



FARGO VA HEALTH CARE SYSTEM REPAIR FLOOD WALL / LEVEE SYSTEM

Bid Document Specifications

CONTRACT NO.: 36CS26319D0045

PROJECT NO.: 437-19-104

December 18, 2020

VA



**U.S. DEPARTMENT OF
VETERANS AFFAIRS**

Veterans Health Administration
Fargo VA
Health Care System

FARGO VA HEALTH CARE SYSTEMS
REPAIR FLOOD WALL LEVEE SYSTEM
Fargo ND

December 18, 2020



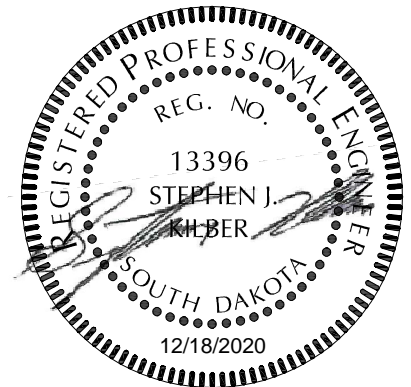
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**DEPARTMENT OF VETERANS AFFAIRS
VHA MASTER SPECIFICATIONS**

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SECTION 00 01 15
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**SECTION 01 00 00
GENERAL REQUIREMENTS**

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SECTION 01 00 00
GENERAL REQUIREMENTS

1.1 SAFETY REQUIREMENTS

- A. Refer to section 01 35 26, SAFETY REQUIREMENTS for safety and infection control requirements.

1.2 GENERAL INTENTION

- A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor and materials and perform work for Project 437-19-104 Repair Flood Wall Levee, Fargo VAMC, Fargo ND as required by drawings and specifications.
- B. One Site Visit will be organized by the VA and will be conducted by the requirements of the FAR. 52.236.27 Alternate 1. Advertisement of the visit will be posted by the Contracting Officer.
- C. Offices of FourFront Design Inc. 517 7th Street, Rapid City, SD 57701, as Architect-Engineers, will 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.
- D. Before placement and installation of work subject to tests by testing laboratory retained by the General Contractor. The Contractor shall notify the Project Engineer to be present at the site. Such prior notice shall be not less than three workdays unless otherwise designated by the Project Engineer.
- E. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA Project Engineer be identified by project and employer and restricted from unauthorized access.

1.3 STATEMENT OF BID ITEM(S)

- A. ITEM I, GENERAL CONSTRUCTION: Work includes general construction, alterations to existing construction, replacement of select walks and driving surfaces, correction of grading for drainage, waterproof membranes, waterproof wall finishes and crack repair, necessary removal and repair of existing construction and certain other items.

- B. DEDUCT ALTERNATE NO.1: Provide a cost deduct to reconstruct the concrete wall cap, in lieu of installing the new Architectural Precast Wall Caps. This will not affect installation of new Architectural Precast Pyramidal caps, which will be provided in the Base Bid and Deduct Alternate No 1.

1.4 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

- A. Drawings and contract documents may be obtained from the website where the solicitation is posted. Additional copies will be at Contractor's expense.

1.5 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 project site without appropriate badge. Badging will be obtained from the Project Engineer, Fargo VA Engineering Office. During Badging, and at all times during the construction of the project, each individual will also have a government issued photo identification available and will present it when requested. They may also be subject to inspection of their personal effects when entering or leaving the project site.
2. Before starting work the General Contractor shall give four (4) weeks' notice to the Contracting Officer. 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 Contracting Officer.
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 Contracting Officer.

E. Document Control:

1. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information.
2. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.
3. Notify Project Engineer and VA Police Department immediately when there is a loss of documents.

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 Project Engineer. 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.
1. The plan documents reference a "Shared Storage" area on the VA campus, where contractors may locate lockable trailers, sheds, etc...as permitted by the Project Engineer. Note: This area is for shared use of any other contractors working on the campus.
 2. The plan document identifies the construction limits available to the General Contractor where secured storage is available.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Project Engineer 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 Project Engineer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Project Engineer. 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 or

sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

- D. Working space and space available for storing materials shall be as shown on the drawings and as determined by the Project Engineer.
- E. Workers are subject to rules of Medical Center applicable to their conduct.
- F. Execute work in such a manner as to interfere as little as possible with work being done by others. Keep roads clear of construction materials, debris, standing construction equipment and vehicles at all times.
- G. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the structure, are not permitted. Except as allowed by Project Engineer.
 - 1. Do not store materials and equipment in other than assigned areas.
 - 2. Schedule delivery of materials and equipment to immediate construction working areas in quantities sufficient for not more than two workdays. Provide unobstructed access to Medical Center.
 - 3. Where work operations under this contract interfere with campus traffic, this General Contractor will provide traffic management to keep traffic flowing.

H. Phasing:

The Medical Center must maintain its operation 24 hours a day 7 days a week. Therefore, any interruption in service must be scheduled and coordinated with the Project Engineer to ensure that no lapses in operation occur. It is the CONTRACTOR'S responsibility to develop a work plan and schedule detailing, at a minimum, the procedures to be employed, the equipment and materials to be used, the interim life safety measure to be used during the work, and a schedule defining the duration of the work with milestone subtasks. The work to be outlined shall include, but not be limited to:

1. All project tasks identified in the construction documents.

To ensure such executions, Contractor shall furnish the Project Engineer with a schedule of approximate dates on which the Contractor intends to accomplish work in each specific area of site, or portion thereof. In addition, Contractor shall notify the Project Engineer three weeks in advance of the proposed date of starting work in each specific area of site, or portion thereof. Arrange such phasing dates to ensure accomplishment of this work in successive phases mutually agreeable to the Project Engineer and Contractor, as follows:

I. Construction Fence: Before construction operations begin, Contractor shall provide a chain link construction fence, (six feet) minimum height, around the construction area indicated on the drawings. Provide gates as required for access with necessary hardware, including hasps and padlocks (Padlocks and keys will be provided by the VA). Remove the fence when directed by Project Engineer.

1. Available space for construction activities are constricted in certain areas. When the General Contractor schedules to be in those areas to work he will be allowed to relocate the fence perimeter to provide services needed for that work. The General Contractor will provide a minimum of 1 weeks' notice to the Project Engineer to adjust these areas and will make those adjustments with the approval of the Project Engineer.

J. When the construction site is turned over to Contractor, Contractor shall accept entire responsibility including upkeep and maintenance.

K. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, 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 Project Engineer.

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 Project Engineer Electrical

work shall be accomplished with all affected circuits or equipment de-energized.

2. Contractor shall submit a request to interrupt any such services to Project Engineer in writing, 21 days in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
 3. Contractor will be advised of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center. Interruption time approved by Medical Center may occur at other than Contractor's normal working hours.
 4. Major interruptions of any system must be requested, in writing, at least 21 calendar days prior to the desired time and shall be performed as directed by the Project Engineer.
 5. In case of a contract construction emergency, service will be interrupted on approval of Project Engineer. Such approval will be confirmed in writing as soon as practical.
- L. 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 at the main, branch or panel they originate from. 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.
- M. To minimize interference of construction activities with flow of Medical Center 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. least one lane must be open to traffic at all times with approval.
- N. Coordinate the work for this contract with other construction operations as directed by Project Engineer. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.

1.7 ALTERATIONS

A. Survey: Before any work is started, the Contractor shall make a thorough survey with the Project Engineer, of the site in which alterations occur and areas which are anticipated routes of access, and furnish a report to the Project Engineer. This report shall list by areas referenced from the plan documents:

1. Existing condition of adjoining grades, asphalt and concrete roadways and sidewalks, flood walls, wall caps, railings and stairs associated with the pump house including internal areas and equipment exposed to the environment and other components not required to be altered throughout.
2. Shall note any discrepancies between drawings and existing conditions at site.
3. Shall designate areas for working space, materials storage and routes of access to areas of the construction site where alterations occur, and which have been agreed upon by Contractor and Project Engineer.

B. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and Project together shall make a thorough re-survey of the areas of the site involved. They shall furnish a report on conditions then existing, as compared with conditions of same as noted in first condition survey report:

1. Re-survey report shall also list any damage caused by Contractor and, will form basis for determining extent of repair work required of Contractor to restore damage caused by Contractor's workers in executing work of this contract.

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 DISPOSAL AND RETENTION

A. Materials and equipment accruing from work removed and from demolition of site or structures, or parts thereof, shall be disposed of as follows:

1. Reserved items which are to remain property of the Government are identified. 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 Project Engineer.
2. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.

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

- A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, 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 workers, 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 Contracting Officer.
- 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 Contracting Officer may have the necessary work performed and charge the cost to the Contractor.
- 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.
- D. Refer to FAR clause 52.236-7, "Permits and Responsibilities," which is included in General Conditions. A National Pollutant Discharge

Elimination System (NPDES) permit is required for this project. The Contractor is considered an "operator" under the permit and has extensive responsibility for compliance with permit requirements. VA will make the permit application available at the (appropriate medical center) office. The apparent low bidder, contractor and affected subcontractors shall furnish all information and certifications that are required to comply with the permit process and permit requirements. Many of the permit requirements will be satisfied by completing construction as shown and specified. Some requirements involve the Contractor's method of operations and operations planning and the Contractor is responsible for employing best management practices. The affected activities often include, but are not limited to the following:

- Designating areas for equipment maintenance and repair;
- Providing waste receptacles at convenient locations and provide regular collection of wastes;
- Locating equipment wash down areas on site, and provide appropriate control of wash-waters;
- Providing protected storage areas for chemicals, paints, solvents, fertilizers, and other potentially toxic materials; and
- Providing adequately maintained sanitary facilities.

1.10 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, without approval of the Project Engineer. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the Project before it is disturbed. Materials and workmanship used in restoring work, shall conform in 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 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 Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workers to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) 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 "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

1.11 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 the result of site survey/investigations by DJ and A, 2000 Maple Street, Missoula MT 59808 (406)721-4320.
- B. A copy of a soil report is not available.
- C. 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 site of work and logs of borings; and, after investigation, decide for themselves character of materials and make their bids accordingly. Upon proper application to Department of Veterans Affairs, bidders will be permitted to make subsurface explorations of their own at site.

1.12 LAYOUT OF WORK

- A. The Contractor shall lay out the work established on the drawings and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at 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. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the

Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through Contractor's negligence before their removal is authorized.

1.13 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, to 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 ensure compliance, as-built drawings shall be made available for the Project Engineer's review, as often as requested.
- C. Contractor shall deliver two approved completed sets of as-built drawings in hardcopy and the electronic version (scanned PDF and AutoCAD compatible) to the Project Engineer within 15 calendar days after each completed phase and after the acceptance of the project by the Project Engineer.
- D. Paragraphs A, B, & C shall also apply to all shop drawings.

1.14 USE OF ROADWAYS

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by the Project Engineer, such temporary roads which are necessary in the performance of contract work. Temporary roads can be constructed as approved by the Project Engineer, and restoration performed by the Contractor at Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.

1.15 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 Project Engineer, 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.

- a. Install temporary sanitary toilets within the designated contractor's construction limits.

1.16 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 Contractor shall carefully conserve any utilities furnished without charge.
- B. The Contractor, at Contractor's expense and in a workmanlike manner, in compliance with code and as satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, and associated paraphernalia and repair restore the infrastructure as required.
- C. 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:
 1. Obtain heat by means provided by the General Contractor.
- D. Electricity (for Construction and Testing): Furnish all temporary electric services.
 1. Obtain electricity by connecting to the Medical Center electrical distribution system. Electricity for all other uses is available at no cost to the Contractor.
- E. Water (for Construction and Testing): Furnish temporary water service.
 1. Obtain water by connecting to the Medical Center water distribution system. Provide reduced pressure backflow preventer at each connection as per code. Water is available at no cost to the Contractor.
 2. 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 Project Engineer's discretion) of use of water from Medical Center's.

1.17 INSTRUCTIONS

- A. Contractor shall furnish Maintenance and Operating manuals (hard copies and electronic) and verbal instructions when required by the various sections of the specifications and as hereinafter specified.
- B. Manuals: Maintenance and operating manuals and one compact disc (two hard copies and one electronic copy each) shall be delivered to the Project Engineer. Manuals shall be complete, detailed guides for the maintenance and operation of components of the project. They shall include complete information necessary for, maintaining in continuous operation for long periods of time. 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, component, accessory and control shall be clearly and thoroughly explained. All necessary precautions and the reason for each precaution shall be clearly set forth.
- C. Instructions: Contractor shall provide qualified, factory-trained manufacturers' representatives to give detailed training to assigned Department of Veterans Affairs personnel in the operation and complete maintenance. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. All instructors 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 Project Engineer and shall be considered concluded only when the Project Engineer 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 Project Engineer, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

1.18 CONSTRUCTION SIGN

- A. Provide 2 Construction Signs installed directed by the Resident Project Engineer. The sign frame will be ½" marine grade plywood, cover sign frame with 0.7 mm (24 gage) galvanized sheet steel securely around

edges and on all bearings. Set bottom of sign level at 900 mm (3 feet) above ground. Each sign will be securely attached to the Security Fence mesh.

- B. Paint all surfaces of sign (including exposed faces of plywood) two coats of white gloss paint. Border and letters shall be of black gloss paint, except project title which shall be blue gloss paint.
- C. Maintain sign and remove it when directed by the Project Engineer.
- D. Detail Drawing of construction sign showing required legend and other characteristics of sign is shown on the drawings.

1.19 PHOTOGRAPHIC DOCUMENTATION

A. During the construction period through completion, provide photographic documentation of construction progress in the amount of a minimum of 20 pictures daily, but will identify all work in progress.

- 1. Pictures will show progress in detail and in general.
 - a. All subterranean work will be photographed before backfilling is accomplished.
 - b. Repair or replacement work will be photographed once demolition is complete and new surfaces or structures are prepared, show reinforcing if used. Pictures will be taken prior to recasting, patching or refinishing. Take multiple pictures where appropriate.
 - c. Finished surfaces will be photographed once complete.
 - d. Submit pictures in a bound report at the end of each month to the Project Engineer. Each picture will be identified referencing face of wall (river or campus side) and location based on panel numbers and location from adjacent joint(s).

- - - E N D - - -

SECTION 01 32 16.15
PROJECT SCHEDULES

PART 1- GENERAL

1.1 DESCRIPTION:

- A. The Contractor shall develop a Critical Path Method (CPM) plan and schedule demonstrating fulfillment of the contract requirements (Project Schedule), and shall keep the Project Schedule up-to-date in accordance with the requirements of this section and shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). Conventional Critical Path Method (CPM) technique shall be utilized to satisfy both time and cost applications.

1.2 CONTRACTOR'S REPRESENTATIVE:

- A. The Contractor shall designate an authorized representative responsible for the Project Schedule including preparation, review and progress reporting with and to the Contracting Officer's Representative (COTR).
- B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section.
- C. The Contractor's representative shall have the option of developing the project schedule within their organization or to engage the services of an outside consultant. If an outside scheduling consultant is utilized, Section 1.3 of this specification will apply.

1.3 CONTRACTOR'S CONSULTANT:

- A. The Contractor shall submit a qualification proposal to the Project Engineer within 10 days of bid acceptance. The qualification proposal shall include:
1. The name and address of the proposed consultant.
 2. Information to show that the proposed consultant has the qualifications to meet the requirements specified in the preceding paragraph.
 3. A representative sample of prior construction projects, which the proposed consultant has performed complete project scheduling services. These representative samples shall be of similar size and scope.

- B. The Project Engineer has the right to approve or disapprove the proposed consultant and will notify the Contractor of the VA decision within seven calendar days from receipt of the qualification proposal. In case of disapproval, the Contractor shall resubmit another consultant within 10 calendar days for renewed consideration. The Contractor shall have their scheduling consultant approved prior to submitting any schedule for approval.

1.4 COMPUTER PRODUCED SCHEDULES

- A. The contractor shall provide monthly, to the Project Engineer all computer-produced time schedules and reports generated from monthly project updates. This monthly computer service will include: three copies of the project schedule a hard copy listing of all project schedule changes, and associated data, made at the update and an electronic file of this data; and the resulting monthly updated schedule in PDM format. These must be submitted with and substantively support the contractor's monthly payment request and the signed look ahead report.
- B. The contractor shall be responsible for the correctness and timeliness of the computer-produced reports. The Contractor shall also responsible for the accurate and timely submittal of the updated project schedule and all CPM data necessary to produce the computer reports and payment request that is specified.
- C. The VA will report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports. The Contractor shall reprocess the computer-produced reports and associated diskette(s), when requested by the Project Engineer correct errors which affect the payment and schedule for the project.

1.5 THE COMPLETE PROJECT SCHEDULE SUBMITTAL

- A. Within 30 calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Project Engineers three blue line copies of the interim schedule on sheets of paper 765 x 1070 mm (30 x 42 inches or as agreed up by with the Project Engineer) and an electronic file in the previously approved CPM schedule program. The submittal shall also include three copies of a computer-produced activity/event ID schedule showing project duration; phase completion dates; and other data. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, activity/event description, duration, budget amount, early start

date, early finish date, late start date, late finish date and total float. Work activity/event relationships shall be restricted to finish-to-start or start-to-start without lead or lag constraints. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Project Engineer. The contractor shall make a separate written detailed request to the Project Engineer identifying these date constraints and secure the Project Engineers written approval before incorporating them into the network diagram. The Project Engineers separate approval of the Project Schedule shall not excuse the contractor of this requirement. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events but must have zero duration. The complete working schedule shall reflect the Contractor's approach to scheduling the complete project. The final Project Schedule in its original form shall contain no contract changes or delays which may have been incurred during the final network diagram development period and shall reflect the entire contract duration as defined in the bid documents. These changes/delays shall be entered at the first update after the final Project Schedule 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.

- B. Within 15 calendar days after receipt of the complete project interim Project Schedule and the complete final Project Schedule, the Project Engineer will do one or both of the following:
1. Notify the Contractor concerning his actions, opinions, and objections.
 2. A meeting with the Contractor at or near the job site for joint review, correction or adjustment of the proposed plan will be scheduled if required. Within 14 calendar days after the joint review, the Contractor shall revise and shall submit three blue line copies of the revised Project Schedule, three copies of the revised computer-produced activity/event ID schedule and a revised electronic file as specified by the Project Engineer. The revised submission will be reviewed by the Project Engineer and, if found to be as previously agreed upon, will be approved.

- C. The approved baseline schedule and the computer-produced schedule(s) generated there from shall constitute the approved baseline schedule until subsequently revised in accordance with the requirements of this section.

1.6 PROJECT SCHEDULE REQUIREMENTS

- A. When developing the project schedule, the contractor is encouraged to develop aggressive scenarios identifying work that can be completed as expediently as possible, taking into account consideration of typical winter dates, the seasonal flooding in the area, and work that can be completed on the wet and dry side of the flood wall. It is preferred the River side (wet side) of the project is completed in an expeditious manner.
- a. Typical and yearly data on the timing and duration of the seasonal flooding can be obtained from the City of Fargo, Floodplain Management Department (701)241-1545.
- B. Show on the project schedule the sequence of work activities/events required for complete performance of all items of work. The Contractor Shall:
1. Show activities/events as:
 - a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
 - b. Project Engineers review and approval of shop drawings, equipment schedules, samples, template, or similar items.
 - c. Interruption of VA Facilities utilities, delivery of Government furnished equipment, and rough-in drawings, project phasing and any other specification requirements.
 - e. VA inspection and acceptance activity/event with a minimum duration of five workdays at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase.
 2. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area
 3. Break up the work into activities/events of a duration no longer than 20 work days each or one reporting period, 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 COR may approve the showing of a longer duration. The duration for VA approval of any required submittal, shop drawing, or other submittals will not be less than 20 workdays.

4. 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.
 5. The schedule shall be generally numbered in such a way to reflect either discipline, phase or location of the work.
- B. The Contractor shall submit the following supporting data in addition to the project schedule:
1. The appropriate project calendar including working days and holidays.
 2. The planned number of shifts per day.
 3. The number of hours per shift.
- Failure of the Contractor to include this data shall delay the review of the submittal until the Project Engineer is in receipt of the missing data.
- C. To the extent that the Project Schedule or any revised Project Schedule shows anything not jointly agreed upon, it shall not be deemed to have been approved by the Project Engineer. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the COTR's approval of the Project Schedule.
- D. Compact Disk Requirements and CPM Activity/Event Record Specifications: Submit to the VA an electronic file(s) containing one file of the data required to produce a schedule, reflecting all the activities/events of the complete project schedule being submitted.

1.7 PAYMENT TO THE CONTRACTOR:

- A. Monthly, the contractor shall submit an application and certificate for payment using VA Form 10-6001a reflecting updated schedule activities 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, FAR 52.232 - 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.232 -Article 71 Including NAS-CPM//for (PAYMENTS UNDER FIXED PRICE CONSTRUCTION). The Contractor

shall be entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated project schedule. Monthly payment requests shall include: a listing of all agreed upon project schedule changes and associated data; and an electronic file (s) of the resulting monthly updated schedule.

- B. Approval of the Contractor's monthly Application for Payment shall be contingent, among other factors, on the submittal of a satisfactory monthly update of the project schedule.

