying of foundation drain pipe. Each section shall rest firmly upon the bedding, through the entire length, with recesses formed for bell joints. Except for recesses for bell joints, the bedding shall fully support the lower quadrant of the pipe.

C. Pipe Laying

1. Lay drain lines to true grades and alignment with a continuous fall in the direction of flow. Bells of pipe sections shall face upgrade. Clean interior of pipe thoroughly before being laid. When drain lines are left open for connection to discharge lines, the open ends shall be temporarily closed and the location marked with wooden stakes. Perforated pipe shall be laid with perforations facing down. Any length that has had its grade or joints disturbed shall be removed and relaid at no additional cost to the Government. Perforated corrugated polyethylene drainage tubing and plastic piping shall be installed in accordance with manufacturer's specifications and as specified herein. Tubing and piping with physical imperfections shall not be installed.
2. Prior to installation of bedding materials or piping, examination of excavation and subgrades are to be observed by the Resident Engineer. Invert elevation of drain pipe shall not be higher than top of lowest floor elevation nor lower than a 45 degree line projected from bottom of any adjacent footing. Lay drain lines and firmly bed in granular material a minimum of 75 mm (3 inches) below invert to top of pipe to true grades and alignment with bells facing upgrade, and to slope uniformly between elevations shown on foundation drainage drawings. Keep trenches dry until pipe is in place and granular material backfill is completed to 300 mm (1 foot) above top of pipe, unless otherwise noted.
3. Install gaskets, seals, sleeves, and couplings according to manufacturers written instructions and per the applicable standard:
 - a. PE and PVC pipe installation shall be per ASTM D2321 and ASTM F758.
 - b. PE joint construction shall be per ASTM D2737 and AASHTO HB17, Division II, Section 26.4.2.4, "Joint Properties."
 - c. PVC joint construction shall be per ASTM D3034 with elastomeric seals gaskets per ASTM D2321.

- d. Perforated PVC joint construction shall be per ASTM D2729, with loose bell and spigot joints.
4. Lay perforated pipe with perforations down. Lay plain end pipe with closed joints held in place with two No. 9 spring steel wire clips at each joint or by standard clay collars.
5. Install cleanout extensions where shown on the Contract Documents (if applicable).
6. Prior to backfilling, check drain lines to assure free flow. Remove obstructions and recheck lines until satisfactory.

D. Jointing

Perforated and porous types of drain pipes shall be laid with closed joints.

- E. Backfilling: Place a minimum of 300 mm (12 inches) of granular engineered fill material, hand tamped, to area above drain tile/ bedding/ filter fabric. Remainder of backfill shall meet criteria for engineered fill and possibly comparable to existing adjacent soils. Where foundation drain is within 600 mm (2 feet) of finished grade, one-half of fill shall be made with crushed stone.

1. Filter fabric may be substituted for sand layer.
2. Use geotextile separation (8 ounce) can be considered for utilization as filter fabric.
3. When drain lines are left open for connection to discharge line, the open ends shall be temporarily closed and their location marked with wooden stakes.

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