

TECHNICAL SPECIFICATIONS FOR

# OREGON DEPARTMENT OF TRANSPORTATION FANNO CREEK STOCKPILE SITE NEW SALT STORAGE SHED

PROJECT ADDRESS:

**TAX LOTS 1S127AA00 100, 200, 300  
BEAVERTON, OREGON 97008**

8/18/20



EXPIRES: 12/31/21

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## SECTION 01 00 00 – SPECIAL CONDITIONS

### 1. GENERAL

#### 1.01 WARRANTIES

- A. Warranties and guarantees are for a period of one year from date of final acceptance unless noted otherwise.

#### 1.02 RECORD DRAWINGS

- A. Furnish Construction Project Manager one copy of "as-built" Drawings. In addition to finish copies required, one work set shall be maintained on project site at all times and shall be subject to inspection by Construction Project Manager. Before delivering finished sets to Construction Project Manager, accurately transpose information from work set showing all deviations from Contract Drawings. Finish copies shall be clean, accurate, easy to read, devoid of dirt, stains, smudges, etc. Contractor is cautioned particularly to indicate by dimension all permanently concealed items. No work may be permanently concealed until it is satisfactorily recorded on work set and evidence of same is presented to ODOT Construction Project Manager.

#### 1.03 CLEAN-UP

- A. In addition to removing rubbish and leaving the facility clean, General Contractor shall clean all surfaces, replace any broken components, clean hardware and fixtures, remove stains, spots, labels and marks from all surfaces.

#### 1.04 SPECIFICATION FORMAT

- A. Division of these Specifications into trade headings conforms roughly to customary practice and to the CSI format. They are used for convenience and identification and may not be consecutive. Divisions included are listed in the index. Contractor shall check his copies of Specifications with index to be sure they are complete. Paragraph numbering may also not be consecutive.

#### 1.05 TERMS

- A. "APPROVED" as used herein means "approved by ODOT Construction Project Manager".
- B. "FOR APPROVAL" means "for Construction Project Manager's approval."
- C. "SELECTED" means "selected by Construction Project Manager."
- D. "PROVIDE" means "furnish and install."
- E. Where words "or approved" are used, Construction Project Manager is sole judge of quality and suitability of proposed alternate or substitution.
- F. "CONSTRUCTION PROJECT MANAGER" refers to the individual selected by ODOT to manage the project.
- G. "PROJECT COORDINATOR" refers to the on-site individual (if) selected by ODOT to be the local liaison with the contractor.
- H. "INSTALL" means "furnish and install."

1.06 MEASUREMENTS

- A. Verify all measurements, dimension and elevations before ordering any material or doing any work. Notify Construction Project Manager of any discrepancies.

1.07 NOT IN CONTRACT

- A. Items noted as "N.I.C." are not in Contract and will be furnished and installed by Owner or others.

1.08 TEMPORARY BARRIERS

- A. Provide and maintain construction barriers bounding the construction/demolition areas. Remove as soon as construction progress allows.

1.09 EXCESSIVE NOISE

- A. All equipment shall have muffling devices in good working order at all times. Equipment not so equipped will be removed from site.
- B. Cooperate with Owner in locating high noise producing equipment in areas least offensive and/or provide sound enclosure or shielding to dampen sound.

1.10 PARKING, STAGING AND MATERIAL STORAGE

- A. Coordinate with Owner for staging area and parking spaces during construction.

1.11 REFERENCED STANDARDS

- A. Where standards are referenced in this specification, they shall be the most current edition or as required by code.

END OF SECTION

## SECTION 01 11 00 - SUMMARY OF WORK

### 1. GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. Work covered by this contract includes furnishing of all labor, materials, equipment and permits for construction of a pre-engineered metal storage building consisting of excavation, backfill, concrete, structure, doors, finishes, grading, paving, utilities, and miscellaneous related items as shown on the drawings and included in these specifications.
- B. The project is located at Tax Lots 1S127AA00 100,200, 300, Beaverton, Oregon 97008.