1.8 PAYMENT AND PROGRESS REPORTING

- A. The General Contractor shall hold weekly progress meetings with the VA and the AE. The contractor will be responsible for running the meeting, providing a written agenda and releasing the meeting minutes. The General Contractor will also coordinate the meeting location and provide for the means to host the AE participation via the internet.
- B. Monthly schedule update meetings will be held on dates mutually agreed to by the Project Engineer and the Contractor. Contractor and their CPM consultant (if applicable) shall attend all monthly schedule update meetings. The Contractor shall accurately update the Project Schedule and all other data required and provide this information to the Project Engineer three workdays in advance of the schedule update meeting. Job progress will be reviewed to verify:
 1. Actual start and/or finish dates for updated/completed activities/events.
 2. Remaining duration for each activity/event started, or scheduled to start, but not completed.
 3. Logic, time and cost data for change orders, and supplemental agreements that are to be incorporated into the Project Schedule.
 4. Changes in activity/event sequence and/or duration which have been made, pursuant to the provisions of following Article, ADJUSTMENT OF CONTRACT COMPLETION.
 5. Completion percentage for all completed and partially completed activities/events.
 6. Logic and duration revisions required by this section of the specifications.
 7. Activity/event duration and percent complete shall be updated independently.
- C. After completion of the joint review, the contractor shall generate an updated computer-produced calendar-dated schedule and supply the

Project Engineer with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified.

- D. After completing the monthly schedule update, the contractor's representative or scheduling consultant shall rerun all current period contract change(s) against the prior approved monthly project schedule. The analysis shall only include original workday durations and schedule logic agreed upon by the contractor and resident engineer for the contract change(s). When there is a disagreement on logic and/or durations, the Contractor shall use the schedule logic and/or durations provided and approved by the Project Engineer. After each rerun update, the resulting electronic project schedule data file shall be appropriately identified and submitted to the VA in accordance to the requirements listed in articles 1.4 and 1.7. This electronic submission is separate from the regular monthly project schedule update requirements and shall be submitted to the resident engineer within fourteen (14) calendar days of completing the regular schedule update. Before inserting the contract changes durations, care must be taken to ensure that only the original durations will be used for the analysis, not the reported durations after progress. In addition, once the final network diagram is approved, the contractor must recreate all manual progress payment updates on this approved network diagram and associated reruns for contract changes in each of these update periods as outlined above for regular update periods. This will require detailed record keeping for each of the manual progress payment updates.
- E. Following approval of the CPM schedule, the VA, the General Contractor, its approved CPM Consultant, RE office representatives, and all subcontractors needed, as determined by the SRE, 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. The Government representatives and the Contractor should conclude the meeting with a clear understanding of those work and administrative actions necessary to maintain project schedule status during the reporting period. This schedule coordination meeting will occur after each monthly project schedule update meeting utilizing the resulting schedule reports from that schedule update. If the project is behind schedule, discussions should include ways to prevent

further slippage as well as ways to improve the project schedule status, when appropriate.

1.09 RESPONSIBILITY FOR COMPLETION

- A. If it becomes apparent from the current revised monthly progress 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 COTR for the proposed schedule changes. If such actions are approved, the representative schedule revisions shall be incorporated by the Contractor into the Project Schedule before the next update, at no additional cost to the Government.

1.10 CHANGES TO THE SCHEDULE

- A. Within 30 calendar days after VA acceptance and approval of any updated project schedule, the Contractor shall submit a revised electronic file (s) 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 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 CPM 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 regardless of the cause for these revisions.
- B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished

equipment, vacating of areas by the VA Facility, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, shall be furnished in writing to the Contracting Officer for approval.

- C. Contracting Officer's approval for the revised project schedule 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 VA representative.
- D. The cost of revisions to the project schedule resulting from contract changes will be included in the proposal for changes in work as specified in FAR 52.243 - 4 (Changes, and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
- E. The cost of revisions to the Project Schedule 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, CPM data and supporting evidence as the COTR 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. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in this request. The Contracting Officer's determination as to the total number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.
- B. Actual delays in activities/events which, according to the computer-produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Contracting Officer will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision.

- 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 FAR 52.243 - 4 (Changes). The Contractor shall include, as a part of each change order proposal, a sketch showing all CPM logic 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

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This specification defines the general requirements and procedures for submittals. A submittal is information submitted for VA review to establish compliance with the contract documents.
- B. Detailed submittal requirements are found in the technical sections of the contract specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective technical specifications at no additional cost to the government.
- C. VA approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense.

1.2 DEFINITIONS

- A. Preconstruction Submittals: Submittals which are required prior to issuing contract notice to proceed or starting construction. For example, Certificates of insurance; Surety bonds; Site-specific safety plan; Construction progress schedule; Schedule of values; Submittal register; List of proposed subcontractors.
- B. Shop Drawings: Drawings, diagrams, and schedules specifically prepared to illustrate some portion of the work. Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be integrated and coordinated.
- C. Product Data: Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions, and brochures, which describe and illustrate size, physical appearance, and other characteristics of materials, systems, or equipment for some portion of the work. Samples of warranty language when the contract requires extended product warranties.

- D. Samples: Physical examples of materials, equipment, or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project. Field samples and mock-ups constructed to establish standards by which the ensuing work can be judged.
- E. Design Data: Calculations, mix designs, analyses, or other data pertaining to a part of work.
- F. Test Reports: Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work. Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.
- G. Certificates: Document required of Contractor, or of a manufacturer, supplier, installer, or subcontractor through Contractor. The purpose is to document procedures, acceptability of methods, or personnel qualifications for a portion of the work.
- H. Manufacturer's Instructions: Pre-printed material describing installation of a product, system, or material, including special notices and MSDS concerning impedances, hazards, and safety precautions.
- I. Manufacturer's Field Reports: Documentation of the testing and verification actions taken by manufacturer's representative at the job site on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must indicate whether the material, product, or system has passed or failed the test.
- J. Operation and Maintenance Data: Manufacturer data that is required to operate, maintain, troubleshoot, and repair equipment, including manufacturer's help, parts list, and product line documentation. This data shall be incorporated in an operations and maintenance manual.
- K. Closeout Submittals: Documentation necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a phase of construction on a multi-phase contract.

1.3 SUBMITTAL REGISTER

- A. The submittal register will list items of equipment and materials for which submittals are required by the specifications. This list may not

be all inclusive and additional submittals may be required by the specifications. The Contractor is not relieved from supplying submittals required by the contract documents but which have been omitted from the submittal register.

- B. The submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period.
- C. The Contractor will provide the initial submittal register in electronic format. Thereafter, the Contractor shall track all submittals by maintaining a complete list, including completion of all data columns, including dates on which submittals are received and returned by the VA.
- D. The Contractor shall update the submittal register as submittal actions occur and maintain the submittal register at the project site until final acceptance of all work by Contracting Officer.
- E. The Contractor shall submit formal monthly updates to the submittal register in electronic format. Each monthly update shall document actual submission and approval dates for each submittal.

1.4 SUBMITTAL SCHEDULING

- A. Submittals are to be scheduled, submitted, reviewed, and approved prior to the acquisition of the material or equipment.
- B. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow time for potential resubmittal.
- C. No delay costs or time extensions will be allowed for time lost in late submittals or resubmittals.
- D. All submittals are required to be approved prior to the start of the specified work activity.

1.5 SUBMITTAL PREPARATION

- A. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.
- B. Collect required data for each specific material, product, unit of work, or system into a single submittal. Prominently mark choices, options, and portions applicable to the submittal. Partial submittals will not be accepted for expedition of construction effort. Submittal will be returned without review if incomplete.

- C. If available product data is incomplete, provide Contractor-prepared documentation to supplement product data and satisfy submittal requirements.
- D. All irrelevant or unnecessary data shall be removed from the submittal to facilitate accuracy and timely processing. Submittals that contain the excessive amount of irrelevant or unnecessary data will be returned with review.
- E. Provide a transmittal form for each submittal with the following information:
 - 1. VA Project title, location and VA Project number.
 - 2. VA Construction contract number.
 - 3. Date of the drawings and revisions.
 - 4. Name, address, and telephone number of subcontractor, supplier, manufacturer, and any other subcontractor associated with the submittal.
 - 5. List paragraph number of the specification section and sheet number of the contract drawings by which the submittal is required.
 - 6. When a resubmission, add alphabetic suffix on submittal description. For example, submittal 18 would become 18A, to indicate resubmission.
 - 7. Product identification and location in project.
- F. The Contractor is responsible for reviewing and certifying that all submittals are in compliance with contract requirements before submitting for VA review. Proposed deviations from the contract requirements are to be clearly identified. All deviations submitted must include a side by side comparison of item being proposed against item specified. Failure to point out deviations will result in the VA requiring removal and replacement of such work at the Contractor's expense.
- G. Stamp, sign, and date each submittal transmittal form indicating action taken.
- H. Stamp used by the Contractor on the submittal transmittal form to certify that the submittal meets contract requirements is to be similar to the following:

CONTRACTOR
(Firm Name)
_____ Approved
_____ Approved with corrections as noted on submittal data and/or attached sheets(s)
SIGNATURE: _____
TITLE: _____
DATE: _____

1.6 SUBMITTAL FORMAT AND TRANSMISSION

- A. Provide submittals in electronic format and one hardcopy, with the exception of material samples. Use PDF as the electronic format, unless otherwise specified or directed by the Project Engineer.
- B. Compile the electronic submittal file as a single, complete document. Name the electronic submittal file specifically according to its contents.
- C. Electronic files must be of sufficient quality that all information is legible. Generate PDF files from original documents so that the text included in the PDF file is both searchable and can be copied. If documents are scanned, Optical Character Resolution (OCR) routines are required.

- D. E-mail electronic submittal documents smaller than 5MB in size to e-mail addresses as directed by the Contracting Officer.
- E. Provide hard copies of submittals when requested by the Project Engineer. Additional hard copies of any submittal may be requested at the discretion of the Project Engineer, at no additional cost to the VA.

1.7 SAMPLES

- A. Submit two sets of physical samples showing range of variation, for each required item.
- B. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified.
- C. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.
- D. Before submitting samples, the Contractor is to ensure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.
- E. The VA reserves the right to disapprove any material or equipment which previously has proven unsatisfactory in service.
- F. Physical samples supplied maybe requested back for use in the project after reviewed and approved.

1.8 OPERATION AND MAINTENANCE DATA

- A. Submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.
- B. In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the item with which such O&M Data are applicable.

1.9 TEST REPORTS

- A. SRE may require specific test after work has been installed or completed which could require contractor to repair test area at no additional cost to contract.

1.10 VA REVIEW OF SUBMITTALS AND RFIS

- A. The VA will review all submittals for compliance with the technical requirements of the contract documents. The Architect-Engineer for this project will assist the VA in reviewing all submittals and determining contractual compliance. Review will be only for conformance with the applicable codes, standards and contract requirements.
- B. Period of review for submittals begins when the VA COR receives submittal from the Contractor.
- C. Period of review for each resubmittal is the same as for initial submittal.
- D. VA review period is 15 working days for submittals.
- E. VA review period is 10 working days for RFIs.
- F. The VA will return submittals to the Contractor with the following notations:
 - 1. "Approved": authorizes the Contractor to proceed with the work covered.
 - 2. "Approved as noted": authorizes the Contractor to proceed with the work covered provided the Contractor incorporates the noted comments and makes the noted corrections.
 - 3. "Disapproved, revise and resubmit": indicates noncompliance with the contract requirements or that submittal is incomplete. Resubmit with appropriate changes and corrections. No work shall proceed for this item until resubmittal is approved.
 - 4. "Not reviewed": indicates submittal does not have evidence of being reviewed and approved by Contractor or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals after taking appropriate action.

1.11 APPROVED SUBMITTALS

- A. The VA approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory.
- B. VA approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project.

Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense.

- C. After submittals have been approved, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.
- D. Retain a copy of all approved submittals at project site, including approved samples.

1.12 WITHHOLDING OF PAYMENT

- A. Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

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**SECTION 01 35 26
SAFETY REQUIREMENTS**

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**SECTION 01 35 26
SAFETY REQUIREMENTS**

1.1 APPLICABLE PUBLICATIONS:

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

B. American Society of Safety Engineers (ASSE):

A10.1-2011.....Pre-Project & Pre-Task Safety and Health
Planning

A10.34-2012.....Protection of the Public on or Adjacent to
Construction Sites

A10.38-2013.....Basic Elements of an Employer's Program to
Provide a Safe and Healthful Work Environment
American National Standard Construction and
Demolition Operations

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

E84-2013.....Surface Burning Characteristics of Building
Materials

D. The Facilities Guidelines Institute (FGI):

FGI Guidelines-2010Guidelines for Design and Construction of
Healthcare Facilities

E. National Fire Protection Association (NFPA):

10-2018.....Standard for Portable Fire Extinguishers

30-2018.....Flammable and Combustible Liquids Code

51B-2019.....Standard for Fire Prevention During Welding,
Cutting and Other Hot Work

70-2020.....National Electrical Code

70B-2019.....Recommended Practice for Electrical Equipment
Maintenance

70E-2018Standard for Electrical Safety in the Workplace

99-2018.....Health Care Facilities Code

241-2019.....Standard for Safeguarding Construction,
Alteration, and Demolition Operations

F. The Joint Commission (TJC)

TJC ManualComprehensive Accreditation and Certification
Manual

G. U.S. Occupational Safety and Health Administration (OSHA):

29 CFR 1910Safety and Health Regulations for General
Industry

29 CFR 1926Safety and Health Regulations for Construction
Industry

H. VHA Directive 2005-007

1.2 DEFINITIONS:

- A. Critical Lift. A lift with the hoisted load exceeding 75% of the crane's maximum capacity; lifts made out of the view of the operator (blind picks); lifts involving two or more cranes; personnel being hoisted; and special hazards such as lifts over occupied facilities, loads lifted close to power-lines, and lifts in high winds or where other adverse environmental conditions exist; and any lift which the crane operator believes is critical.
- B. OSHA "Competent Person" (CP). One who is capable of identifying existing and predictable hazards in the surroundings and working conditions which are unsanitary, hazardous or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them (see 29 CFR 1926.32(f)).
- C. "Qualified Person" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.
- D. High Visibility Accident. Any mishap which may generate publicity or high visibility.

E. Accident/Incident Criticality Categories:

1. No impact - near miss incidents that should be investigated but are not required to be reported to the VA;
2. Minor incident/impact - incidents that require first aid or result in minor equipment damage (less than \$5000). These incidents must be investigated but are not required to be reported to the VA;
3. Moderate incident/impact - Any work-related injury or illness that results in:
 - a. Days away from work (any time lost after day of injury/illness onset);
 - b. Restricted work;
 - c. Transfer to another job;
 - d. Medical treatment beyond first aid;
 - e. Loss of consciousness;
4. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (5) above or,
5. Any incident that leads to major equipment damage (greater than \$5000).

F. These incidents must be investigated and are required to be reported to the VA;

- 1 Major incident/impact - Any mishap that leads to fatalities, hospitalizations, amputations, and losses of an eye as a result of contractors' activities. Or any incident which leads to major property damage (greater than \$20,000) and/or may generate publicity or high visibility. These incidents must be investigated and are required to be reported to the VA as soon as practical, but not later than 2 hours after the incident.

G. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by physician or registered personnel.

1.3 REGULATORY REQUIREMENTS:

- A. In addition to the detailed requirements included in the provisions of this contract, comply with 29 CFR 1926, comply with 29 CFR 1910 as incorporated by reference within 29 CFR 1926, comply with ASSE A10.34, and all applicable [federal, state, and local] laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern except with specific approval and acceptance by the Project Engineer or Government Designated Authority.

1.4 ACCIDENT PREVENTION PLAN (APP):

- A. The APP (aka Construction Safety & Health Plan) shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and ensure it is site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all worksite safety and health of each subcontractor(s). Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.

- B. The APP shall be prepared as follows:

- 1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language can be found in ASSE A10.33). Specifically articulating the safety requirements found within these VA contract safety specifications.
- 2. Address both the Prime Contractors and the subcontractors work operations.
- 3. State measures to be taken to control hazards associated with materials, services, or equipment provided by suppliers.
- 4. Address all the elements/sub-elements and in order as follows:

- a. **SIGNATURE SHEET.** Title, signature, and phone number of the following:
- 1) Plan preparer (Qualified Person such as corporate safety staff person or contracted Certified Safety Professional with construction safety experience);
 - 2) Plan approver (company/corporate officers authorized to obligate the company);
 - 3) Plan concurrence (e.g., Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional). Provide concurrence of other applicable corporate and project personnel (Contractor).
- b. **BACKGROUND INFORMATION.** List the following:
- 1) Contractor;
 - 2) VA Contract and Project number;
 - 3) VA Project name;
 - 4) Brief project description, description of work to be performed, and location; phases of work anticipated (these will require an AHA).
- c. **STATEMENT OF SAFETY AND HEALTH POLICY.** Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract should be provided.
- d. **RESPONSIBILITIES AND LINES OF AUTHORITIES.** Provide the following:
- 1) A statement of the employer's ultimate responsibility for the implementation of his SOH program;
 - 2) Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes.

- 3) The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached.;
 - 4) Requirements that no work shall be performed unless a designated competent person is present on the job site;
 - 5) Requirements for pre-task Activity Hazard Analysis (AHAs);
 - 6) Lines of authority;
 - 7) Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;
- e. SUBCONTRACTORS AND SUPPLIERS.** If applicable, provide procedures for coordinating SOH activities with other employers on the job site:
- 1) Identification of subcontractors and suppliers (if known);
 - 2) Safety responsibilities of subcontractors and suppliers.
- f. TRAINING.**
- 1) Site-specific SOH orientation training at the time of initial hire or assignment to the project for every employee before working on the project site is required.
 - 2) Mandatory training and certifications that are applicable to this project (e.g., explosive actuated tools, crane operator, rigger, crane signal person, fall protection, electrical lockout/NFPA 70E, machine/equipment lockout, confined space, etc...) and any requirements for periodic retraining/recertification are required.
 - 3) Procedures for ongoing safety and health training for supervisors and employees shall be established to address changes in site hazards/conditions.
 - 4) OSHA 10-hour training is required for all workers on site and the OSHA 30-hour training is required for Trade Competent Persons (CPs)

g. SAFETY AND HEALTH INSPECTIONS.

- 1) Specific assignment of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: Who will conduct (e.g., "Site Safety and Health CP"), proof of inspector's training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures.
- 2) Any external inspections/certifications that may be required (e.g., contracted CSP or CSHT)

h. ACCIDENT/INCIDENT INVESTIGATION & REPORTING. The Contractor shall conduct mishap investigations of all Moderate and Major as well as all High Visibility Incidents. The APP shall include accident/incident investigation procedure and identify person(s) responsible to provide the following to the Project Engineer or Government Designated Authority:

- 1) Exposure data (man-hours worked);
- 2) Accident investigation reports;
- 3) Project site injury and illness logs.

i. PLANS (PROGRAMS, PROCEDURES) REQUIRED. Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational, patient, and public safety risks in site-specific compliance and accident prevention plans. These Plans shall include but are not be limited to procedures for addressing the risks associates with the following:

- 1) Emergency response;
- 2) Contingency for severe weather;
- 3) Fire Prevention;
- 4) Medical Support;
- 5) Posting of emergency telephone numbers;
- 6) Prevention of alcohol and drug abuse;
- 7) Site sanitation (housekeeping, drinking water, toilets);

- 8) Night operations and lighting;
- 9) Hazard communication program;
- 10) Welding/Cutting "Hot" work;
- 11) Electrical Safe Work Practices (Electrical LOTO/NFPA 70E);
- 12) General Electrical Safety;
- 13) Hazardous energy control (Machine LOTO);
- 14) Site-Specific Fall Protection & Prevention;
- 15) Excavation/trenching;
- 16) Respiratory protection;
- 17) Health hazard control program;
- 18) Abrasive blasting;
- 19) Heat/Cold Stress Monitoring;
- 20) Crystalline Silica Monitoring (Assessment);
- 21) Demolition plan (to include engineering survey);
- 22) Public (Mandatory compliance with ANSI/ASSE A10.34-2012).

C. Submit the APP to the Project Engineer or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

D. Once accepted by the Project Engineer or Government Designated Authority, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer in accordance with FAR Clause 52.236-13, *Accident Prevention*, until the matter has been rectified.

E. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Project Engineer or Government Designated Authority. Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and

develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public and the environment.

1.5 ACTIVITY HAZARD ANALYSES (AHAS) :

- A. AHAs are also known as Job Hazard Analyses, Job Safety Analyses, and Activity Safety Analyses. Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub-contractor is to perform the work, the Contractor(s) performing that work activity shall prepare an AHA (Example electronic AHA forms can be found on the US Army Corps of Engineers web site)
- B. AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.
- C. Work shall not begin until the AHA for the work activity has been accepted by the Project Engineer or Government Designated Authority and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.
 - 1. The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by OSHA and/or other State and Local agencies) shall be identified and included in the AHA. Certification of their competency/qualification shall be submitted to the Government Designated Authority (GDA) for acceptance prior to the start of that work activity.
 - 2. The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s).
 - a. If more than one Competent/Qualified Person is used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of

work involved in the AHA and familiar with current site safety issues.

- b. If a new Competent/Qualified Person (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new person shall acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.
3. Submit AHAs to the Project Engineer or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for review at least 21 calendar days prior to the start of each phase. Subsequent AHAs as shall be formatted as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.
4. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.
5. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. All activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier, or subcontractor and provided to the prime contractor for review and approval and then submitted to the Project Engineer or Government Designated Authority.

1.6 PRECONSTRUCTION CONFERENCE:

- A. Contractor representatives who have a responsibility or significant role in implementation of the accident prevention program, as required by 29 CFR 1926.20(b)(1), on the project shall attend the preconstruction conference to gain a mutual understanding of its implementation. This includes the project superintendent, subcontractor superintendents, and any other assigned safety and health professionals.
- B. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This

list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.

- C. Deficiencies in the submitted APP will be brought to the attention of the Contractor within 21 days of submittal, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP. SPEC WRITER NOTE: If the contract will involve (a) work of a long duration or hazardous nature, or (b) performance within a Government facility that on the advice of VA construction safety representatives involves hazardous operations that might endanger the safety of the public, patients and/or Government personnel or property, the SSHO and Superintendent and/or Quality Control Manager must be separate persons (See Section 1.7(C) for choice).

1.7 "SITE SAFETY AND HEALTH OFFICER" (SSHO) AND "COMPETENT PERSON" (CP):

- A. The Prime Contractor shall designate a minimum of one SSHO at each project site that will be identified as the SSHO to administer the Contractor's safety program and government-accepted Accident Prevention Plan. Each subcontractor shall designate a minimum of one CP in compliance with 29 CFR 1926.20 (b) (2) that will be identified as a CP to administer their individual safety programs.
- B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).
- C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations). However, the SSHO has be a separate qualified individual from the Prime Contractor's Superintendent and/or Quality Control Manager with duties only as the SSHO

- D. The SSHO or an equally qualified Designated Representative/alternate will maintain a presence on the site during construction operations in accordance with FAR Clause 52.236-6: *Superintendence by the Contractor*. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs shall be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.
- E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee in accordance with FAR Clause 52.236-5: Material and Workmanship, Paragraph (c).

1.8 TRAINING:

- A. The designated Prime Contractor SSHO must meet the requirements of all applicable OSHA standards and be capable (through training, experience, and qualifications) of ensuring that the requirements of 29 CFR 1926.16 and other appropriate Federal, State and local requirements are met for the project. As a minimum the SSHO must have completed the OSHA 30-hour Construction Safety class and have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or certified Construction Safety and Health Technician (CSHT) certification or have a safety and health degree from an accredited university or college.
- B. All designated CPs shall have completed the OSHA 30-hour Construction Safety course within the past 5 years.
- C. In addition to the OSHA 30 Hour Construction Safety Course, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations shall have a specialized formal course in the hazard recognition & control associated with those high hazard work operations. Documented "repeat" deficiencies in the execution of safety requirements will require retaking the requisite formal course.

- D. All other construction workers shall have the OSHA 10-hour Construction Safety Outreach course and any necessary safety training to be able to identify hazards within their work environment.
- E. Submit training records associated with the above training requirements to the Project Engineer or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES no later than the day of the preconstruction conference for acceptance.
- F. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing shall include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures, accident reporting etc... Documentation shall be provided to the Project Engineer that individuals have undergone contractor's safety briefing.
- G. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.9 INSPECTIONS:

- A. The SSHO shall conduct frequent and regular safety inspections (daily) of the site and each of the subcontractors CPs shall conduct frequent and regular safety inspections (daily) of their work operations as required by 29 CFR 1926.20(b)(2). Each week, the SSHO shall conduct a formal documented inspection of the entire construction areas with the subcontractors' "Trade Safety and Health CPs" present in their work areas. Coordinate with, and report findings and corrective actions weekly to Project Engineer or Government Designated Authority.
- B. A Certified Safety Professional (CSP) with specialized knowledge in construction safety or a certified Construction Safety and Health Technician (CSHT) shall randomly conduct a monthly site safety inspection. The CSP or CSHT can be a corporate safety professional or independently contracted. The CSP or CSHT will provide their certificate number on the required report for verification as necessary.

1. Results of the inspection will be documented with tracking of the identified hazards to abatement.
2. The Project Engineer or Government Designated Authority will be notified immediately prior to start of the inspection and invited to accompany the inspection.
3. Identified hazard and controls will be discussed to come to a mutual understanding to ensure abatement and prevent future reoccurrence.
4. A report of the inspection findings with status of abatement will be provided to the Project Engineer or Government Designated Authority within one week of the onsite inspection.

1.10 ACCIDENTS, OSHA 300 LOGS, AND MAN-HOURS:

- A. The prime contractor shall establish and maintain an accident reporting, recordkeeping, and analysis system to track and analyze all injuries and illnesses, high visibility incidents, and accidental property damage (both government and contractor) that occur on site. Notify the Project Engineer or Government Designated Authority as soon as practical, but no more than four hours after any accident meeting the definition of a Moderate or Major incidents, High Visibility Incidents, , or any weight handling and hoisting equipment accident. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Project Engineer or Government Designated Authority determine whether a government investigation will be conducted.
- B. Conduct an accident investigation for all Minor, Moderate and Major incidents as defined in paragraph DEFINITIONS, and property damage accidents resulting in at least \$20,000 in damages, to establish the root cause(s) of the accident. Complete the VA Form 2162 (or equivalent) , and provide the report to the Project Engineer Safety Manager Officer or Contracting Officer Representative or Government Designated Authority within 5 calendar days of the accident. The

Project Engineer or Government Designated Authority will provide copies of any required or special forms.

- C. A summation of all man-hours worked by the contractor and associated sub-contractors for each month will be reported to the Project Engineer or Government Designated Authority monthly.
- D. A summation of all Minor, Moderate, and Major incidents experienced on site by the contractor and associated sub-contractors for each month will be provided to the Project Engineer or Government Designated Authority monthly. The contractor and associated sub-contractors' OSHA 300 logs will be made available to the Project Engineer or Government Designated Authority as requested.

1.11 PERSONAL PROTECTIVE EQUIPMENT (PPE) :

- A. PPE is governed in all areas by the nature of the work the employee is performing. For example, specific PPE required for performing work on electrical equipment is identified in NFPA 70E, Standard for Electrical Safety in the Workplace.
- B. Mandatory PPE includes:
 - 1. Hard Hats - unless written authorization is given by the Project Engineer or Government Designated Authority in circumstances of work operations that have limited potential for falling object hazards such as during finishing work or minor remodeling. With authorization to relax the requirement of hard hats, if a worker becomes exposed to an overhead falling object hazard, then hard hats would be required in accordance with the OSHA regulations.
 - 2. Safety glasses - unless written authorization is given by the Project Engineer or Government Designated Authority in circumstances of no eye hazards, appropriate safety glasses meeting the ANSI Z.87.1 standard must be worn by each person on site.
 - 3. Appropriate Safety Shoes - based on the hazards present, safety shoes meeting the requirements of ASTM F2413-11 shall be worn by each person on site unless written authorization is given by the Project Engineer or Government Designated Authority in circumstances of no foot hazards.

4. Hearing protection - Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks.

1.12 INFECTION CONTROL

- A. Infection Control is critical in all medical center facilities. Exterior construction activities causing disturbance of soil or creates dust in some other manner must be controlled.
- B. Final Cleanup:
 1. Upon completion of project and as work progresses, remove all construction debris that have been part of the construction.
- C. Exterior Construction
 1. Contractor shall verify that dust will not be introduced into the medical center through intake vents, or building openings. HEPA filtration on intake vents is required where dust may be introduced.
 2. Dust created from disturbance of soil such as from vehicle movement will be wetted with use of a water truck as necessary
 3. All cutting, drilling, grinding, sanding, or disturbance of materials shall be accomplished with tools equipped with either local exhaust ventilation (i.e. vacuum systems) or wet suppression controls.

1.14 FIRE SAFETY

- A. Fire Safety Plan: Establish and maintain a site-specific 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 Project Engineer or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. This plan may be an element of the Accident Prevention Plan.
- B. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.

- C. 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).
- D. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- E. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Project Engineer or Government Designated Authority.
- F. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- G. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- H. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Project Engineer. Obtain permits from Resident Project Engineer at least 1 hour in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.
- I. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Project Engineer or Government Designated Authority.
- J. Smoking: Smoking is prohibited.
- K. Dispose of waste and debris in accordance with NFPA 241.

1.15 FALL PROTECTION

- A. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) for ALL WORK, unless specified differently or the OSHA 29 CFR 1926 requirements are more stringent, to include steel erection activities, systems-engineered activities (prefabricated) metal buildings, residential (wood) construction and scaffolding work.
 - 1. The use of a Safety Monitoring System (SMS) as a fall protection method is prohibited.

2. The use of Controlled Access Zone (CAZ) as a fall protection method is prohibited.
3. A Warning Line System (WLS) may ONLY be used on floors or flat or low-sloped roofs (between 0 - 18.4 degrees or 4:12 slope) and shall be erected around all sides of the work area (See 29 CFR 1926.502(f) for construction of WLS requirements). Working within the WLS does not require FP. No worker shall be allowed in the area between the roof or floor edge and the WLS without FP. FP is required when working outside the WLS.
4. Fall protection while using a ladder will be governed by the OSHA requirements.

1.16 SCAFFOLDS AND OTHER WORK PLATFORMS

- A. All scaffolds and other work platforms construction activities shall comply with 29 CFR 1926 Subpart L.
- B. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) as stated in Section 1.16.
- C. The following hierarchy and prohibitions shall be followed in selecting appropriate work platforms.
 1. Scaffolds, platforms, or temporary floors shall be provided for all work except that can be performed safely from the ground or similar footing.
 2. Ladders less than 20 feet may be used as work platforms only when use of small hand tools or handling of light material is involved.
 3. Ladder jacks, lean-to, and prop-scaffolds are prohibited.
 4. Emergency descent devices shall not be used as working platforms.
- D. Contractors shall use a scaffold tagging system in which all scaffolds are tagged by the Competent Person. Tags shall be color-coded: green indicates the scaffold has been inspected and is safe to use; red indicates the scaffold is unsafe to use. Tags shall be readily visible, made of materials that will withstand the environment in which they are used, be legible and shall include:
 1. The Competent Person's name and signature;

2. Dates of initial and last inspections.

- E. Mast Climbing work platforms: When access ladders, including masts designed as ladders, exceed 20 ft (6 m) in height, positive fall protection shall be used.

1.17 EXCAVATION AND TRENCHES

- A. All excavation and trenching work shall comply with 29 CFR 1926 Subpart P. Excavations less than 5 feet in depth require evaluation by the contractor's "Competent Person" (CP) for determination of the necessity of an excavation protective system where kneeling, laying in, or stooping within the excavation is required.
- B. All excavations and trenches 24 inches in depth or greater shall require a written trenching and excavation permit (NOTE - some States and other local jurisdictions require separate state/jurisdiction-issued excavation permits). The permit shall have two sections, one section will be completed prior to digging or drilling and the other will be completed prior to personnel entering the excavations greater than 5 feet in depth. Each section of the permit shall be provided to the Project or other Government Designated Authority prior to proceeding with digging or drilling and prior to proceeding with entering the excavation. After completion of the work and prior to opening a new section of an excavation, the permit shall be closed out and provided to the Project Engineer or other Government Designated Authority. The permit shall be maintained onsite and the first section of the permit shall include the following:
1. Estimated start time & stop time. Specific location and nature of the work.
 2. Indication of the contractor's "Competent Person" (CP) in excavation safety with qualifications and signature. Formal course in excavation safety is required by the contractor's CP.
 3. Indication of whether soil or concrete removal to an offsite location is necessary.
 4. Indication of whether soil samples are required to determine soil contamination.

5. Indication of coordination with local authority (i.e. "One Call") or contractor's effort to determine utility location with search and survey equipment.
 6. Indication of review of site drawings for proximity of utilities to digging/drilling.
- C. The second section of the permit for excavations greater than five feet in depth shall include the following:
1. Determination of OSHA classification of soil. Soil samples will be from freshly dug soil with samples taken from different soil type layers as necessary and placed at a safe distance from the excavation by the excavating equipment. A pocket penetrometer will be utilized in determination of the unconfined compression strength of the soil for comparison against OSHA table (Less than 0.5 Tons/FT² - Type C, 0.5 Tons/FT² to 1.5 Tons/FT² - Type B, greater than 1.5 Tons/FT² - Type A without condition to reduce to Type B).
 2. Indication of selected protective system (sloping/benching, shoring, shielding). When soil classification is identified as "Type A" or "Solid Rock", only shoring or shielding or Professional Engineer designed systems can be used for protection. A Sloping/Benching system may only be used when classifying the soil as Type B or Type C. Refer to Appendix B of 29 CFR 1926, Subpart P for further information on protective systems designs.
 3. Indication of the spoil pile being stored at least 2 feet from the edge of the excavation and safe access being provided within 25 feet of the workers.
 4. Indication of assessment for a potential toxic, explosive, or oxygen deficient atmosphere where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist. Internal combustion engine equipment is not allowed in an excavation without providing force air ventilation to lower the concentration to below OSHA PELs, providing sufficient oxygen levels, and atmospheric testing as necessary to ensure safe levels are maintained.
- D. As required by OSHA 29 CFR 1926.651(b)(1), the estimated location of utility installations, such as sewer, telephone, fuel, electric, water

lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

1. The planned dig site will be outlined/marked in white prior to locating the utilities.
 2. Used of the American Public Works Association Uniform Color Code is required for the marking of the proposed excavation and located utilities.
 3. 811 will be called two business days before digging on all local or State lands and public Right-of Ways.
 4. Digging will not commence until all known utilities are marked.
 5. Utility markings will be maintained.
- E. Excavations will be hand dug or excavated by other similar safe and acceptable means as excavation operations approach within 3 to 5 feet of identified underground utilities. Exploratory bar or other detection equipment will be utilized as necessary to further identify the location of underground utilities.
- F. Excavations greater than 20 feet in depth require a Professional Engineer designed excavation protective system.

1.18 CONFINED SPACE ENTRY

- A. All confined space entry shall comply with 29 CFR 1926, Subpart AA except for specifically referenced operations in 29 CFR 1926 such as excavations/trenches [1926.651(g)].
- B. A site-specific Confined Space Entry Plan (including permitting process) shall be developed and submitted to the Project Engineer.

1.19 WELDING AND CUTTING

As specified in section 1.14, Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Project Engineer or other Government Designated Authority. Obtain permits from Project Engineer or other Government Designated Authority at least 1 hour in advance.

1.20 LADDERS

- A. All Ladder use shall comply with 29 CFR 1926 Subpart X. Wood ladders are not permitted on campus.
- B. All portable ladders shall be of sufficient length and shall be placed so that workers will not stretch or assume a hazardous position.
- C. Manufacturer safety labels shall be in place on ladders
- D. Step Ladders shall not be used in the closed position
- E. Top steps or cap of step ladders shall not be used as a step
- F. Portable ladders, used as temporary access, shall extend at least 3 ft (0.9 m) above the upper landing surface.
 - 1. When a 3 ft (0.9-m) extension is not possible, a grasping device (such as a grab rail) shall be provided to assist workers in mounting and dismounting the ladder.
 - 2. In no case shall the length of the ladder be such that ladder deflection under a load would, by itself, cause the ladder to slip from its support.
- G. Ladders shall be inspected for visible defects on a daily basis and after any occurrence that could affect their safe use. Broken or damaged ladders shall be immediately tagged "DO NOT USE," or with similar wording, and withdrawn from service until restored to a condition meeting their original design.

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**SECTION 01 45 29
TESTING LABORATORY SERVICES**

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained by the General Contractor.

1.2 REFERENCES:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- B. North Dakota Department of Transportation Standard Specifications for Roads and Bridge Construction (2014 ed.)
- C. American Association of State Highway and Transportation Officials (AASHTO):
 - T27-11.....Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
 - T99-10.....Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
 - T310-13.....Standard Method of Test for In-place Density and Moisture Content of Soil and Soil-aggregate by Nuclear Methods (Shallow Depth)
- D. American Society for Testing and Materials (ASTM):
 - C31/C31M-10.....Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - C33/C33M-11a.....Standard Specification for Concrete Aggregates
 - C39/C39M-12.....Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - C136-06.....Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - C138/C138M-10b.....Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
 - C143/C143M-10a.....Standard Test Method for Slump of Hydraulic Cement Concrete

C172/C172M-10.....Standard Practice for Sampling Freshly Mixed Concrete

C173/C173M-10b.....Standard Test Method for Air Content of freshly Mixed Concrete by the Volumetric Method

C1064/C1064M-11.....Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete

D422-63 (2007).....Standard Test Method for Particle-Size Analysis of Soils

D698-07e1.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort

D1188-07e1.....Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples

D2216-10.....Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

D3666-11.....Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

D3740-11.....Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction

D6938-10.....Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

E329-11c.....Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

E543-09.....Standard Specification for Agencies Performing Non-Destructive Testing

1.3 REQUIREMENTS:

A. Accreditation Requirements: Construction materials testing laboratories must be accredited by a laboratory accreditation authority. Contractor shall submit a copy of the Certificate of Accreditation and Scope of Accreditation for the proposed testing agency a minimum of 14-days prior to beginning testing. The laboratory's scope of accreditation

must include the appropriate ASTM standards listed in the technical sections of the specifications. The policy applies to the specific laboratory performing the actual testing, not just the "Corporate Office."

- B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by Project Engineer. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall notify Project Engineer of such failure within 24-hours of failing test or deficient construction.
- C. Written Reports: Testing laboratory shall submit test reports to Project Engineer and Contractor within 48-hours of test completion.
- D. Verbal Reports: Give verbal notification to Project Engineer and Contractor immediately of any failing tests or irregularities.
- E. Perform re-tests of failing tests, which cost shall be borne by the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EARTHWORK:

- A. General: The Testing Laboratory shall 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 shall be as identified herein and shall include 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 Project Engineer regarding suitability or unsuitability of areas where proof-rolling was observed.
- B. Testing Compaction:
 - 1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with ASTM D698 and/or ASTM D1557.
 - 2. Make field density tests in accordance with the primary testing method following ASTM D6938, D2922, or D1556, depending on the type of soil being tested.

- a. Pavement Subgrade: One test for each 100 m² (1,000 square feet), but in no case fewer than two tests.
- b. Curb, Gutter, and Sidewalk: One test for each 20 m (70 linear feet), but in no case fewer than two tests.
- c. Backfill River side: One test for 100 cy, but in no case fewer than 14 tests. Maximum density and optimum moisture content of fill and backfill material shall be determined in accordance with ASTM D2922.
- C. Fill and Backfill Material (Gradation): Two gradations from onsite source material. Two gradations from each borrow source.
- d. Testing Materials: Test suitability of on-site and off-site borrow as directed by Project Engineer.

3.2 SITE WORK CONCRETE:

Test site work concrete including materials for concrete as required in Section 32 05 23 - Cement and Concrete for Exterior Improvements. Provide one set of concrete tests (slump, air content, compressive strength and temperature) for every day of concrete placement.

A. 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.
4. Perform slump tests in accordance with ASTM C143. Test the first truck each day, and every time test cylinders are made.
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. Test the first truck and each time cylinders are made.
- B. 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 degrees C (40 degrees 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 degrees C (85 degrees 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.
- 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 to be tested as directed by Project Engineer. Compile laboratory test reports as follows: Compressive strength test shall be result of one cylinder, except when one cylinder shows evidence of improper sampling, molding or testing, in which case it shall be discarded and strength of spare cylinder shall be used.
 2. Furnish certified concrete test reports to Contractor and Project Engineer. 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. Weather conditions during placing.

- f. Temperature of concrete in each test cylinder when test cylinder was molded.
- g. Maximum and minimum ambient temperature during placing.
- h. Date delivered to laboratory and date tested.

3.3 ELASTOMERIC JOINT SEALANT:

- A. Refer to Section 07 01 91 - Joint Sealants, Paragraph 3.5 - Field Quality Control, for description, frequency, and reporting of elastomeric joint sealant tests.

3.4 CORING AT EPOXY RESIN INJECTION LOCATIONS:

- A. Refer to Section 03 64 00 - Crack Injection Grouting, Paragraph 3.5 - Field Quality Control, for description, method, frequency, and reporting of coring findings at epoxy resin injection sites. Coring for testing will not be allowed within 2-feet of existing floodwall Waterstops (as indicated on original floodwall plans available from the Fargo VA).

3.5 TYPE OF TEST:

- A. Approximate Number of Tests Required as follows.

1. Earthwork:

- a. Laboratory Maximum Density/Optimum Moisture Test; Soils: One (1).
- b. Field Density, Soils: Fourteen (14)

2. Aggregate Base Course:

- a. Field Density: three (3).
- b. Aggregate: Base Course Gradation: one (1)

3. Concrete:

- a. Making and Curing Concrete Test Cylinders (ASTM C31): One set (3) per truck load delivered, site cured.
- b. Compressive Strength, Test Cylinders (ASTM C39): One set (3) per truck load delivered (14 day, 28 day and reserve).
- c. Concrete Slump Test (ASTM C143): One per truck load delivered.
- d. Concrete Air Content Test (ASTM C173): One per truck load delivered.

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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, solid waste, radiant energy, and radioactive materials, 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 effect human health or public welfare,
 2. Unfavorably alter ecological balances of importance to human life,
 3. Effect other species of importance to humankind, or;
 4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.
- C. Definitions of Pollutants:
1. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
 2. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
 3. Sediment: Soil and other debris that has been eroded and transported by runoff water.
 4. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
 5. 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 "water of the United States" and would require a permit to discharge water from the governing agency.

6. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.
7. Sanitary Wastes:
 - a. Sewage: Domestic sanitary sewage and human and animal waste.
 - b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2 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. Note any corrective action taken.

1.3 REFERENCES

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

1.4 SUBMITTALS

- A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
 1. Environmental Protection Plan: Submit a detailed Environmental Protection Plan within 15-days of receipt of NTP. The Plan shall include, but not limited to, the following:
 - a. Name(s) of person(s) within the Contractor's organization who is (are) responsible for ensuring adherence to the Environmental Protection Plan.
 - b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site.
 - c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
 - d. Description of the Contractor's environmental protection personnel training program.
 - e. 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.