#### 1.02 CONTRACT DOCUMENTS

- A. The Contract Drawings indicate the location of facilities, equipment, etc. The Contractor shall verify the location of all items to be furnished, installed, or connected prior to installation of the items.
- B. The Drawings are not to be scaled. Locations of existing features shall be determined at the site after field measurements have been taken.

#### 1.03 TIME OF COMMENCEMENT AND COMPLETION

- A. Notice to proceed: A written notice to proceed will be provided by the Owner to the Contractor as indicated in the invitation to bid. The Contractor shall begin the work upon receipt of the notice to proceed. Notwithstanding any other provision of the contract, the Owner shall not be obligated to accept or to pay for any work furnished by the Contractor prior to delivery of notice to proceed, whether or not the Owner has knowledge of the furnishing of work.
- B. Completion of all items of work shall be within the time limits indicated in the invitation to bid.

#### 1.04 CONTRACTOR'S COPIES OF CONTRACT DOCUMENTS

- A. Contractor will be supplied by the Owner with one (1) set of full-size drawings, (1) set of reduced drawings and one set of specifications. At least one complete set of contract documents, including one full-size set of drawings shall be kept at the site of construction in good condition, and at all times available to the Construction Project Manager.

#### 1.05 COORDINATION OF WORK WITH OWNER AND OTHERS

- A. Owner will occupy premises during construction period for the conduct of Owner's normal operations.
- B. Contractor shall coordinate his work with the Owner during construction operations to minimize conflicts and to facilitate Owner's use of facilities.
- C. Schedule work to maintain Owner's continuous operations.
- D. Move any stored products, which are under Contractor's control, when necessary and when directed, and which interfere with owner's operations.

1.06 INFORMATION CONCERNING CONDITIONS

- A. Contractor shall make his own deductions and conclusions as to the nature of the materials to be excavated, the difficulties which may arise from subsurface conditions, and of doing any other work affected by the subsurface conditions and shall accept full responsibility. A geotechnical report is available to the contractor.
- B. Bidders shall satisfy themselves by personal examination and by such other means as they desire with respect to actual conditions in regard to the nature of the ground and subsoil water and in regard to the location of existing groundwater or surface structures. Unforeseen conditions shall not constitute a claim for additional payment under the terms of the contract or constitute a basis of cancellation thereof.

1.07 PERMITS AND FEES

- A. The acquisition of all permits required, and payment of all fees, inspection charges and other similar costs shall be the responsibility of the Contractor. The State has applied for plan review with the Building Official. Contractor shall pay for and obtain a building permit for the project as noted above. The Contractor shall be responsible for obtaining and paying for all other construction and trades permits as may be required by Federal, State and Local Officials.

1.08 NOTICE TO UTILITY COMPANIES AND AGENCIES

- A. Contractor shall notify all utility companies and public agencies affected by the construction 48 hours prior to excavation.

AGENCY/UTILITY

One Call System

TELEPHONE

(800)332-2344

The Contractor, in locating and protecting underground utilities, must comply with the regulations of ORS 757.541 to 757.571.

- B. Contractor shall be responsible to mark the location, and if necessary or prudent, to expose the existing utilities prior to construction of the facilities contained in this contract. If in the course of the work required hereunder, it is found necessary to relocate, revise or repair publicly or privately owned utility system, the said relocations, repairs or revisions shall be accomplished by the Contractor or an employee of the utility company.

1.09 EXISTING UTILITIES

- A. In general, the locations of existing underground utilities are indicated on the drawings where known. Information shown has been obtained from available records and field surveys. The Owner does not guarantee the accuracy or completeness of this information, and it is to be understood that other above ground or underground facilities not shown on the drawings are likely to be encountered during the course of the work.
- B. Existing utilities, whether shown on the drawings or not, shall be protected as may be necessary by the Contractor in a manner satisfactory to owners and operators of the utilities and to the Owner. No utilities shall be removed without notifying owners and operators of the utility.