- f. 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.
 - g. Procedures to provide the environmental protection that comply 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.
 - h. Permits, licenses, and the location of the solid waste disposal area.
 - i. 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. Include as part of an Erosion Control Plan approved by and the Department of Veterans Affairs.
 - j. Environmental Monitoring Plans for the job site including land, water, air, and noise.
 - k. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.
 - l. Spill Prevention Control and Countermeasure Plan (SPCCP). The SPCCP shall detail procedures for delivery, handling, containment, and storage of fuels and hydrocarbon materials. Include procedures to contain and remediate spills.
 - m. Means and methods proposed to protect Medical Center air-handling, cooling towers, and other equipment from damage due to airborne particulates. Means and methods proposed to protect staff vehicles from damage during the wall cleaning process. Furnish a sequencing plan indicating parking areas to be closed during the wall cleaning.
- B. 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.

1.5 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. Confine activities to areas defined by 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, topsoil, and land forms without permission from the Project Engineer. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.
 - 1. Work Area Limits: Prior to any construction, mark the areas that require work to be performed under this contract. Mark or fence isolated areas within the general work area that are to be saved and protected. Protect monuments, works of art, and markers before construction operations begin. Convey to all personnel the purpose of marking and protecting all necessary objects.
 - 2. Protection of Landscape: Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved techniques.
 - a. Box and protect from damage existing trees and shrubs to remain on the construction site.
 - b. Immediately repair all damage to existing trees and shrubs by trimming, cleaning, and painting with antiseptic tree paint.
 - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
 - 3. Temporary Protection of Disturbed Areas: Install environmental control devices, including but not limited to silt fence and wattles, to contain runoff on the construction site. This includes protection of storm drain inlets on the Medical Center side of the wall. Periodically inspect condition of sediment and erosion control devices and maintain in serviceable condition. Inspect sediment and erosion control devices after rainfall events exceeding one-half inch. Protect drainage areas as required by Section 208 of the Clean Water Act.

- a. Remove sediment accumulating at erosion control devices on a regular basis and following large rainfall events after soil has dried.
 - b. Reuse or conserve the collected topsoil sediment as directed by the Project Engineer. Topsoil use and requirements are specified in Section 31 20 00, EARTHWORK.
 - c. Institute effluent quality monitoring programs as required by Federal, State, and local environmental agencies.
4. Erosion and Sedimentation Control Devices: The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's activities. Construct or install all temporary and permanent erosion and sedimentation control features included in the Environmental Protection Plan or as shown on the plans. Maintain temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing, and mulching, until permanent drainage and erosion control facilities are completed and operative.
 5. Manage borrow areas on and off Government property to minimize erosion and to prevent sediment from entering nearby water courses or lakes.
 6. Manage and control spoil areas on Government property to limit spoil to areas within the construction limits and prevent erosion of soil or sediment from entering nearby water courses.
 7. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Do not store solid wastes below the 100-year flood plain elevation. 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. Media from sandblasting operations, if used, and cementitious surfacing from the floodwall cleaning process shall be collected, containerized and disposed of offsite in an approved manner.
 8. Store chemical waste above the flood plain and away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.

9. Handle discarded materials other than those included in the solid waste category as directed by the Project Engineer.
- 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 retention ponds allowing the suspended material to settle, the pollutants to separate, or the water to evaporate. Periodically remove pollutants and contaminated soils from retention ponds and dispose of offsite.
 2. Monitor water areas affected by construction.
- 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.
- 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 North Dakota Air Pollution Statute, Rule, or Regulation 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 (such as from sandblasting or pressure-washing operations) at all times, including weekends, holidays, and hours when work is not in progress. IT IS IMPERATIVE THAT MEDICAL CENTER EQUIPMENT, VEHICLES, DELIVERY TRUCKS, STAFF, AND THE GENERAL PUBLIC ARE PROTECTED FROM EXPOSURE TO AIRBORNE PARTICULATES AT ALL TIMES.
 2. Particulates Control: Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, 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, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators, or other methods are permitted to control particulates in the work area.

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. Reduction of Noise: Minimize noise using every reasonable action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the Project 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 8:00a.m. and 6:00p.m as approved by the COR. Repetitive impact noise on the property shall not exceed the following dB limitations:

Time Duration of Impact Noise	Sound Level in dB
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 at 15 m (50 feet) (dBA):

<u>EARTHMOVING</u>		<u>MATERIALS HANDLING</u>	
FRONT LOADERS	75	CONCRETE MIXERS	75
BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCRAPERS	80	PILE DRIVERS	95
GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80
PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80

PUMPS	75		
GENERATORS	75	SAWS	75
COMPRESSORS	75	VIBRATORS	75

- b. Use shields or other physical barriers to restrict noise transmission.
 - 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 55 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 weighing network 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 Resident Engineer 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. Site Restoration: Leave erosion control devices in place until disturbed areas are re-vegetated or as directed by the Project Engineer.
- I. 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 satisfactory to the Project Engineer. The Contractor shall clean parking areas, buildings, and exterior equipment to pre-construction conditions. Cleaning shall include offsite 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.

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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.
 - 2. Inerts (eg, concrete, masonry and asphalt).
 - 3. Paint.

1.2 RELATED WORK

- A. Section 02 41 00, DEMOLITION.
- B. Section 01 00 00, GENERAL REQUIREMENTS.

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 recycle construction and demolition waste to a minimum of 25 percent.
- 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.
- 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 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 facility 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.
 - 4. 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.
- C. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
 - D. 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 RECORDS

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.

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 00
DEMOLITION**

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies demolition and removal of structures and debris.

1.2 RELATED WORK:

- A. Demolition and removal of roads, walks, curbs, and on-grade slabs to be demolished. Section 31 20 00, EARTH WORK.
- B. Safety Requirements: Section 01 35 26 Safety Requirements Article, ACCIDENT PREVENTION PLAN (APP).
- C. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- E. Construction Waste Management: Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT.
- F. Infection Control: Section 01 35 26, SAFETY REQUIREMENTS.

1.3 PROTECTION:

- A. Perform demolition 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 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.
 2. 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.
 3. 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, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Medical Center any damaged items shall be repaired or replaced as approved by the Resident Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall 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 Resident Engineer's approval.
- G. The work shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- H. The work shall comply with the requirements of Section 01 00 00, GENERAL REQUIREMENTS and Section 01 35 26, SAFETY REQUIREMENTS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION:

- A. Completely remove portions of structures, including all appurtenances related or connected there to as described in the plan documents.
- B. Debris, including concrete, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the

Medical Center to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Project Engineer. Break up concrete slabs below grade that do not require removal from present location into pieces not exceeding 600 mm (24 inches) square to permit drainage. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.

- C. Remove and legally dispose of all materials, 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 All materials in the indicated trash dump areas, including above surrounding grade and extending to a depth of 1500mm (5feet) below surrounding grade, shall be included as part of the lump sum compensation for the work of this section. Materials that are located beneath the surface of the surrounding ground more than 5 feet, or materials that are discovered to be hazardous, shall be handled as unforeseen. The removal of hazardous material shall be referred to Hazardous Materials specifications.

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 Project Engineer. Clean-up shall include off the Medical Center 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 03 40 00
CONCRETE REPAIR**

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the requirements for materials, proportioning, and application of concrete repair mortar.

1.2 DEFINITION

Repair of structural concrete defects by use of a concrete repair mortar that is hand trowel applied.

1.3 RELATED WORK

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

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Product data for repair mortar.
- C. Repair Procedure: Contractor shall submit a detailed list of equipment and procedures proposed to be used for concrete repair.

1.5 QUALITY CONTROL

- A. Inspections:
 - 1. Surface Preparation: Surfaces prepared for concrete repair mortar application shall be inspected by the resident engineer prior to placing repair mortar.
 - 2. Repair Mortar Application: Resident Engineer shall be present during application of repair mortar for each type of repair required until a level of consistency and quality is achieved to the satisfaction of the engineer.

1.6 DELIVERY, HANDLING, AND STORAGE

- A. Properly deliver and handle materials to prevent contamination, segregation, or damage to materials.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Repair Mortar:
 - 1. MasterEmaco S 488CI as manufactured by BASF Corporation Construction Systems, 889 Valley Park Drive, Shakopee, MN 55379; www.master-builders-solutions.basf.us; 1-800-433-9517.

2. MasterEmaco N 400 as manufactured by BASF Corporation Construction Systems, 889 Valey Park Drive, Shakopee, MN 55379; www.master-builders-solutions.basf.us; 1-800-433-9517.

3. "Or Equal" products allowed.

PART 3 - EXECUTION

3.1 GENERAL

A. Repair mortar shall be installed in strict accordance with manufacturer's written installation instructions.

3.2 SURFACE PREPARATION AND MIXING

A. Substrate: Substrate must be structurally sound and free from defect. Remove delaminated material as indicated on drawings. Substrate shall be prepared such that final surface profile meets or exceeds the characteristics of CSP 10 as defined in the ICRI Guideline No. 310.2R-2013.

B. Defined Perimeter: Saw-cut the perimeter of the area being repaired to a minimum depth of 3/4". Where saw-cut is not practical, edge may be defined using shall chipping hammer with effort to achieve a 90-degree square edge, subject to the review and approval of the engineer.

C. Exposed Reinforcing: Exposed reinforcing shall have all oxidation and scale removed by hand tools and power tools as required and in accordance with ICRI Technical Guideline No. 310.1R.

D. Mixing Processes:

1. Mixing: Mix the repair mortar in accordance with manufacturer's written instructions.

3.3 APPLICATION

A. Hand-Trowel: Repair mortar shall be installed by hand trowel in accordance with manufacturer's written instructions.

B. Spray Application: At contractor's option and if accessibility permits, repair mortar may be spray applied in strict accordance with manufacturer's written instructions.

1. Applicators and workmen must have thorough knowledge of pump and spray equipment before applying product.

3.4 FINISHING

A. After placement of mortar, level the surface immediately using a wooden float.

B. Start final finishing when the mortar has begun to set using a wooden or sponge float.

3.5 CURING

A. Cure with an approved curing compound compliant with ASTM C 309 or ASTM C 1315.

3.6 PROTECTION

A. Protection: Protect adjacent structure and utilities from damage during surface preparation and application of mortar.

3.7 DEFECTIVE WORK

A. General work will be evaluated by the Resident Engineer or designated agent. If the evaluation reveals unbonded work or cores fail to meet specified strengths, or finishes are unsatisfactory, repair such defective work, as approved, without additional cost to the Government.

- - - END - - -

SECTION 03 45 00
PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section includes the performance criteria, materials, production, and erection of architectural precast concrete units. The work performed under this section includes all labor, material, equipment, related services, and supervision required for the manufacture and erection of the architectural precast concrete work shown on the construction documents.

1.2 RELATED WORK:

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Sealants and Caulking: Section 07 01 91, JOINT SEALANTS - Rehabilitation and Replacement.
- C. Size, Type and Color of Materials: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 QUALITY ASSURANCE:

- A. Fabricator Qualifications: A firm that complies with PCI MNL 117 and the following requirements and is experienced in producing units similar to those indicated for this Project and with a record of successful in-service performance:
- B. Erector Qualifications:
- C. Testing Laboratory Accreditation Requirements: Construction materials testing laboratories must be accredited by a laboratory accreditation authority. Submit a copy of the Certificate of Accreditation and Scope of Accreditation.
- D. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117.
- E. Sample Panels: Before fabricating units, produce a minimum of two (2) sample panels approximately 1.5 sq. m. (16 sq. ft.) in size for review by Contracting Officer Representative (COR). Incorporate full scale details of architectural features, finishes, textures, and transitions in the sample panels. Approved sample panel will be used for mockup and range sample.
- F. Range Samples: After sample panel approval and before production of units for installation, produce a minimum of three (3) samples, approximately 1.5 sq. m. (16 sq. ft.) in size, representing anticipated range of color

and texture of project. Following range sample acceptance by the COR, maintain samples at the manufacturer's plant and the Project site as color and texture acceptability reference.

- G. Mockups: After sample panel and range sample approval but before production of units, construct full sized mockups to verify selections and to demonstrate aesthetic effects and qualities of materials and execution. Mockup to be representative of the finished work in all respects including glass, aluminum framing, sealants and architectural precast concrete complete with all anchors, connections, flashings, and joint fillers as approved on the final shop drawings. Build mockups to comply with the following requirements, using materials indicated for the completed work:
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01, GENERAL REQUIREMENTS.

1.4 PERFORMANCE REQUIREMENTS:

- A. Structural Performance: Provide units and connections capable of withstanding: the design criteria specified on the construction documents, self-weights and weights of materials supported or attached, for the conditions indicated.
- B. Design concrete units and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live load deflection, shrinkage and creep of primary building structure, and other building movements.
- C. Thermal Movements: Provide for in-plane thermal movements resulting from annual ambient temperature changes of degrees F.
- D. Calculated Fire-Test-Response Characteristics: Where indicated, provide units whose fire resistance has been calculated according to PCI MNL 124.

1.5 SOURCE QUALITY CONTROL:

- A. Quality-Control Testing: Test and inspect precast concrete according to Section 01 45 29, TESTING LABORATORY SERVICES and PCI MNL 117 requirements respectively. If using self-consolidating concrete also test and inspect according to PCI TR-6.
- B. Testing: When determined by the Project Engineer COR that there is evidence that the concrete strength of precast concrete units may be deficient, employ an independent testing agency at Contractor's expense to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to PCI MNL 117:
- C. Defective or Damaged Work: Units that do not comply with acceptability requirements, including concrete strength, manufacturing tolerances, and

color and texture range are unacceptable. Chipped, spalled or cored units may be repaired, if repaired units match the visual mock-up. The COR will reject units that do not match the accepted samples and visual mock-up. Remove unacceptable units from the site and replace with precast concrete units that comply with requirements.

1.6 SUBMITTALS:

- A. Product Data: For each type of product indicated.
- B. Sustainable Design Submittals, as described below:
- C. Design Mixes: For each concrete mix along with compressive strength and water-absorption tests.
- D. Samples for each facing unit required, showing the full range of color and texture expected. Supply sample showing color and texture of joint treatment.
- E. Qualification Data for fabricator, erector. List of completed projects with project names and addresses, names and addresses of COR and owners, and PCI Certification documentation.
- F. Testing laboratory accreditations.
- G. Material Test Reports: From an accredited testing agency indicating and interpreting test results of the following for compliance with requirements indicated:
- H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements.
- I. Description of stone anchor shear and tensile test assembly.
- J. Certificate of Compliance.
- K. Erectors Post Audit Declaration.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Comply with product handling requirements of PCI MNL 117 at the plant and project site.
- B. Deliver all units to the project site in such quantities and at such times to assure compliance with the agreed project schedule and proper setting sequence so as to limit unloading units temporarily on the ground.
- C. Lift and support units only at designated points shown on the shop drawings.
- D. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.
- E. Store units with adequate dunnage and bracing and protect units to prevent contact with soil to prevent staining, and to prevent cracking,

distortion, warping, and other physical damage. Place stored units so identification marks are clearly visible for inspection.

1.8 WARRANTY:

A. Construction Warranty: Comply with FAR clause 52.246-21 "Warranty of Construction".

1.9 APPLICABLE PUBLICATIONS:

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

B. ASTM International (ASTM):

- A108-13.....Steel Bar, Carbon and Alloy, Cold-Finished
- A123/A123M-13.....Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- A153/A153M-09.....Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- A184/A184M-06e1 (R2011)..Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
- A615/A615M-14.....Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- A767/A767M-09.....Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
- A775/A775M-07b (R2014)...Epoxy-Coated Steel Reinforcing Bars
- C33/C33M-13.....Concrete Aggregates
- C40/C40M-11.....Organic Impurities in Fine Aggregate for Concrete
- C144-11.....Aggregate for Masonry Mortar
- C150/C150M-12.....Portland Cement
- C260/C260M-10a.....Air-Entraining Admixtures for Concrete
- C330/C330M-14.....Lightweight Aggregates for Structural Concrete
- C373-14a.....Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products
- C494/C494M-13.....Chemical Admixtures for Concrete
- C618-12a.....Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
- C881/C881M-14.....for Epoxy-Resin-Base Bonding Systems for Concrete
- C920-14a.....Elastomeric Joint Sealants
- C979/C979M-10.....Pigments for Integrally Colored Concrete
- C989/C989M-14.....Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
- C1017/C1017M-13.....Chemical Admixtures for Use in Producing Flowing Concrete

C1218/C1218M-99(R2008)..Test Method for Water-Soluble Chloride in Mortar
and Concrete

C1240-14.....Silica Fume Used in Cementitious Mixtures

C1354/C1354M-09.....Test Method for Strength of Individual Stone
Anchorages in Dimension Stone

E488/E488M-10.....Strength of Anchors in Concrete Elements

F436-11.....Hardened Steel Washers

F844-07a(R2013).....Washers, Steel, Plain (Flat), Unhardened for
General Use

F3125/F3125M-15.....Standard Specification for High Strength
Structural Bolts, Steel and Alloy Steel, Heat
Treated, 120ksi (830MPa) and 150ksi (1040MPa)
Minimum Tensile Strength, Inch and Meter
Dimensions

C. American Concrete Institute (ACI):

ACI 211.1-91(R2009).....Selecting Proportions for Normal, Heavyweight and
Mass Concrete (Reapproved 2002)

ACI 318/318M-14.....Building Code Requirements for Structural Concrete

D. American Welding Society (AWS):

C5.4-93.....Recommended Practices for Stud Welding

D1.1/D1.1M(R2011).....Structural Welding Code - Steel

D1.4/D1.4M.....Structural Welding Code - Reinforcing Steel

E. Precast/Prestressed Concrete Institute (PCI):

Architectural Precast Concrete - Color and Texture Selection Guide

MNL-117-96.....Quality Control for Plants and Production of
Architectural Precast Concrete Products

MNL-120-10.....Design Handbook - Precast and Prestressed Concrete

MNL-122-07.....Architectural Precast Concrete

MNL-127-99.....Erector's Manual - Standards and Guidelines for
the Erection of Precast Concrete Products

MNL-135-00.....Tolerance Manual for Precast and Prestressed
Concrete Construction

PART 2 - PRODUCTS

2.1 MOLD MATERIALS:

- A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; non-reactive with concrete and suitable for producing required finishes:

2.2 REINFORCING MATERIALS:

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (Grade 420), deformed.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 30 percent.
- C. Weldable Reinforcing Bars: ASTM A706/A706M, deformed.
- F. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.3 CONCRETE MATERIALS:

- A. Portland Cement: ASTM C150/C150M, Type I or III.
- B. Supplementary Cementitious Materials for unexposed surfaces (backup concrete) only.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C33/C33M, with coarse aggregates complying with Class 5S. Provide and stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for entire project.
- E. Unexposed Surface (Backup) Concrete Aggregates: ASTM C33/C33M
- F. Admixtures: Admixtures containing calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture are not permitted.
- G. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.

2.7 GROUT MATERIALS:

- A. Sand-Cement Grout: Portland Cement, ASTM C150/C150M, Type I, and clean, natural sand, ASTM C144, or ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, non-staining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107/C1107M, Grade A for dry pack and Grades B and C for flowable grout and of a consistency suitable for application within a 30-minute working time.

2.9 STONE MATERIALS AND ACCESSORIES:

- A. Fabricate stone units in sizes, types and shapes to comply with requirements as indicated on contract documents.

- B. Anchors: Stainless steel, ASTM A666, Type 304, of temper and diameter required to support loads without exceeding allowable design stresses.
- C. Sealant Filler: ASTM C920, low-modulus, multicomponent, non-sag polyurethane or silicone sealant complying with requirements in Section 07 92 00, JOINT SEALANTS and that is non-staining to stone substrate.
- D. Epoxy Filler: ASTM C881/C881M, 100% solids, sand-filled non-shrinking, non-staining of type, class, and grade to suit application.
- E. Bond Breaker: Preformed, compressible, resilient, non-staining, non-waxing, closed-cell polyethylene foam pad, nonabsorbent to liquid and gas, 3 mm (1/8 inch) thick.

2.11 CONCRETE MIXES:

- A. Prepare design mixes to match Project Engineers sample for each type of concrete required.
- B. Provide design mixes prepared by a qualified independent testing agency or by qualified precast plant personnel at fabricator's option.
- C. Limit water-soluble chloride ions to the maximum percentage by weight of cement permitted by ACI 318/318M or PCI MNL 117 when tested in accordance with ASTM C1218/C1218M.
- D. Normal Weight Concrete Face and Backup Mixtures: Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
- F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 117.
- G. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows.
- H. Total air content for various sizes of coarse aggregate for normal weight concrete.

Nominal Maximum Size of Aggregate mm (inch)	Total Air Content, Percent, by Volume	
	Severe Exposure	Moderate Exposure
Less than 9 (3/8)	9	7
9 (3/8)	7-1/2	6
13 (1/2)	7	5-1/2
19 (3/4)	6	5
25 (1)	6	5
38 (1-1/2)	5-1/2	4-1/2

- H. When included in design mixes, add other admixtures to concrete mixes according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 MOLD FABRICATION:

- A. Molds: Construct and maintain molds, mortar tight, within fabrication tolerances and of sufficient strength to withstand pressures due to concrete-placement, vibration operations, and temperature changes

3.4 FABRICATION:

- A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Position anchors for attachment of loose hardware and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
- B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing units to supporting and adjacent construction.
- C. Provide cast-in reglets, slots, holes, and other accessories in units as indicated on contract documents.
- D. Provide cast-in openings larger than 254 mm (10 inches) in any dimension. Do not drill or cut openings or reinforcing.
- E. Reinforcement: Comply with recommendations in PCI MNL 117 for fabrication, placing, and supporting reinforcement.

3.6 FABRICATION TOLERANCES:

- A. Fabricate units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.
- B. Fabricate architectural trim units such as sills, lintels, coping, cornices, quoins, medallions, bollards, benches, planters, and pavers, with tolerances meeting PCI MNL 135.

3.7 FINISHES:

- A. Provide exposed panel faces free of joint marks, grain, and other obvious defects. Corners to be uniform, straight and sharp.
- B. Finish exposed top, front and back surfaces of units to match face-surface finish.
- C. Finish unexposed surfaces, bottom of units by smooth steel-trowel finish.
- D. Finish unexposed surfaces of units by float finish.

3.8 ERECTION PREPARATION:

- A. Deliver anchorage devices that are embedded in or attached to the building structural frame or foundation before start of such work. Furnish locations, setting diagrams, and templates for the proper installation of each anchorage device.
- B. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.9 ERECTION:

- A. Erect units level, plumb and square within the specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.
- B. Connect units in position by grouting, or as otherwise indicated on approved Erection Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting or grouting are completed.
- E. Setting: Where shown, fill joints with cement mortar
- F. Pointing: Wash and brush clean, leaving joints free from loose mortar, dust and other foreign material.
- G. Sealing of Joints: Where shown and where required to make work watertight: clean, dry and seal joints between precast concrete elements and between precast elements and adjoining materials as specified in Section 07 91 91, JOINT SEALANTS - Rehabilitation and Replacement.

3.10 ERECTION TOLERANCES:

- A. Erect units level, plumb, square, true, and in alignment without exceeding the erection tolerances of PCI MNL 117, Appendix I.

3.11 FIELD QUALITY CONTROL:

- A. Special Inspections: Contractor engaged qualified special inspector approved by COR is to perform the following special inspections and prepare reports:
- B. Testing Agency: Contractor engaged qualified testing agency approved by the Project Engineer is to perform tests and inspections and prepare test reports.
- D. Report test results directly from testing agency within 7 days after testing and in writing to Contractor and COR.

- E. As directed by the Project Engineer, repair, or remove and replace work that does not comply with specified requirements.
- F. Perform additional testing and inspecting, at no additional cost, to determine compliance of corrected work with specified requirements.

3.12 REPAIRS:

- A. When permitted by Project Engineer, repair damaged units.
- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 6.1 m (20 feet).
- C. Remove and replace damaged units when repairs do not meet requirements.
- D. Repair damaged units to meet acceptability of PCI MNL 117.

3.13 CLEANING:

- A. Clean surfaces of precast concrete to be exposed to view, as necessary, prior to shipping.
- B. Clean mortar and any other deleterious material from concrete surfaces and adjacent materials immediately.
- C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

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**SECTION 03 64 00
CRACK INJECTION GROUTING**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Sealing hairline cracks in concrete structures through pressure injection.

1.2 REFERENCES

- A. ASTM D-1042 - Standard Test Method for Linear Dimensional Changes of Plastics Caused by Exposure to Heat and Moisture.
- B. ASTM D-3574 - Standard Test Methods for Flexible Cellular Materials - Slab, Bonded, and Molded Urethane Foams

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 23- SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Repair Procedure: Contractor shall submit a detailed list of equipment and procedures proposed to be used for polyurethane injection.
- D. Prior Experience: Contractor shall provide evidence that the subcontractor installing the polyurethane is qualified in accordance with the requirements under Quality Control below.

1.4 QUALITY CONTROL

- A. Installer Qualifications: Contractor having at least 3 years documented experience in installation of polyurethane concrete repairs. Contractor shall submit a list of 5 projects performed in the last 3 years in which polyurethane injection was successfully completed. List shall contain project name and location, Owner of project, brief description of work, and completion date.

1.5 DELIVERY, HANDLING, AND STORAGE

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Keep lids on tightly to prevent moisture from entering containers. Avoid direct contact with product. Use caution when opening as pressure may build up inside containers.

1.6 PROJECT CONDITIONS

- A. Low temperatures will increase viscosity making product more difficult to pump. Low temperatures or cold water will slow down the reaction time. pH of reaction water should be between 3 and 10 for optimum foam. Keep lid tightly closed.
- B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. GCP Applied Technologies; 62 Whittemore Avenue, Cambridge, MA 02140. Tel: (713) 896-0123. Web: <http://www.gcpat.com/>
- B. Prime Resins; 2291 Plunkett Road, Conyers, GA 30012. Tel: (770) 388-0626. Web: <http://www.primeresins.com>
- C. Alchemy-Spetec; 4508 Bibb Blvd B5, Tucker GA 30084. Tel: (404) 618-0438. Web: <http://www.alchemy-spetec.com>
- D. Materials as specified, OR EQUAL.

2.2 HYDROPHOBIC RESIN MATERIALS

- A. DENEFF Flex SLV PURe as manufactured by GCP Applied Technologies.
 - 1. Material: Hydrophobic polyurethane foam injection resin requiring catalyst to adjust set time.
 - 2. Physical Properties: 77 degree F - Liquid: Viscosity: 200 cps
 - 3. Accessories: Catalyst, injection ports, and cleaning materials as per the manufacturer's recommendations.
- B. Prime Flex 940 as manufactured by Prime Resins.
 - 1. Material: Hydrophobic polyurethane foam injection resin requiring catalyst to adjust set time.
 - 2. Physical Properties: 73 degree F - Liquid: Viscosity: 450-600 cps
 - 3. Accessories: Catalyst, injection ports, and cleaning materials as per the manufacturer's recommendations.
- C. Spetec PUR F400 as manufactured by Alchemy-Spetec.
 - 1. Material: Hydrophobic polyurethane foam injection resin requiring catalyst to adjust set time.
 - 2. Physical Properties: 77 degree F - Liquid: Viscosity: 110-130 cps

3. Accessories: Catalyst, injection ports, and cleaning materials as per the manufacturer's recommendations.

D. Materials as specified, OR EQUAL.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition material overnight to 70 degrees to 80 degrees F. Heat bands or heated water baths may be used on the pails before and during installation to maintain the product's temperature. Avoid splashing water into open containers.

B. Equipment: As required by manufacturer's recommendations.

C. If necessary, grind off any surface contamination to fully expose the cracks. Contractor to follow manufacturer's recommendations for the surface preparation prior to the polyurethane injection.

3.2 INSTALLATION OF HYDROPHOBIC MATERIALS

A. Mixing:

1. Mix only the amount of material to be used within a few hours.
2. Use a low speed drill with a mixing paddle.
3. Be careful not to whip too much air into the mixture.
4. Pour in catalyst while mixing.
5. Wear safety glasses or goggles whenever handling or mixing chemicals.

B. Install in accordance with manufacturer's instructions.

1. Expose the cracks.
2. Drill injection holes.
3. Flush injection holes with water using a probe that reaches the back of the hole.
4. Install injection ports and zerk fittings.
5. Flush the crack with water if necessary.
6. Inject resin as follows; and allow to cure.
 - a. Injection of the polyurethane adhesive shall begin at the lowest entry port and continue until there the adhesive emerges from the next adjacent (higher) port.
 - b. As soon as the adhesive emerges from the adjacent port, injection shall be stopped, the port sealed, and the injection transferred to the adjacent port.
 - c. The process of injection, waiting for emergence of adhesive from the next adjacent port, sealing of the injection port and

continuation of injection in the adjacent port shall continue until the crack is filled.

- d. The process of injection described in steps a through c above may be modified to the extent that injection at the original port may be continued after emergence of adhesive from the adjacent port by sealing that port and waiting for emergence at the next higher port or ports. This modification of the regular injection procedure may be used if the injection pressure does not substantially increase, the port seals remain in place and no leaks become apparent.
- e. If port to port travel of the injection adhesive is not indicated, the work shall be stopped, and remedial action shall be taken which may require resetting of surface ports or drilling holes which intersect with the crack from a different angle. Such work shall only be done after authorization from the Resident Engineer.
- f. At below grade applications where only one side of the wall is visible, the contractor is to monitor the adjacent ports as detailed in the steps above, as well as monitor the injection pressure. The contractor is responsible for estimating what duration of time is adequate for grouting the below grade cracks and is responsible to prove that the cracks are full by attempting to inject each port to refusal.

3.3 DRESS OUT

- A. Flush injection ports and fill holes with either a cementitious or epoxy-based patching material.
- B. Grind excess resin from face of concrete.

3.4 CLEAN-UP

- A. Flush injection equipment with cleaner as recommended by the manufacturer.

- - - END OF SECTION - - -

SECTION 07 01 91

JOINT SEALANTS REHABILITATION AND REPLACEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes replacement of exterior weatherproofing sealants.

1.2 RELATED REQUIREMENTS

- A. Section 02 41 00 Demolition
- B. Section 03 40 00 Concrete Repair
- C. Section 03 45 00 Precast Architectural Concrete
- D. Section 07 13 26 Self Adhering Waterproof Membrane
- E. Section 07 16 00 Cementitious and Reactive Waterproofing
- F. Section 09 06 00 Painting
- G. Section 03 64 00 Crack Injection Grouting

1.3 REFERENCES

- A. References, General: Versions of the following cited standards current as of the date of issue of the project apply to the Work of this Section.
- B. ASTM International (ASTM): www.astm.org:
 1. ASTM C 510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
 2. ASTM C 661 - Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer.
 3. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
 4. ASTM C 794 - Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 5. ASTM C 920 - Specification for Elastomeric Joint Sealants.
 6. ASTM C 1193 - Guide for Use of Joint Sealants.
 7. ASTM C 1247 - Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.
 8. ASTM C 1248 - Test Method for Staining of Porous Substrate by Joint Sealants.
 9. ASTM C 1311 - Specification for Solvent Release Sealants.
 10. ASTM C 1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
 11. ASTM C 1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.
 12. ASTM D 412 - Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

13. ASTM D 624 - Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
14. ASTM D 2203 - Standard Test Method for Staining from Sealants.
15. ASTM D 2240 - Test Method for Rubber Property - Durometer Hardness.

C. Sealant, Waterproofing, and Restoration Institute (SWRI):
www.swrionline.org:

1. SWRI Validation Program.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.
- B. Preinstallation Conference: Conduct conference at Project Site.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 1. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of joint sealant product specified, including:
 1. Preparation instructions and recommendations.
- B. Samples for Color Selection: For each joint sealant type.
- C. Samples for Verification: For each exterior joint sealant product, for each color selected.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and qualified applicator.
- B. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
- C. Preconstruction field-adhesion test reports.
- D. Field quality control adhesion test reports.
- E. Warranty: Sample of unexecuted manufacturer and installer special warranties.

1.8 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience with record of successful product in-service use.
 - 1. Single Source Responsibility: Provide exterior joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- B. Installer Qualifications: A firm with minimum [three] years of experience installation of specified products in successful use on similar projects, including a full-time on-site supervisor with a minimum of [three] years of experience installing similar work, able to communicate verbally with a contractor, [architect,] and employees.
- C. Manufacturer Qualifications: A qualified manufacturer [listed in this Section] with minimum five years of experience in manufacture of waterproofing as one of its principal products.
- D. Mockups: Provide one each (expansion joint and control joint) joint sealant application mockup identical to specified joint sealants and installation methods, installed by Project personnel.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Accept materials on site in manufacturer's unopened original packaging.
- B. Store primers and sealants in dry location with ambient temperature range of 60 to 80 deg. F (15 to 27deg. C).

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not install joint sealants during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
 - 1. Do not install primers or sealants when atmospheric temperatures or joint surface temperatures are less than 40 deg. F (4 deg. C).
 - 2. Do not install sealant when temperature is less than 5 deg F (3 deg C) below dew point.

1.11 SCHEDULING

- A. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.

1.12 WARRANTY

- A. Special Installer's Warranty: Original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
 - 1. Warranty Period: [Two] years from date of Substantial Completion.

B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration joint substrates exceeding design specifications.
3. Mechanical damage caused by outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: Provide joint sealant products manufactured by **Tremco, Inc., Commercial Sealants and Waterproofing Division, An RPM Company**, Beachwood OH; (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com, [or comparable products of other manufacturer approved by Architect in accordance with Instructions to Bidders and Division 01 General Requirements].

2.2 MATERIALS, GENERAL

A. Sustainability Requirements: Provide thermal and moisture protection materials as follows:

1. Provide adhesives and sealants with a VOC content complying with VOC content less than that allowed under South Coast Air Quality Management District (SCAQMD) Rule No. 1168.

B. Compatibility: Provide joint sealants and accessory materials that are compatible with one another, and with adjacent materials, as demonstrated by sealant manufacturer using ASTM C1087 testing and related experience.

C. Joint Sealant Standard: Comply with ASTM C 920 and other specified requirements for each joint sealant.

D. Single-Component, Non-sag, Moisture-Cure, Polyurethane Hybrid Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, Use NT; Greenguard certified.

1. Basis of Design Product: **Tremco, Inc., Dymonic 100**, OR EQUAL.
2. Volatile Organic Compound (VOC) Content: 40 g/L maximum.
3. Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
4. Tensile Strength ASTM D412: 350 to 450 psi
5. Percent Elongation ASTM D412: 800 to 900%
6. Modulus at 100% ASTM D412: 75 to 85 psi
7. Tear Strength ASTM D412: 65 to 75 psi
8. Smoke Development ASTM E84: 5
9. Color: Sandstone or similar.

E. Single-Component, Non-sag, Moisture-Cure, Polyurethane Hybrid Joint Sealant: ASTM C 920, Type S, Grade NS, Class 35, Use NT; Greenguard certified.

1. Basis of Design Product: **Tremco, Inc., Dymonic FC**, OR EQUAL.
2. Volatile Organic Compound (VOC) Content: 10 g/L maximum.
3. Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
4. Color: Sandstone or similar.

2.3 JOINT SEALANT ACCESSORIES

- A. Cylindrical Sealant Backing: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.
- B. Bond Breaker Tape: Polymer tape compatible with joint sealant and adjacent materials and recommended by sealant manufacturer.
- C. Cleaners: Chemical cleaners acceptable to joint sealant manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examination of Existing Joint Sealants: Examine existing joint. Examine joints for compliance with requirements for joint configuration, installation tolerances, condition of joint substrate, and other conditions affecting joint-sealant performance.
- B. Submit report to the Project Engineer indicating conditions that cannot be corrected to comply with joint sealant manufacturer's recommendations as part of the specified joint replacement or rehabilitation. Proceed with work once non-complying conditions are corrected.

3.2 JOINT PREPARATION

- A. Removal of Failed Joint Sealant Materials: Cut out and remove all joint materials and associated backing materials NOTE: The joints include a water stop installation approximately middle of the wall, use extreme care to not damage these water stops. If a water stop ~~bulb~~ is damaged, report to the Project Engineer immediately in writing.
- B. Surface Cleaning of Joint Substrates: Clean joints thoroughly immediately before installing joint sealants. Remove foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 1. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods in addition to solvent cleaning to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Remove laitance and form-release agents from concrete.
 2. Clean porous and nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or

leave residues capable of interfering with adhesion of joint sealants.

3. NOTE: The joints include a water stop installation approximately middle of the wall, use extreme care to not damage these water stops. If a water stop ~~bulb~~ is damaged, report to the Project Engineer immediately in writing

C. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.

D. Joint Backing: Select joint backing materials recommended by sealant manufacturer as compatible with sealant and adjacent materials. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.

1. Install joint backing to maintain the following joint ratios:
 - a. Joints up to 1/2 inch (13 mm) wide: 1:1 width to depth ratio.
 - b. Joints greater than 1/2 inch (13 mm) wide: 2:1 width to depth ratio; maximum 1/2 inch (13 mm) joint depth.
2. Install bond breaker tape over substrates when sealant backings are not used.

3.3 INSTALLATION OF JOINT SEALANTS

A. Joint Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.

1. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
2. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
3. Tool exposed joint surface concave using tooling agents approved by sealant manufacturer for application.

B. Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.

1. Remove masking tape immediately after tooling joint without disturbing seal.
2. Remove excess sealant from surfaces while still uncured.

3.4 FIELD QUALITY CONTROL

A. The General Contractor will retain testing agency to perform the following tests:

1. Verification that substrate preparation meets requirements.
2. Testing and certification that joint sealant materials comply with requirements.

3. Testing of application for compliance with adhesion requirements.
- B. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C 1193, Method A.
1. Perform [5] tests for the first [1000 feet (300 m)] of joint length for each kind of sealant and joint substrate, and one test for each [1000 feet (300 m)] of joint length thereafter or 1 test per each floor per building elevation, minimum.
 2. For sealant applied between dissimilar materials, test both sides of joint.
- C. Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
- D. Submit report of field adhesion testing to the Project Engineer indicating tests, locations, dates, results, and remedial actions taken.

3.5 EXTERIOR JOINT-SEALANT SCHEDULE

- A. Exterior construction joints in cast-in-place concrete
1. Joint Sealant: Single-component neutral-curing non-staining silicone sealant.
 2. Joint Sealant: Multi-component neutral-curing non-staining field tintable silicone sealant.
 3. Joint Sealant: Single-component non-sag urethane sealant.
 4. Joint-Sealant Color: [As selected by Architect from manufacturer's standard colors] [Approved custom match to substrate sample].
- B. Exterior movement joints in Architectural Precast Stone Caps.
1. JointSealant:Single-component neutral-curing non-staining silicone sealant.
 2. Joint Sealant: Single-component non-sag urethane sealant.
 3. Joint-Sealant Color: [As selected by Architect from manufacturer's standard colors] [Approved custom match to mortar].

END OF SECTION

SECTION 07 13 26

SELF-ADHERING WATERPROOF MEMBRANE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Application of rolled, self-adhering waterproofing membrane system.

1.02 RELATED SECTIONS

- A. Section 07 01 91 - Joint Sealants Rehabilitation and Replacement

1.03 REFERENCES

- A. American Railway Engineering & Maintenance of Way Association (AREMA) Specification Chapter 29 - Waterproofing.
- B. ASTM D146 - Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Fabrics Used in Roofing and Waterproofing.
- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- D. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
- E. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
- F. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives. (T-Peel Test).
- G. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- H. ASTM E96 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
- I. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

1.04 SUBMITTALS

- A. Comply with Section 01 33 23 - Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store all materials in a clean dry area in accordance with manufacturer's instructions. Protect materials from standing or flowing water.

- C. Store adhesives and primers at temperatures of 40°F (5°C) and above to facilitate handling.
- D. Store membrane cartons on pallets.
- E. Do not store at temperatures above 90°F (32°C) for extended periods.
- F. Keep away from sparks and flames.
- G. Completely cover when stored outside. Protect from rain.
- H. Protect materials during handling and application to prevent damage or contamination.
- I. Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Protect rolls from direct sunlight until ready for use
- C. Do not apply membrane when air or surface temperatures are below 40°F (4°C).
- D. Do not apply to frozen concrete.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. W.R. MEADOWS, Inc., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Web Site www.wrmeadows.com.
- B. Products listed below are to be considered as "Basis of Design", other materials considered "As Equal" are allowed.

2.02 MATERIALS

- A. Rolled, Self-Adhering Waterproofing Membrane: Polymeric waterproofing membrane protected by release paper on cross-laminated polyethylene carrier film with exposed polymeric membrane strips on both sides protected by pull-off release strips.
 1. Performance Based Specification: Waterproofing membrane shall have the following characteristics:
 2. Compliance: AREMA Specification Chapter 29 - Waterproofing.
 3. Thickness:
 4. Carrier Film: 4 mils.
 5. Polymeric Membrane: 56 mils.
 6. Tensile Strength, ASTM D412, Die C:
 7. Carrier Film: 5,900 psi (40.71 MPa) minimum.
 8. Polymeric Membrane: 460 psi (3.23 MPa) minimum.
 9. Elongation, ASTM D412, Die C: Polymeric Membrane: 97 minimum.
 10. Peel Adhesion, ASTM D903: 11.8 lbf/in. (2068 N/m).

11. Lap Adhesion, ASTM D1876: 8.62 lbf/in. (1508 N/m)
 12. Water Vapor Permeability, ASTM E96, Method B: 0.036 perms.
 13. Water Absorption, ASTM D570: 0.1 percent, 72 hours maximum.
 14. Resistance to Hydrostatic Head: Equivalent to 230.9 feet (70.3m) of water.
 - a) Puncture Resistance, ASTM E154: 48.2 lbf (214.6 N).
 - b) Exposure to Fungi, Soil Test: Pass, 16 weeks.
- Color:
- i) Carrier Film: White.
 - ii) Polymeric Membrane: Black.

B. MEL-ROL Waterproofing System by W.R. MEADOWS (Or Equal).

1. MEL-ROL: For use at temperatures of 40°F (4°C) and above.

2.03 ACCESSORIES

A. Surface Conditioner:

1. Temperatures Above 40°F (4°C): Mel-Prime Water Base Primer.

B. Flashing and Fillets: MEL-ROL LIQUID MEMBRANE.

C. Pointing Mastic: POINTING MASTIC.

D. Termination Bar: TERMINATION BAR.

E. Corner Tape: DETAIL STRIP.

F. Waterproofing Protection Course: PROTECTION COURSE (1/8" Thickness)

PART 3 EXECUTION

3.01 EXAMINATION

Examine surfaces to receive self-adhering membrane. Notify Project Engineer if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.

C. Do not apply waterproofing to surfaces unacceptable to manufacturer.

D. Concrete surfaces must be clean, smooth and free of standing water.

E. Patch all holes and voids and smooth out any surface misalignments.

F. Apply surface conditioner to surfaces that will be covered within one working day according to manufacturer's recommended coverage rates.

G. Install corner tape on all inside and outside corners, including the footing.

H. Apply a 9" (229 mm) strip of self-adhering membrane over construction, control and expansion joints and over cracks greater than 1/16" (1.59 mm) wide.

I. Seal all terminations with pointing mastic.

3.03 APPLICATION

A. Vertical Application

1. Apply waterproofing membrane system in accordance with manufacturer's instructions.
2. Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.
3. Remove release paper on edge and position the membrane.
4. Pull balance of release paper off, running the roll vertically over the top of the corner tape at the footing.
5. Immediately hand-rub the membrane firmly to the surface, removing any bubbles or wrinkles, then pressure roll the complete surface to assure positive adhesion.
6. Overlap all seams and stagger end laps at least 2 ½" (63.5 mm).
7. Seal all terminations with pointing mastic.
8. Inspect membrane before covering and repair as necessary. Cover tears and inadequate overlaps with membrane. Seal edges of patches with pointing mastic.

3.04 PROTECTION

- A. Protect membrane on vertical and horizontal applications with immediate application of waterproofing protection course, rolled matrix drainage board.
- B. Backfill immediately using care to avoid damaging waterproofing membrane system.

END OF SECTION

07 16 00
Cementitious and Reactive Waterproofing

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Application of a flexible, cementitious, waterproofing coating.
- C. The general conditions, supplementary conditions and general requirements of this document apply to general contractors, subcontractors, material suppliers, and all other persons furnishing labor and materials under this section.

1.02 WORK INCLUDED

- A. Provide all labor, material, and equipment necessary to apply cementitious coating in application over concrete surfaces as shown on the contract drawings and specified herein.

1.03 RELATED SECTIONS

- A. Section 07 13 26 - Self Adhering Waterproof Membrane

1.04 REFERENCES

- A. TT-P-1411 - Federal Specification, Paint, Copolymer-Resin, Cementitious (for Waterproofing Concrete and Masonry Walls).

1.05 QUALITY ASSURANCE

- A. Contractor will provide the proper equipment, manpower, and supervision at the jobsite to install the cementitious coating in compliance with the project plans and specifications.
- B. Prepare a site sample approximately 4' x 4'. This sample will be regarded as the minimum standard of workmanship acceptable for this project.
- C. Installation must be carried out by an experienced contractor with an adequate number of skilled personnel experienced in the application of the crystalline coating systems.
- D. Maintain a record of the batch numbers of all materials supplied for this project.

1.06 PRE-CONSTRUCTION MEETING

- A. Convene [one] week prior to commencing work of this section, in accordance with Section 1.05 - Quality Assurance, meeting with manufacturer's technical representative, General Contractor and Site Engineer to review the installation procedures.

1.07 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store cementitious coating in a clean, dry area protected from direct sunlight, weather and other damage. Store all wet materials at a temperature of not less than 44° F at all times.
- C. Protect materials during handling and application to prevent damage or contamination.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse. Application of this product is solely below grade on the east (river side) face.
- B. Product must never be applied if ambient temperatures cannot be kept above 40° F during application and for 48 hours thereafter.
- C. Avoid applications at temperatures above 82° F.
- D. Protect surrounding surfaces from damage due to work of this trade.
- E. Hot Weather Application
 - 1. Protect the surface against rapid evaporation of water between the finishing and the final set time.
 - 2. Use water misting or apply a surface evaporation retarder.
- F. Cold Weather Application
 - 1. Apply in temperatures above freezing point.
 - 2. Protect the material against freezing for a minimum of 48 hours.
 - 3. Use electrical heaters to avoid carbonation and carbonation cracking.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. W. R. MEADOWS®, INC., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Website: www.wrmeadows.com.
- B. GEMITE PRODUCTS INC., 1787 Drew Road, Mississauga, Ontario, Canada L5S 1J5. (888) 443-6483. Fax (905) 672-6780. Website: www.gemite.com.
- C. "Or Equal" products allowed.

2.02 MATERIALS

- A. Flexible Cementitious Coating: CEM-KOTE FLEX ST manufactured by Gemite Products Inc. and distributed by W. R. MEADOWS.
- B. Or Equal.

2.03 ACCESSORIES

- A. Reinforcing Fabric (Woven) for cove reinforcement: REINFORCING FABRIC HD manufactured by Gemite Products Inc. and distributed by W. R. MEADOWS.
- B. Reinforcing Fabric (Non-Woven) for crack treatment: REINFORCING FABRIC NW manufactured by Gemite Products Inc. and distributed by W. R. MEADOWS.

- C. Thin Patching Mortar for thin repairs, including bug holes:
MEADOW-PATCH™ T1 manufactured by W. R. MEADOWS.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive the thin set mortar and flexible cementitious coating.
- B. Report to the VA Project Engineer, in writing, any defects in previously prepared work or unsatisfactory site conditions.
- C. Do not begin surface preparation or application until unacceptable conditions have been corrected.
- D. Starting work under this section means acceptance of the surface and previously prepared work.

3.02 SURFACE PREPARATION

- A. Thoroughly clean the surface using high-pressure wash or sandblasting procedures to remove existing finishes and clean surface.
- B. Ensure all soft concrete surfaces and any bond-inhibiting materials, such as release agents, are removed.
- C. Wash the surface thoroughly with water prior to the application of the cementitious coating.
- D. Allow all surface water to dry off to achieve a saturated surface dry (SSD) condition.
- E. To ensure proper surface preparation, a bond test should be performed in accordance with manufacturer's instructions.
- F. Surface Repair
 1. Coordinate surface repair with the General Contractor as specified in other sections for repairs deeper than ¼". For surface repairs as required by the manufacturer for thin coat and surface repair use products by manufacturer noted above.
 2. Uneven concrete, due to concrete form misplacement, must be chipped away and surface patched smooth.
 3. Build corner coves 2" x 2" minimum, using an overhead or vertical structural repair mortar.
- G. Treatment of Existing Cracks and All Non-Structural Joints
 1. Identify all the existing cracks not repaired by the high-pressure injection system and joints and apply a thin layer of the flexible cementitious coating approximately 4 ½" wide and 19 mils thick by trowel or brush.
 2. Embed the non-woven reinforcing fabric over the entire area of this coating and work in using trowel.
 3. Ensure this coating application totally covers the reinforcing fabric.
 4. Let dry sufficiently and apply an additional coat of this flexible cementitious coating to build up to a total thickness of 38 mils over the entire area.

H. Treatment of Inside Corners

1. Install a 2" x 2" cove over the inside corners using polymer-modified structural repair mortar.
 2. Apply a thin layer of flexible cementitious coating approximately 10" wide and 31 mils by trowel or brush.
 3. Embed the woven reinforcing fabric over the entire area of this coating and work in using trowel.
 4. Ensure this coating application totally covers the reinforcing fabric.
 5. Apply an additional coat of this flexible cementitious coating to build up a total thickness of 63 mils over the entire area.
- I. Treatment of Protruding Elements
1. Apply two coats of flexible cementitious coating at a thickness of 63 mils to both the concrete surface and protruding element.
 2. Form a 2" x 2" minimum cove using polymer-modified structural repair mortar in the corner.
 3. Allow polymer-modified structural repair mortar to cure.

3.03 MIXING

- A. Flexible Cementitious Coating
1. Mix the content of the bag, component A, with the liquid component B.
 2. Use a heavy-duty drill (400 - 600 RPM) with a helix screw or paddle mixer to achieve thorough mixing.
 3. Pour approximately 80% of the liquid component B into the mixing container (mixer) and gradually add the dry component A into the liquid and mix until a smooth and lump-free mix is obtained.
 4. Add the remaining liquid as required for a given application consistency.
 5. At high ambient temperatures, and depending on application, one to two cups of water can be added if required.

3.04 APPLICATION

- A. Flexible Cementitious Coating
1. Brush or spray-apply the first coat of cementitious coating to a thickness of 1/32".
 2. If spraying, brush the first coat to eliminate any pinholes.
 3. Apply the second coat after approximately 15 - 30 minutes at the same thickness as the first coat (1/32"), giving a finish thickness of 1/16".
 4. Brush the second coat to eliminate pinholes.
 5. Protect against surface water evaporation.
- B. Finishing
1. To obtain a smooth surface, if required, finish the surface using a steel trowel.
- C. Curing
- D. Air-dry cure flexible cementitious coating for 72 hours at 68° F and 70 - 80% RH prior to filling with water.
- E. Allowance for longer curing/drying time will be required with cooler temperatures and higher relative humidity.

3.05 SITE CLEANUP

- A. Remove all excess and waste materials from the jobsite in accordance with contract provisions.
- B. Ensure all surrounding areas where the material has been applied and is free of debris.

END OF SECTION

**SECTION 09 06 00
SCHEDULE FOR FINISHES**

SECTION 09 06 00-SCHEDULE FOR FINISHES

VAMC:	Fargo VA Medical Center
Location:	Fargo, ND
Project no. and Name:	437-19-104 Repair Fargo Flood Wall Levee
Submission:	100% Final Bid Documents
Date:	December 18, 2020

**SECTION 09 06 00
SCHEDULE FOR FINISHES**

PART I - GENERAL

1.1 DESCRIPTION

This section contains a coordinated system in which requirements for materials specified in other sections shown are identified by abbreviated material names and finish codes in the room finish schedule or shown for other locations.

1.2 MANUFACTURERS

Manufacturer's trade names and numbers used herein are only to identify colors, finishes, textures and patterns. Products of other manufacturer's equivalent to colors, finishes, textures and patterns of manufacturers listed that meet requirements of technical specifications will be acceptable upon approval in writing by contracting officer for finish requirements.

1.3 SUBMITALS

Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES—provide quadruplicate samples for color approval of materials and finishes specified in this section.

1.4 APPLICABLE PUBLICATIONS

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

B. MASTER PAINTING INSTITUTE: (MPI)

2001.....Architectural Painting Specification Manual

PART 2- PRODUCTS

2.3 DIVISION 03 - CONCRETE

A. SECTION 03 40 00, CONCRETE REPAIR

Surface	Finish Description
Sidewalks, Splash Pan	Light Broom Finish

B. SECTION 03 45 00, PRECAST ARCHITECTURAL CONCRETE

Finish Color	Texture	Finish	Manufacturer	Mfg. Color Name/No.
TBD	Fine Grain	TBD		TBD

2.7 DIVISION 07 - THERMAL AND MOISTURE PROTECTION

R. SECTION 07 01 91, JOINT SEALANTS

Location	Color		Manufacturer	Manufacturer Color
Expansion Joints	Sandstone		Tremco	
Control Joints	Sandstone		Tremco	
Precast Concrete	Sandstone		Tremco	

2.9 DIVISION 09 - FINISHES

T. SECTION 09 90 00, PAINT AND COATINGS

2. Paint code		Manufacturer	Mfg. Color Name/No.
P1		Luxon	TBD

--- E N D---

SECTION 09 90 00
EXTERIOR WATERPROOF PAINT SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior paint and coatings systems including surface preparation.

1.2 RELATED SECTIONS

- A. Section 03 40 00 - Concrete Repair.
- B. Section 07 01 90 - Joint Sealants - Rehabilitation and Replacement
- C. Section 03 64 00 - Crack Injection Grouting

1.3 REFERENCES

- A. Steel Structures Painting Council (SSPC):
1. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.
- B. Safety Data Sheets / Environmental Data Sheets: Per manufacturer's SDS/EDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.
- C. California Department of Public Health (CDPH):
1. CDPH v1.1-2010 and V1.2-2017

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 23 - SHOP DRAWINGS AND PRODUCT DATA
- B. Product Data: For each paint system indicated, including.
1. Product characteristics.
 2. Surface preparation instructions and recommendations.
 3. Primer requirements and finish specification.
 4. Storage and handling requirements and recommendations.
 5. Application methods.
 6. Cautions for storage, handling and installation.
- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's products, colors and sheens available.
- D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.
- E. Only submit complying products based on project requirements (i.e. LEED). One must also comply with the regulations regarding VOCs (CARB, OTC, SCAQMD, LADCO). To ensure compliance with district regulations and other rules, businesses that perform coating activities should contact the local district in each area where the coating will be used.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish surfaces for verification of products, colors and sheens.
 - 2. Finish area designated by Project Engineer
 - 3. Provide samples that designate primer and finish coats.
 - 4. Do not proceed with remaining work until the Architect approves the mock-up.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.
 - 1. Product name, and type (description).
 - 2. Application and use instructions.
 - 3. Surface preparation.
 - 4. VOC content.
 - 5. Environmental handling.
 - 6. Batch date.
 - 7. Color number.
- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Furnish Owner with an additional one percent of each material and

color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Fax: 440-826-1989; Email: request infospecifications@sherwin.com; Web: www.swspecs.com.
- B. "Or Equal" Requests for substitutions will be considered

2.2 APPLICATIONS/SCOPE

- A. Exterior Paints and Coatings:
 - 1. Concrete: Cast-in-place.

2.3 PAINT MATERIALS - GENERAL

- A. Paints and Coatings:
 - 1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufactures product instructions for optimal color conformance.

Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

- B. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- C. Color: Refer to Finish Schedule for paint colors, and as selected.

2.4 EXTERIOR PAINT SYSTEMS

- A. CONCRETE Poured-in-place Cement).
 - 1. Exterior Above Grade Atmospheric Waterproofing System:
 - a. Flat Finish:
 - 1) 1st Coat: S-W Loxon BlockSurfacer, LX01W00200 (16.0 mils wet, 8.8 mils dry).
 - 2) 2nd Coat: S-W Loxon Waterproofing Masonry Flat Coating, LX11-50 Series.
 - 3) 3rd Coat: S-W Loxon Waterproofing Masonry Flat Coating, LX11-50 Series (14-18 mils wet, 6.5-8.4 mils dry per coat).
 - 4) Or Equal systems will be considered.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared; notify Project Engineer of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Project Engineer of unsatisfactory preparation before proceeding.
- B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Project Engineer immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
 - 1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
 - 2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
 - 3. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
 - 4. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.
- B. Concrete: The existing concrete surface finish will be removed and prepared under other Sections of this specification. Further preparation: Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

- C. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
- D. Cement Composition Siding/Panels: Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments.
- E. Exterior Composition Board (Hardboard): Some composition boards may exude a waxy material that must be removed with a solvent prior to coating. Whether factory primed or unprimed, exterior composition board siding (hardboard) must be cleaned thoroughly and primed with an alkyd primer.

3.3 INSTALLATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G. Inspection: The coated surface must be inspected and approved by the Architect just prior to the application of each coat.

3.4 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following

manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

SECTION 31 20 00
EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. This section specifies the requirements for furnishing all equipment, materials, labor, tools, and techniques for earthwork including, but not limited to, the following:

1. Site preparation.
2. Topsoil removal and replacement.
3. Excavation.
4. Granular materials - base course and engineered fill
5. Filling and backfilling.
6. Grading.
7. Soil Disposal.
8. Clean Up.

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 material, and inorganic materials, including silts, too wet to be stable and any material with a liquid limit and plasticity index exceeding 40 and 15 respectively. Unsatisfactory soils also include satisfactory soils not maintained within 3 percent of optimum moisture content at time of compaction, as defined by ASTM D698.
2. Existing Subgrade: Same materials as 1.2.A that are not capable of direct support of slabs, pavement, and similar items with possible exception of improvement by compaction, proof-rolling, or similar methods.

B. Site Earthwork: Earthwork operations required in area outside of structure.

C. Degree of compaction: Degree of compaction is expressed as a percentage of maximum density obtained by laboratory test procedure. This percentage of maximum density is obtained through use of data provided from results of field test procedures presented in ASTM D1556, ASTM D2167, and ASTM D6938.

- D. Fill: Satisfactory soil materials used to raise existing grades. In the construction documents, the term "fill" means fill or backfill as appropriate.
- E. Backfill: Soil materials, including base course and engineered fill used to fill an excavation.
- F. Unauthorized excavation: Removal of materials beyond indicated sub-grade elevations or indicated lines and dimensions without written authorization by the Project Engineer. No payment will be made for unauthorized excavation or remedial work required to correct unauthorized excavation.
- G. Authorized additional excavation: Removal of additional material authorized by the Contracting Officer (only) based on testing by the Contractor's soils testing agency and determination by the Project Engineer that unsuitable bearing materials are encountered at required sub-grade elevations.
- H. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular sub-base, drainage fill, or topsoil materials.
- I. Structure: Foundations, slabs, tanks, curbs, mechanical and electrical appurtenances, or other stationary features constructed above or below the ground surface.
- J. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- K. Base course: Gravel layer placed between the sub-grade placed between the sub-grade and a concrete pavement or walk.
- L. Utilities include on-site underground pipes, conduits, ducts, and cables as well as underground services.
- M. Debris: Debris includes all materials located within the designated work area not covered in the other definitions and shall include but not be limited to items like vehicles, equipment, appliances, building materials or remains thereof, tires, any solid or liquid chemicals or products stored or found in containers or spilled on the ground.
- N. Contaminated soils: Soil that contains contaminants as defined and determined by the Project Engineer or the Contractor's testing agency. Timely notification of suspected contaminated soils is required by Contractor per Division 1 - General Requirements.

1.3 RELATED WORK:

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Safety requirements: Section 01 35 26.
- C. Protection of existing utilities, existing equipment, roads, and pavements: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Erosion Control: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, and Section 32 92 19, PLANTING AND SEEDING.
- E. Site preparation: Section 02 41 00, DEMOLITION.

1.4 CLASSIFICATION OF EXCAVATION:

- A. Unclassified Excavation: Removal and disposal of pavements and other man-made obstructions visible on 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.
- B. Classified Excavation: Removal and disposal of all material not defined as Rock.

1.5 SUBMITTALS:

- A. Furnish to Project Engineer:
 - 1. Soil samples.
 - a. Classification in accordance with ASTM D2487 for each on-site or borrow soil material proposed for fill, backfill, engineered fill, or structural fill.
 - b. Laboratory compaction curve in accordance with ASTM D698 or D1557 for each on site or borrow soil material proposed for fill, backfill, engineered fill, or structural fill.
 - c. Test reports for compliance with ASTM D2940 requirements for subbase material.
 - d. Pre-excavation photographs and videotape in the vicinity of the existing structures to document existing site features, including surfaces finishes, cracks, or other structural blemishes that might be misconstrued as damage caused by earthwork operations.

1.6 APPLICABLE PUBLICATIONS:

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

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

T99-10.....Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 inch) Drop

T180-10.....Standard Method of Test for Moisture-Density Relations of Soils using a 4.54 kg (10 lb) Rammer and a 457 mm (18 inch) Drop

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

C33-03.....Concrete Aggregate

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

D698-07e1.....Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft³ (600 kN m/m³))

D1140-00.....Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve

D1556-07.....Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method

D1557-09.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2700 kN m/m³))

D2167-08.....Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

D2487-11.....Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D2940-09.....Standard Specifications for Graded Aggregate Material for Bases or Subbases for Highways or Airports

D6938-10.....Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. General: Provide borrow soil material when sufficient satisfactory soil materials are not available from excavations.
- B. Fills: Material in compliance with ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, SM, SC, and ML, or any combination of these groups; free of rock or gravel larger than 75 mm (3 inches) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Material approved from onsite or offsite sources shall have a minimum dry density of 1760 kg/m³ (110 pcf), a maximum Plasticity Index of 15, and a maximum Liquid Limit of 40.
- C. Engineered Fill: Naturally or artificially graded mixture of compliance with ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, SM, SC, and ML, or any combination of these groups, or as approved by the Engineer or material with at least 90 percent passing a 37.5-mm (1 1/2-inch) sieve and not more than 12 percent passing a 75- μ m (No. 200) sieve, per ASTM D2940;.
- D. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 37.5 mm (1 1/2-inch) sieve and 0 to 5 percent passing a 2.36 mm (No. 8) sieve.
- E. Granular Fill (Base Course):
 - 1. Under concrete slabs - granular fill shall consist of clean crushed rock placed beneath sidewalks, walkways, and parking area slabs. Fine aggregate grading shall conform to ASTM C 33 with a maximum of 3 percent by weight passing ASTM D 1140, 75 micrometers (No. 200) sieve, and no more than 10 \pm percent by weight passing the 4.75 mm (No. 4) size sieve, or coarse aggregate Size 57, 67, or 77.
- F. Requirements for Offsite Soils: Offsite soils brought in for use as backfill shall be clean native soils not previously used in construction or grading. Backfill shall contain less than 100 parts per million (ppm) of total hydrocarbons (TPH).

PART 3 - EXECUTION

3.1 SITE PREPARATION:

- A. Clearing: Clear within limits of earthwork operations as shown. Work includes removal of trees, shrubs, fences, foundations, incidental structures, paving, debris, trash, and other obstructions. Remove materials from Medical Center Property.
- B. Trees and Shrubs: Trees and shrubs, not shown for removal, may be removed from areas within 4500 mm (15 feet) of new construction and 2250 mm (7.5 feet) of utility lines when removal is approved in advance by Project Engineer. Remove materials from Medical Center property.
- C. Stripping Topsoil: Strip topsoil from within limits of earthwork operations as specified. Topsoil shall be a fertile, friable, natural topsoil of loamy character and characteristic of locality. Topsoil shall be capable of growing healthy horticultural crops of grasses. Stockpile topsoil and protect as directed by Project Engineer. Eliminate foreign materials, 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 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 soil is wet so that the composition of the soil will be destroyed.
- D. Concrete Slabs and Paving: Score deeply or saw cut to insure a neat, straight cut, sections of existing concrete slabs and paving to be removed where excavation or trenching occurs. Extend pavement section to be removed a minimum of 300 mm (12 inches) on each side of widest part of trench excavation and ensure final score lines are approximately parallel unless otherwise indicated. Remove material from Medical Center property.
- E. Lines and Grades:
 - 1. Grades shall be established by competent contractor personnel to conform to elevations indicated on plans within the tolerances herein specified. Grades shall be established to provide a smooth surface, free from irregular surface changes, to direct surface drainage away from the floodwall. Grading shall comply with compaction requirements and grade cross sections, lines, and

- elevations indicated. Where spot grades are indicated the grade shall be established based on interpolation of the elevations between the spot grades while maintaining appropriate transition at structures and paving and uninterrupted drainage flow into inlets.
2. Locations of existing and proposed elevations indicated on plans, except spot elevations, are approximate. Proposed spot elevations and contour lines have been developed utilizing the existing conditions survey and developed contour lines and may be approximate. Contractor is responsible to notify Project Engineer of any differences between existing elevations shown on plans. Notify Project Engineer of any differences between existing or constructed grades, as compared to those shown on the plans.
 3. Subsequent to establishment of lines and grades, Contractor will be responsible for any additional cut and/or fill required to ensure that site is graded to conform to elevations indicated on plans.
 4. Replace and grade topsoil. Finish grading as specified in Section 32 92 19, PLANTING AND SEEDING. Prepare surfaces for hydro-seeding or sod.
- F. 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. Protection of Excavations: Side slopes shall be laid back to a minimum angle or protected by trench boxes in accordance with OSHA regulations. Slope excavations and provide safe access to protect workers, adjacent paving, structures, and utilities.
1. Design of the temporary support of excavation system is the responsibility of the Contractor. The Contractor shall submit an Excavation Plan for approval 21 days prior to starting excavations.
 2. Construction of the support of excavation system shall not interfere with the permanent structure and may begin only after approval of the Excavation Plan by the Project Engineer.
- B. Excavation Dewatering: One primary focus of the project is to excavate all vertical control and expansion joints on the river side down to the top of the floodwall footing for replacement of joint sealants. There may be groundwater present. Control groundwater to 1) protect the

stability of the excavation side slopes and 2) allow for a thorough cleaning/surface preparation/drying of the wall for application of joint sealants. Operate pumping equipment, and/or use other materials, means and equipment as required to keep excavation free of water until approval of permanent work has been received from Project Engineer. Approval by the Project Engineer is also required before installation of the permanent work on the vertical joints. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. Operate dewatering systems or other control measures continuously until construction work and curing cycles are completed. Discharges shall be routed through silt fencing, wattles, or other erosion control devices prior to entering the Medical Center storm drains or the Red River. Open excavations shall be barricaded and protected in accordance with OSHA during non-working hours to protect Medical Center staff and the public.

- C. Subgrade Protection: Protect subgrades from softening, undermining, washout, or damage by rain or water accumulation. Reroute surface water runoff from excavated areas and not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
- D. Blasting: Blasting will not be allowed for this project. Equipment causing ground vibrations will not be allowed for this project. Additionally, the Contractor shall minimize the use of high decibel equipment (ref Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS) in the performance of this project to respect patient comfort.
- E. Site Earthwork: Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil and other materials not classified as rock or unauthorized excavation. Excavation shall be accomplished as required by drawings and specifications. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 25 mm (1 inch). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, complying with OSHA requirements, and for inspections. Remove subgrade materials that are determined by Project Engineer as unsuitable and replace with

acceptable material. If there is a question as to whether material is unsuitable or not, the contractor's material testing lab shall obtain samples of the material, and the materials shall be examined by an independent testing laboratory for soil classification to determine whether it is unsuitable or not. When unsuitable material is encountered and removed, contract price and time will be adjusted in accordance with Articles, DIFFERING SITE CONDITIONS, CHANGES and CHANGES-SUPPLEMENT of the GENERAL CONDITIONS as applicable. Adjustments to be based on volume in cut section only.

1. Site Grading:

- a. Provide a smooth transition between adjacent existing grades and new grades.
- b. Cut out soft spots, fill low spots, and trim high spots to comply with plan grading and required surface tolerances.
- c. Slope grades to direct water away from the floodwall and to prevent ponds from forming where not designed. Finish subgrades to required elevations within the following tolerances:
 - 1) Lawn or Unpaved Areas: Plus or minus 25 mm (1 inch).
 - 2) Walks: Plus or minus 25 mm (1 inch).
 - 3) Pavements: Plus or minus 13 mm (1 inch).

3.3 FILLING AND BACKFILLING:

- A. General: Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation. For fill and backfill, use excavated materials and borrow meeting the criteria specified herein, as applicable. Borrow will be supplied at no additional cost to the Government. Do not use unsuitable or overly wet or dry excavated materials. Do not backfill until waterproofing and or damp proofing has been applied and the work inspected and approved by Project Engineer.
- B. Placing: Place materials in horizontal layers not exceeding 200 mm (8 inches) in loose depth for material compacted by heavy compaction equipment, and not more than 150 mm (6 inches) in loose depth for material compacted by hand-operated tampers and then compacted. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Place no material on surfaces that are muddy, frozen, or contain frost.

- C. Protection: Place and compact backfill using methods that will not damage the floodwall or waterproofing. Do not place soil material having particles greater than 1-inch within 12-inches of the floodwall surface.
- D. Compaction: Compact with approved tamping rollers, sheepsfoot rollers, pneumatic tired rollers, steel wheeled rollers, vibrator compactors, or other approved equipment (hand or mechanized) well suited to soil being compacted. Moisten or aerate material as necessary to provide moisture content that will readily facilitate obtaining specified compaction with equipment used. Backfill adjacent to all types of structures shall be placed and compacted to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials to prevent wedging action or eccentric loading upon or against the structure. Compact soil to not less than the following percentages of maximum dry density, according to ASTM D698 or ASTM D1557. Testing methods shall be as recommended by Contractor's certified testing agency, with tests taken no less than specified in Section 01 45 29 Testing Laboratory Services. The Resident Engineer may request re-tests or additional testing depending on conditions and results.
- E. Borrow Material: Borrow material shall be selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Borrow material shall be selected by the Contractor and as approved by the Project Engineer. Unless otherwise provided in the contract, the Contractor shall obtain from the Owner the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling Unless specifically provided, no borrow shall be obtained within the limits of the project site. Necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon shall be considered related operations to the borrow excavation.

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 and to the grades shown on the plans. 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. Replace topsoil to original thickness and scarify, remove clumps, and prepare as required for hydro-seeding.
- C. Place base course under concrete slabs on grade, tamped, and leveled. Thickness of fill shall be 150 mm (6 inches) unless otherwise shown.
- D. Finish subgrade in a condition acceptable to Project Engineer at least one day in advance of paving operations. Maintain finished subgrade in a smooth and compacted, dry, and unfrozen condition until succeeding operation has been accomplished. Scarify, compact, and grade subgrade prior to further construction when approved compacted subgrade is disturbed by Contractor's subsequent operations or adverse weather.
- E. Grading for Paved Areas: Provide final grades for both subgrade and base course to +/- 6 mm (0.25 inches) of indicated grades.

3.5 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL:

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and construction debris, and legally dispose of it off Medical Center property. Stockpile or spread excess soil as directed by Project Engineer.
- B. Remove from site and dispose of any excess excavated materials after all fill and backfill operations have been completed.

3.6 CLEAN UP:

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 all debris, rubbish, and excess material from Medical Center property. Maintain erosion control devices in place and functional until vegetation has been re-established to the satisfaction of the Project Engineer.

----- E N D -----

SECTION 32 05 23
CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Subbase for concrete pavements.
 2. Curbs, gutters, and combination curbs and gutters.
 3. Pedestrian Pavement: walks, grade slabs, and patios.
 4. Vehicular Pavement: parking lots.

1.2 RELATED REQUIREMENTS

- A. Field Testing: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Subgrade Preparation and Subbase Compaction: Section 31 20 00, EARTHWORK.
- C. Reinforcement - see notes on plans and referenced standard specifications.
- D. Demolition

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American Association of State Highway and Transportation Officials (AASHTO):
1. M147-65-UL-04 - Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
- C. American Concrete Institute (ACI):
1. 305R - Guide to Hot Weather Concreting.
 2. 306R - Guide to Cold Weather Concreting.
- D. ASTM International (ASTM):
1. A615/A615M-16 - Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
 2. A996/A996M-15 - Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
 3. A1064/A1064M-16 - Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 4. C33/C33M-16 - Concrete Aggregates.
 5. C94/C94M-16 - Ready Mixed Concrete.
 6. C143/C143M-15a - Slump of Hydraulic Cement Concrete.
 7. C150/C150M-16 - Portland Cement.

8. C171-16 - Sheet Materials for Curing Concrete.
9. C260/C260M-10a - Air Entraining Admixtures for Concrete.
10. C309-11 - Liquid Membrane Forming Compounds for Curing Concrete.
11. C494/C494M-15a - Chemical Admixtures for Concrete.
12. C618-15 - Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
13. D1751-04(2013)e1 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
14. D5893/D5893M-10 - Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.
15. D6690-15 - Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

1.4 PREINSTALLATION MEETINGS

- A. Conduct preinstallation meeting at project site at least 15 prior to planned placement. Key personnel shall discuss and agree to proposed schedule of work, access to the placement, and necessary traffic controls.

1.5 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Mix design (for each specified type of concrete)
 1. Mix proportions and test results
 2. Aggregate sources and gradations
 3. Cementous materials certifications
 4. Base course aggregate source and gradation
- C. Test reports: Certify products comply with specifications.
 1. Concrete materials.
 2. Select subbase materials.
 3. Field test reports.
- D. Certificates: Certify products comply with specifications.
 1. Expansion joint filler.
 2. Reinforcement.
 3. Curing materials.

1.6 QUALITY ASSURANCE

- A. Test placements at the testing frequency and including plastic and compression cylinder tests as required by this section and Section 01 45 29 - TESTING LABORATORY SERVICES.

1.7 STORAGE AND HANDLING

- A. Store products in neat and organized manner in Staging Area. Do not impact traffic flows and maintain public safety.
- B. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

- A. Hot Weather Concreting Procedures: ACI 305R - most current edition.
- B. Cold Weather Concreting Procedures: ACI 306R - most current edition.
Use non-corrosive, non-chloride accelerator admixture.
Do not use calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions.

1.9 WARRANTY

Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II.
- B. Pozzolans:
 - 1. Fly Ash: ASTM C618, Class C or F including supplementary optional physical requirements.
- C. Coarse Aggregate: ASTM C33/C33M; size to be minus ¾-inch to suit application.
- D. Fine Aggregate: ASTM C33/C33M.
- E. Mixing Water: Fresh, clean, and potable.
- F. Air-Entraining Admixture: ASTM C260/C260M.
- G. Chemical Admixtures: ASTM C494/C494M.
- H. Reinforcing Steel: ASTM A615/A615M or ASTM A996/A996M, Grade 420 (60); deformed.
- I. Welded Wire Fabric: ASTM A1064/A1064M, plain; Grade 385 (56); sized as indicated.
- J. Expansion Joint Filler: ASTM D1751.

K. Sheet Materials for Curing Concrete: ASTM C171.

2.2 BASE COURSE

A. Base Course: as defined in Section 31 20 00, EARTHWORK. Select granular material composed of sand, sand-gravel, crushed stone, crushed or granulated slag, with or without soil binder, or combinations of these materials.

BASE COURSE GRADING REQUIREMENTS							
Sieve Size		Percentage Passing by Mass					
		Grades					
(mm)	(in)	A	B	C	D	E	F
50	2	100	100				
25	1		75-95	100	100	100	100
9.5	3/8	30-65	40-75	50-85	60-100		
4.47	No. 4	25-55	30-60	35-65	50-85	55-100	70-100
2.00	No. 10	15-40	20-45	25-50	40-70	40-100	55-100
0.425	No. 40	8-20	15-30	15-30	25-45	20-50	30-70
0.075	No. 200	2-8	5-20	5-15	5-20	6-20	8-25

B. Other Acceptable Gradations: Materials within three to five percent, plus or minus, of specified gradation, or as approved by the Project Engineer.

2.3 FORMS

A. Forms: Wood, plywood, metal, or other materials, approved by Contracting Officer's Representative, of grade or type suitable to obtain type of finish specified.

1. Plywood: Exterior grade, free of defects and patches on contact surface.
2. Lumber: Sound, grade-marked, S4S stress graded softwood, minimum 50 mm (2 inches) thick, free from warp, twist, loose knots, splits, or other defects.

Form Coating: As approved by Project Engineer.

B. Provide forms suitable in cross-section, depth, and strength to resist springing during depositing and consolidating concrete. Do not use

forms varying from straight line more than 3 mm in 3000 mm (1/8 inch in 10 feet), horizontally and vertically.

2.4 CONCRETE CURING MATERIALS

- A. Concrete curing materials, conform to one of the following:
 - 1. Burlap: Minimum 233 g/sq. m (7 ounces/sq. yd.) dry.
 - 2. Sheet Materials for Curing Concrete: ASTM C171.
 - 3. Curing Compound: ASTM C309, Type 1 clear or Type 1-D ~~liquid~~ membrane forming type, without paraffin or petroleum.

2.5 CONCRETE MIXES

- A. Design concrete mixes according to ASTM C94/C94M, Option C.
- B. Concrete Type: Type B, 4000 psi, air-entrained. See Table I.

TABLE I - CONCRETE TYPES					
Concrete Type	Minimum 28 Day Compressive Strength f'c MPa (psi)	Non-Air-Entrained		Air-Entrained	
		Min. Cement kg/cu. m (lbs./cu. yd.)	Max. Water Cement Ratio	Min. Cement kg/cu. m (lbs./cu. yd.)	Max. Water Cement Ratio
A	35 (5000)1,3	375 (630)	0.45	385 (650)	0.40
B	30 (4000)1,3	325 (550)	0.55	340 (570)	0.50
C	25 (3000)1,3	280 (470)	0.65	290 (490)	0.55
D	25 (3000)1,2	300 (500)	*	310 (520)	*

Footnotes:

1. If trial mixes are used, achieve compressive strength 8.3 MPa (1,200 psi) in excess of f'c. For concrete strengths greater than 35 MPa (5,000 psi), achieve compressive strength 9.7 MPa (1,400 psi) in excess of f'c.
2. For Concrete Exposed to High Sulfate Content Soils: Maximum water cement ratio is 0.44.
3. Laboratory Determined according to ACI 211.1 for normal weight concrete.

- C. Maximum Slump: ASTM C143/C143M. See Table II.

TABLE II - MAXIMUM SLUMP	
APPLICATION	MAXIMUM SLUMP
Curb & Gutter	75 mm (3 inches)
Pedestrian Pavement	75 mm (3 inches)

TABLE II - MAXIMUM SLUMP	
APPLICATION	MAXIMUM SLUMP
Vehicular Pavement	50 mm (2 inches) Machine Finished
	100 mm (4 inches) Hand Finished

2.6 FIBER-REINFORCED CONCRETE

- A. Concrete Mix: Type B (in Table I above), 4000 psi, air-entrained. Mix shall include synthetic macrofiber of a dosage rate to provide a minimum residual strength of 200 psi.
- B. Maximum slump
 - 1. hand finished = 4-inches
 - 2. machine finished = 2-inches
- C. Synthetic Macrofiber: Shall conform to ASTM C1116/C1116M, Type III containing synthetic macrofibers meeting the criteria of ASTM D7508/D7508M for macro-chopped strands or hybrid chopped strands.
- D. Control Joints - tooled or sawcut control joints shall be spaced at approximately 10-foot intervals in each direction and spaced in even increments.
- E. Finish - broom finish in direction of slope.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Demolish and dispose of underlying concrete and asphalt pavement at locations shown on the plans.
- B. Where only concrete topping is required to correct grade deficiencies, scarify the substrate concrete and install reinforcing dowels per plan.
- C. Place and compact base course where shown on plans.
- D. Examine and verify substrate suitability for product installation.
- E. Protect existing construction and completed work from damage. Protect newly-applied cementitious coating during placements.
- F. Prepare, construct, and finish subgrade. See Section 31 20 00, EARTHWORK.
- G. Maintain subgrade in smooth, compacted condition, in conformance with the required section and established grade until the succeeding operation has been accomplished.

3.2 SELECT SUBBASE

A. Placing:

1. Place subbase material on prepared subgrade in uniform layer to required contour and grades, and to maximum 200 mm (8 inches) loose depth.
2. When required compacted thickness exceeds 150 mm (6 inches), place subbase material in equal thickness layers.
3. When subbase elevation is 13 mm (1/2 inch) or more below required grade, excavate subbase minimum 75 mm (3 inches) deep. Place and compact subbase to required grade.

B. Compaction:

1. Perform compaction with approved hand or mechanical equipment well suited to the material being compacted. Protect floodwall from damage. Surface repairs to the completed waterproofing shall be completed by and at the expense of the Contractor.
2. Maintain subbase at optimum moisture content for compaction.
3. Compact each subbase layer to minimum 95 percent of maximum density as specified in Section 31 20 00, EARTHWORK.

C. Protection:

1. Protect subbase from damage until concrete is placed.
2. Reconstruct damaged subbase before placing concrete.

3.3 SETTING FORMS

A. Form Substrate:

1. Compact form substrate to uniformly support forms along entire length.
2. Correct substrate imperfections and variations by cutting, filling, and compacting.

B. Form Setting:

1. Set forms to indicated line and grade with tight joints. Rigidly brace forms preventing movement.
2. Remove forms when removal will not damage concrete and when required for finishing.
3. Clean and oil forms before each use.
4. Correct forms, when required, immediately before placing concrete.

C. Form Tolerances:

1. Variation from Indicated Line: Maximum 6 mm (1/4 inch).

2. Variation from Indicated Grade: Maximum 3 mm in 3000 mm (1/8 inch in 10 feet).

3.2 PLACING REINFORCEMENT

- A. Keep reinforcement clean from contamination preventing concrete bond. Remove loose scale.
- B. Install reinforcement at spacings and splices as shown on drawings.
- C. Support and securely tie reinforcing steel to prevent displacement during concrete placement.
- D. Obtain Project Engineer's reinforcement placement approval before placing concrete.

3.3 JOINTS - GENERAL

- A. Place joints, where shown on Plans.
 1. Conform to details shown.
 2. Install joints perpendicular to finished concrete surface.
- B. Make joints straight and continuous from edge to edge of pavement.

3.4 CONSTRUCTION JOINTS

- A. Locate joints between slabs of vehicular pavement as shown on the Drawings.
- B. Place transverse construction joints of type shown, where indicated, and whenever concrete placement is suspended for more than 30 minutes.
- C. Provide butt-type joint with dowels in curb and gutter at planned joint locations.
- D. Provide keyed joints with tie bars when joint occurs in middle third of planned curb and gutter joint interval.

3.5 CONTRACTION JOINTS

- A. Tool or cut joints to width, depth, and radius edge shown on drawings using grooving tool, jointer, or saw.
- B. Construct joints in curbs and gutters by inserting 3 mm (1/8 inch) steel plates conforming to curb and gutter cross sections.
 1. Keep plates in place until concrete can hold its shape.
- C. Finish joint edges with edging tool.
- D. Score pedestrian pavement with grooving tool or jointer.

3.6 EXPANSION JOINTS

- A. Form expansion joints with expansion joint filler of thickness shown on drawings.

1. Locate joints around perimeter of structures and features abutting site work concrete.
 2. Create complete, uniform separation between structure and site work concrete.
- B. Extend expansion joint material full depth of concrete with top edge of joint filler below finished concrete surface where sealant is indicated on Drawings.
- C. Cut and shape material matching cross section.
- D. Anchor with approved devices to prevent displacing during placing and finishing operations.
- E. Round joint edges with edging tool (1/4-inch radius, typical).

3.7 PLACING CONCRETE - GENERAL

- A. Preparation before Placing Concrete:
1. Protect placement locations and subgrade from frost, per ACI-306.
 2. Obtain Project Engineer's approval.
 3. Remove debris and other foreign material.
 4. Uniformly moisten substrate, without standing water.
- B. Convey concrete from mixer to final location without segregation or loss of ingredients. Deposit concrete to minimize handling.
- C. During placement, consolidate concrete by spading or vibrating to minimize voids, honeycomb, and rock pockets.
1. Vibrate concrete against forms and along joints.
 2. Avoid excess vibration and handling causing segregation.
- D. Place concrete continuously between joints without bulkheads.
- E. Install construction joint in concrete placement suspended for more than 30 minutes.
- F. Replace concrete with cracks, chips, bird baths, and other defects to nearest joints, approved by Contracting Officer's Representative.

3.8 PLACING CONCRETE FOR CURB AND GUTTER, AND PAVEMENT

- A. Place concrete in one-layer conforming to cross section shown on Drawings after consolidating and finishing.
- B. Deposit concrete near joints without disturbing joints. Do not place concrete directly onto joint assemblies.
- C. Strike concrete surface to proper section ready for consolidation.
- D. Consolidate concrete by tamping and spading or with approved mechanical finishing equipment.

- E. Finish concrete surface with wood or metal float.
- F. Construct concrete pads and pavements to the lines and grades shown on the drawings, with sufficient slope to drain away from the floodwall and preventing standing water.

3.11 FORM REMOVAL

- A. Keep forms in place minimum 12 hours after concrete placement. Remove forms without damaging concrete.
- B. Do not use bars or heavy tools against concrete to remove forms. Repair damage concrete found after form removal.

3.12 CONCRETE FINISHING - GENERAL

- A. Follow operation sequence below, unless otherwise indicated on Drawings:
 - 1. Consolidating, floating, striking, troweling, texturing, and joint edging.
- B. Use edging tool with 6 mm (1/4 inch) radius.
- C. Keep finishing equipment and tools clean and suitable for use.

3.13 CONCRETE FINISHING - PEDESTRIAN PAVEMENT

- A. Walks and Grade Slabs:
 - 1. Finish concrete surfaces with metal float, troweled smooth, and finished with a broom moistened with clear water.
 - 2. Finish slab edges and formed transverse joints with edger.
 - 3. Broom surfaces transverse to traffic direction.
 - i. Use brooming to eliminate flat surface produced by edger.
 - ii. Produce uniform corrugations, maximum 1.5 mm (1/16 inch) deep profile.
 - 4. Provide surface uniform in color and free of surface blemishes, form marks, and tool marks.
 - 5. Paving Tolerances:
 - i. Variation from Indicated Plane: Maximum 5 mm in 3000 mm (3/16 inch in 10 feet).
 - ii. Variation from Indicated Thickness: Maximum 6 mm (1/4 inch).

3.14 CONCRETE FINISHING - CURBS AND GUTTERS

- A. Round edges of gutter and top of curb with edging tool.
- B. Gutter and Curb Top:

1. Float surfaces and finish with smooth wood or metal float until true to grade and section and uniform color.
 2. Finish surfaces, while still plastic, longitudinally with bristle brush.
- C. Curb Face:
1. Remove curb form and immediately rub curb face with wood or concrete rubbing block removing blemishes, form marks, and tool marks and providing uniform color.
 2. Brush curb face, while still plastic, matching gutter and curb top.
- D. Curb and Gutter Tolerances: (except at grade changes or curves.)
1. Variation from Indicated Plane and Grade:
 - i. Gutter: Maximum 3 mm in 3000 mm (1/8 inch in 10 feet).
 - ii. Curb Top and Face: Maximum 6 mm in 3000 mm (1/4 inch in 10 feet).
- E. Replace curbs and gutters within joint boundary when curbs and gutters exceed specified tolerances.
- F. Correct depressions causing standing water.

3.15 CONCRETE CURING

- A. Concrete Protection:
1. Protect unhardened concrete from rain and flowing water.
 2. Provide sufficient curing and protection materials available and ready for use before concrete placement begins.
 3. Protect concrete to prevent pavement cracking from ambient temperature changes during curing period.
 - i. Replace pavement damaged by curing method allowing concrete cracking.
 - ii. Employ another curing method as directed by Contracting Officer's Representative.
- B. Cure concrete for minimum 7 days by one of the following methods appropriate to weather conditions preventing moisture loss and rapid temperature change:
1. Sheet Materials:
 - i. Wet exposed concrete surface with fine water spray and cover with sheet materials.
 - ii. Overlap sheets minimum 300 mm (12 inches).
 - iii. Securely anchor sheet materials preventing displacement.
 2. Curing Compound:

- i. Protect joints indicated to receive sealants preventing contamination from curing compound.
- ii. Insert moistened paper or fiber rope into joint or cover joint with waterproof paper.
- iii. Apply curing compound before concrete dries.
- iv. Apply curing compound in two coats at right angles to each other.
- v. Application Rate: Maximum 5 sq. m/L (200 sq. ft./gallon), both coats.
- vi. Immediately reapply curing compound to surfaces damaged during curing period.

3.16 CONCRETE PROTECTIVE COATING

- A. Apply protective coating of linseed oil mixture to exposed-to-view concrete surfaces, drainage structures, and features that project through, into, or against concrete exterior improvements to protect the concrete against deicing materials.
- B. Complete backfilling and curing operation before applying protective coating.
- C. Dry and thoroughly clean concrete before each application.
- D. Apply two coats, with maximum coverage of 11 sq. m/L (50 sq. yds./gal.); first coat, and maximum 16 sq. m/L (70 sq. yds./gal.); second coat, except apply commercially prepared mixture according to manufacturer's instructions.
- E. Protect coated surfaces from vehicular and pedestrian traffic until dry.
- F. Do not heat protective coating, and do not expose protective coating to open flame, sparks, or fire adjacent to open containers or applicators. Do not apply material at temperatures lower than 10 degrees C (50 degrees F).

3.17 FIELD QUALITY CONTROL

- A. Field Tests: Shall be performed by testing laboratory specified in Section 01 45 29, TESTING LABORATORY SERVICES.
 1. Compaction.
 - i. Pavement subgrade.
 - ii. Curb, gutter, and sidewalk.
 2. Concrete:

- i. Delivery samples.
- ii. Field samples.
- iii. Compression cylinder tests

3.18 CLEANING

- G. After completing curing:
 - 1. Remove sheet curing materials if applicable.
 - 2. Sweep concrete clean, removing foreign matter from the joints.
 - 3. Prepare and Seal joints as specified and per manufacturer's instructions.

3.19 PROTECTION

- A. Protect exterior improvements from traffic and construction operations.
 - 4. Prohibit traffic on paving for minimum seven days after placement, or longer as directed by Project Engineer.
- B. Repair damage.
 - 1. Replace concrete containing excessive cracking, fractures, spalling, and other defects within joint boundary, when directed by Project Engineer, and at no additional cost to the Government.

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SECTION 32 92 19
SEEDING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

A. ASTM INTERNATIONAL (ASTM):

1. ASTM C602 (2019) Agricultural Liming Materials
2. ASTM D4427 (2018) Standard Classification of Peat Samples by Laboratory Testing
3. ASTM D4972 (2018) Standard Test Methods for pH of Soils

B. U.S. DEPARTMENT OF AGRICULTURE (USDA)

C. AMS Seed Act (1940; R 1988; R 1998) Federal Seed Act

D. DOA SSIR 42 (1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

E. North Dakota Seed Law

1.2 DEFINITIONS

- A. Stand of Turf Seed: 95 percent ground cover of the established species.

1.3 RELATED REQUIREMENTS

- A. Section 31 20 00 EARTHWORK, Section 32 92 23 SODDING, applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.4 SUBMITTALS

- A. Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section
- B. 01 33 23 SUBMITTAL PROCEDURES: SD-03 Product Data

1. Fertilizer:
Include physical characteristics, and recommendations.
SD-06 Test Reports
2. Topsoil Composition Tests (reports and recommendations).
3. SD-07 Certificates
4. State Certification and Approval for Seed; SD-08 Manufacturer's Instructions
5. Erosion Control Materials

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery
 1. Seed Protection: Protect from drying out and from contamination during delivery, on-site storage, and handling.
- B. Fertilizer Delivery
 1. Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.
- C. Storage
 1. Seed, Fertilizer Storage Store in cool, dry locations away from contaminants.
- D. Topsoil
 1. Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.
- E. Handling
 1. Do not drop or dump materials from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

- A. Restrictions
 1. Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 TIME LIMITATIONS

A. Seed

1. Apply seed within twenty-four hours after seed bed preparation.
2. Planting may be done April 15th through October 15th

PART 2 PRODUCTS

2.1 SEED

A. Classification

1. Provide seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weed seed content, and inert material. Label in conformance with AMS Seed Act and applicable the North Dakota Seed Law seed laws. Wet, moldy, or otherwise damaged seed will be rejected. Field mixes will be acceptable when field mix is performed on site in the presence of the Contracting Officer.

B. Seed Purity

Botanical Name	Common Name	Minimum Percent Pure Seed	Minimum Percent Germination and Hard Seed	Percent by weight
Poa pratensis	Kentucky Bluegrass	90%	85%	+/-5%
Festuca rubra	Creeping Red Fescue	90%	85%	+/-5%
Lolium perenne L.	Fine Leaf Perennial Ryegrass	95%	90%	+/-5%

C. Seed Mixture by Weight

Common Name	Percent (by Weight)
Kentucky Bluegrass	60%
Creeping Red Fescue	10%
Fine Leaf Perennial Ryegrass	30%

2.2 TOPSOIL

- A. On-Site Topsoil
 - 1. Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil in paragraph COMPOSITION. When available topsoil must be existing surface soil stripped and stockpiled on-site in accordance with Section 31 20 00 EARTHWORK.
- B. Off-Site Topsoil
 - 1. Conform to requirements specified in paragraph COMPOSITION. Additional topsoil must be furnished by the Contractor.
- C. Composition
 - 1. Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 19 mm 3/4 inch, with maximum 3 percent retained on 6 mm 1/4 inch screen. The pH must be tested in accordance with ASTM D4972. Topsoil must be free of sticks, stones, roots, and other debris and objectionable materials.

2.3 SOIL CONDITIONERS

- A. Add conditioners to topsoil as required to bring into compliance with "composition" standard for topsoil as specified herein.
- B. Peat
 - 1. Natural product of [peat moss] derived from a freshwater site and conforming to ASTM D4427. Shred and granulate peat to pass a 12.5 mm 1/2 inch mesh screen and condition in storage pile for minimum 6 months after excavation.
- C. Perlite Horticultural grade.

2.4 FERTILIZER

- A. Hydroseeding Fertilizer
 - 1. Controlled release fertilizer, to use with hydroseeding and composed of pills coated with plastic resin to provide a continuous release of nutrients for at least 6 months and containing the following minimum percentages, by weight, of plant food nutrients.
 - 2. Fertilizer shall be 10-10-10 at an application rate of 90 pounds per acre (2 pounds per 1,000 sq. Ft.). Fertilizer shall contain slow release nitrogen in the form of

inorganic chemicals amounting to at least 50% of the available nitrogen specified. Fertilizer shall conform to all State and Federal regulations.

3. The seed, water and mulch shall be combined and kept under constant agitation so that a slurry of seed, mulch (if required) and fertilizer and water can be applied hydraulically to the areas to be seed. The equipment used will provide sufficient agitation to insure a uniform mixture of the ingredients throughout the application of each given quantity of slurry mixture. Uniform coverage and seeding ratios shall be obtained and spot checks of seed distribution may be made by random placing of paper plates on areas to be seeded. After seeding, comparison of actual count of seed on the plates will verify the uniformity and application rate of the seeding distribution. Hydroseeding will not be allowed after September 15th.

2.5 MULCH

- A. Mulch must be free from noxious weeds, mold, and other deleterious materials.
- B. Straw
 1. Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw must contain no fertile seed.
- C. Hay
 1. Air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Hay must be sterile, containing no fertile seed.
- D. Wood Cellulose Fiber Mulch
 1. Use recovered materials of either paper-based (100 percent post-consumer content) or wood-based (100 percent total recovered content) hydraulic mulch. Processed to contain no growth or germination-inhibiting factors and dyed an appropriate color to facilitate visual metering of materials application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 5.5 to 8.2. Use with hydraulic application of grass seed and fertilizer.

2.6 WATER

- A. Source of water must be approved by Contracting Officer and of suitable quality for irrigation, containing no elements toxic to plant life.

PART 3 EXECUTION

3.1 PREPARATION

A. EXTENT OF WORK:

1. Provide soil preparation prior to planting (including soil conditioners as required), fertilizing, seeding, and surface topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

B. Topsoil:

1. Provide 4 inches of on-site topsoil to meet indicated finish grade. After areas have been brought to indicated finish grade, incorporate fertilizer into soil a minimum depth of 4 inches by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.2 SEEDING

- A. Seed Application Seasons and Conditions Immediately before seeding, restore soil to proper grade. Do not seed when ground is muddy, frozen, snow covered, or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Contracting Officer stating the special conditions and proposed variance.

B. Seed Application Method: Seeding method must be hydroseeding.

1. Hydroseeding

- a. First, mix water and fiber. Wood cellulose fiber, paper fiber, or recycled paper must be applied as part of the hydroseeding operation. Fiber must be added at 1,000 pounds, dry weight, per acre. Then add and mix seed and fertilizer to produce a homogeneous slurry. Seed must be mixed to ensure broadcasting at the rate of 3 pounds per 1000 square feet. When hydraulically sprayed on the ground, material must form a blotter like cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch. Do not seed areas which are in excess of what can be mulched that same day.

Roll seeded area with a roller not exceeding 112 pounds.

C. Mulching

1. Hay or Straw Mulch:

- a. Hay or straw mulch must be spread uniformly at the rate of 2 tons per acre. Mulch must be spread by hand, blower-type mulch spreader, or other approved method. Mulching must be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch must not be bunched or clumped. Sunlight must not be completely excluded from penetrating to the ground surface. All areas installed with seed must be mulched on the same day as the seeding. Mulch must be anchored immediately following spreading.

2. Mechanical Anchor

- a. Mechanical anchor must be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3. Asphalt Adhesive Tackifier:

- a. Asphalt adhesive tackifier must be sprayed at a rate between 666 to 866 liters per hectare 10 to 13 gallons per 1000 square feet. Sunlight must not be completely excluded from penetrating to the ground surface.

4. Non-Asphaltic Tackifier:

- a. Hydrophilic colloid must be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture must be applied over the area.

5. Asphalt Adhesive Coated Mulch:

- a. Hay or straw mulch may be spread simultaneously with asphalt adhesive applied at a rate between 666 to 866 liters per hectare 10 to 13 gallons per 1000 square feet, using power mulch equipment which must be equipped with suitable asphalt pump and nozzle. The adhesive-coated mulch must be applied evenly over the surface. Sunlight must not be completely excluded from penetrating to the ground surface.

3.3 Rolling

- A. Immediately after seeding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90] pounds for each foot of roller width. If seeding is performed with cultipacker-type seeder or by hydroseeding, rolling may be eliminated.
 - 1. Erosion Control Material:
 - a. Install in accordance with manufacturer's instructions, where indicated or as directed by the Contracting Officer.
 - 2. Watering
 - a. Apply water with a fine spray to areas seeded. Apply water at a rate sufficient to ensure thorough wetting of soil to a depth of 2-3inches without run off. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.3 PROTECTION OF TURF AREAS

- A. Immediately after turfing, protect area against traffic and other use with stakes and strings around area periphery. Set string height to 48 inches and space stakes at 96 inches.

3.4 OVERSEEDING

- A. Apply seed in accordance with and at rates indicated in applicable portions of paragraph SEED APPLICATION METHOD.

3.5 RESTORATION

- A. Restore to original condition existing turf areas which have been damaged during turf installation operations at the Contractor's expense. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

3.6 MAINTENANCE AND WARRANTY

- A. Provide maintenance of seeded areas for three months from Date of Substantial Completion.
- B. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

- C. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- D. Immediately reseed areas that show bare spots.
- E. Protect seeded areas with warning signs during maintenance period.
- F. Protect seeded areas with warning signs during maintenance period.
- G. Protect seeded areas with warning signs during maintenance period.

-- End of Section --

SECTION 32 92 23
SODDING

PART 1 GENERAL

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
- B. ASTM INTERNATIONAL (ASTM)
 - a. ASTM C602 (2019) Agricultural Liming Materials
 - b. ASTM D4427 (2018) Standard Classification of Peat Samples by Laboratory Testing
 - c. ASTM D4972 (2018) Standard Test Methods for pH of Soils
- C. TURFGRASS PRODUCERS INTERNATIONAL (TPI)
- D. TPI GSS (1995) Guideline Specifications to Turfgrass Sodding
- E. U.S. DEPARTMENT OF AGRICULTURE (USDA)
- F. DOA SSIR 42 (1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.1 DEFINITIONS

- A. Stand of Turf
 - 1. 100 percent ground cover of the established species.

1.2 RELATED REQUIREMENTS

- A. Section 31 00 00 EARTHWORK, Section 32 92 19 SEEDING, applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.3 SUBMITTALS

- A. Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval. for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES: SD-03 Product Data
- B. Fertilizer: Include physical characteristics, and recommendations.
- C. SD-06 Test Reports: Topsoil composition tests (reports and recommendations).
- D. SD-07 Certificates
- E. Nursery or Sod farm certification for sods. Indicate type of sod in accordance with TPI GSS.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery

1. Sod Protection: Protect from drying out and from contamination during delivery, on-site storage, and handling.
2. Fertilizer Delivery: Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.

B. Storage:

1. Sod Storage: Lightly sprinkle with water, cover with moist burlap, straw, or other approved covering; and protect from exposure to wind and direct sunlight until planted. Provide covering that will allow air to circulate so that internal heat will not develop. Do not store sod longer than 24 hours. Do not store directly on concrete or bituminous surfaces.
2. Topsoil: Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.

C. Handling

1. Do not drop or dump materials from vehicles.

1.5 TIME RESTRICTIONS AND PLANTING CONDITIONS

A. Restrictions

1. Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 TIME LIMITATIONS

A. Sod

1. Place sod a maximum of thirty-six hours after initial harvesting, in accordance with TPI GSS as modified herein.

PART 2 PRODUCTS

2.1 SODS

A. Classification:

1. Nursery grown, certified as classified in the TPI GSS. Machine cut sod at a uniform thickness of 3/4 inch within a tolerance of 1/4 inch, excluding top growth and thatch. Each individual sod piece shall be strong enough to support its own weight when lifted by the ends. Broken pads, irregularly shaped pieces, and torn or uneven ends will be rejected. Wood pegs and wire staples for anchorage shall be as recommended by sod supplier.
2. Purity: Sod species shall be genetically pure, free of weeds, pests, and disease.
3. Planting Dates: Lay sod from April 15th to July 15th for warm season spring planting and from August 15th to October 15th for cool season fall planting.
4. Composition:
 - a. Proportion: Proportion native grass species meeting the following requirements:
 - i. Commercially produced from native grass and flower seed mixtures per 32 92 19 SEEDING, and as shown on the plans.
 - ii. Seeded and grown in turf reinforcement mats or natural organic mats for at least 30 days before delivery and installation.

2.2 TOPSOIL

A. On-Site Topsoil

1. Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil in paragraph entitled "Composition." When available topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 31 20 00 EARTHWORK.

B. Composition:

1. Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 19 mm 3/4 inch, with maximum 3 percent retained on 6 mm 1/4 inch screen. The pH shall be tested in accordance with ASTM D4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials

2.4 SOIL CONDITIONERS

- A. Add conditioners to topsoil as required to bring into compliance with "composition" standard for topsoil as specified herein.
- B. Lime: Commercial grade hydrate limestone containing a calcium carbonate equivalent (C.C.E.) as specified in ASTM C602 of not less than 10 percent.
- C. Aluminum Sulfate Commercial grade.
- D. Sulfur: 100 percent elemental
- E. Iron: 100 percent elemental
- F. Peat: Natural product of [peat moss] derived from a freshwater site and conforming to [ASTM D4427] [as modified herein]. Shred and

- granulate peat to pass a 1/2 inch mesh screen and condition in storage pile for minimum 6 months after excavation.
- G. Sand: Clean and free of materials harmful to plants.
 - H. Perlite Horticultural grade.
 - I. Composted Derivatives: Ground bark, nitrolized sawdust, humus or other green wood waste material free of stones, sticks, and soil stabilized with nitrogen and having the following properties:
 - 1. Particle Size: Minimum percent by weight passing:
 - No. 4 mesh screen 95
 - No. 8 mesh screen 80
 - 2. Nitrogen Content: Minimum percent based on dry weight:
 - Fir Sawdust 0.7
 - Fir or Pine Bark 1.0
 - J. Gypsum: Coarsely ground gypsum comprised of calcium sulfate dihydrate 91 percent, calcium 22 percent, sulfur 17 percent; minimum 96 percent passing through 20 mesh screen, 100 percent passing thru 16 mesh screens.
 - K. Calcined Clay: Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.5 WATER

- A. Source of water shall be approved by Contracting Officer and of suitable quality for irrigation containing no element toxic to plant life.

PART 3 EXECUTION

3.1 PREPARATION

- A. Extent Of Work:
 - 1. Provide soil preparation (including soil conditioners), fertilizing and sodding of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.
- B. Soil Preparation
 - 1. Provide 4 inches of top soil on-site to meet indicated finish grade. After areas have been brought to indicated finish grade, incorporate [fertilizer] [pH adjusters] [soil conditioners] into

soil a minimum depth of 4 inches by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.2 SODDING

A. Finished Grade and Topsoil

1. Prior to the commencement of the sodding operation, the Contractor shall verify that finished grades are as indicated on drawings; the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 31 20 00 EARTHWORK.
2. The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove from the surface debris and stones over a minimum 5/8 inch in any dimension.
3. Placing: Place sod a maximum of 36 hours after initial harvesting, in accordance with TPI GSS as modified herein.
4. Sodding Slopes and Ditches: For slopes 2:1 and greater, lay sod with long edge perpendicular to the contour. For V-ditches and flat-bottomed ditches, lay sod with long edge perpendicular to flow of water. Anchor each piece of sod with wood pegs or wire staples maximum 2 feet on center. On slope areas, start sodding at bottom of the slope.
5. Finishing: After completing sodding, blend edges of sodded area smoothly into surrounding area. Air pockets shall be eliminated and a true and even surface shall be provided. Frayed edges shall be trimmed, and holes and missing corners shall be patched with sod.

B. Rolling: Immediately after sodding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90 pounds for each foot of roller width.

C. Watering: Start watering areas sodded as required by daily temperature and wind conditions. Apply water at a rate sufficient to ensure thorough wetting of soil to minimum depth of 6 inches. Run-off, puddling, and wilting shall be prevented. Unless otherwise directed, watering trucks shall not be driven over turf areas. Watering of other adjacent areas or plant material shall be prevented.

3.3 PROTECTION OF TURF AREAS

A. Immediately after turfing, protect area against traffic and other use.

B. Dethatching: Upon completion of aerating operation and Contracting Officer's approval to proceed, dethatch turf areas indicated, by approved device, to a depth of 1/4 inch below existing soil level, to reduce thatch build-up, grain, and surface compaction. Keep clean

at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work is complete. Remove all debris generated during this operation off site.

3.4 RESTORATION

A. Restore to original condition existing turf areas which have been damaged during turf installation operations. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

3.4 MAINTENANCE AND WARRANTY

A. Provide maintenance of sodded areas for three months from Date of Substantial Completion.

-- End of Section --