1.10 RESTORATION OF STRUCTURES AND SURFACES

- A. Structures: The Contractor shall remove such existing structures as may be necessary for the performance of the work and, if required, shall rebuild the structures thus removed in as good a condition as found with minimum requirements as herein specified. Contractor shall also repair all existing structures which may be damaged as a result of the work under this contract.

- B. Curbs, gutters, driveways, sidewalks and similar structures that are broken or damaged by the installation of the work shall be reconstructed by the Contractor. Reconstruction shall be of the same kind of material with the same finish and in not less than the same dimensions as the original work. Concrete shall be as specified herein unless otherwise indicated. Repairs shall be made by removing and replacing the entire portions between joints or scores and not merely refinishing any damaged part. Work shall match the appearance of the existing improvements as nearly as possible. Repairs shall meet all current code requirements of the jurisdiction having authority.
- C. Cultivated areas and other surface improvements: Cultivated areas, either landscaping or lawns, and other surface improvements which are damaged by actions of the Contractor shall be restored as nearly as possible to their original condition.

#### 1.11 CONSTRUCTION STAKING

- A. Construction staking shall be provided by the Contractor.
- B. Horizontal control shall be obtained by measurement off existing structures as shown on the drawings.

#### 1.12 TEMPORARY UTILITIES

- A. Contractor shall make arrangements for utility requirements during construction in accordance with this specification.

#### 1.13 EXCESS MATERIALS AND DEBRIS

- A. Excess materials and debris resulting from clearing and grubbing, demolition, excavation, and any of the Contractor's activities, shall be removed from the project site and disposed of at the Contractor's expense, unless otherwise noted on drawings. Disposal shall be made in accordance with applicable laws and regulations.
- B. Excess materials and debris shall not be stockpiled or placed on public or private property except with the express written permission of the property owner. Contractor shall be responsible for obtaining all necessary permits and for paying all fees required for stockpiling or disposal of excess material and debris.

#### 1.14 TESTING

- A. ODOT will provide testing services through a laboratory as noted on plans and specifications. Contractor shall coordinate with testing laboratory for scheduling and field work. Cost of testing is not included in construction contract. Testing will be paid for by ODOT.

END OF SECTION



## SECTION 01 31 13 – PROJECT COORDINATION

### 1. GENERAL

#### 1.01 DESCRIPTION

- A. The Contractor shall coordinate the efforts of all suppliers and Subcontractors and shall maintain orderly progress of the work, prevent duplication of effort and ensure proper sequence of operations.
- B. The Contractor shall coordinate with the Owner during the duration of the project.
  - 1. All technical design questions shall be referred to Diana Avila, Facilities Engineer at (503) 986-5789; or Luis Umana, Construction Project Manager, at (503) 428-0933.
  - 2. The Contractor will be responsible for keeping the Construction Project Manager informed of all activity throughout the project identified in this Contract.

#### 1.02 QUALITY ASSURANCE

- A. Throughout the progress of the work, the Contractor shall provide all necessary personnel thoroughly familiar with the Specifications and Drawings, completely trained and experienced in the necessary skills, who shall be present at the site and direct all work performed.
- B. Conditions of Surfaces: Surfaces previously prepared or installed by another trade shall be inspected carefully before applying subsequent materials or finishes. If an unsatisfactory condition to that finish exists, notify the General Contractor and Construction Project Manager in writing, immediately. Otherwise, assume full responsibility for resulting appearance, condition and acceptance of finished surface.
- C. Covering Up: No Contractor or Subcontractor shall cover up or conceal work of other Contractor/Subcontractor until same has been inspected and/or approved.

#### 1.03 SUBMITTALS

- A. Submit the names of Contractor's and all Subcontractor's representatives who shall direct the work.

### 2. PRODUCTS (N/ A)

### 3. EXECUTION

#### 3.01 COORDINATION

- A. Contractor shall verify and confirm all dimensions and conditions shown or implied on the Drawings and Specifications. Notify Construction Project Manager of discrepancies prior to start of work.
- B. Verify sizes of custom manufactured items with actual job conditions before submitting Shop Drawings or commencing fabrication.
- C. Drawings are generally diagrammatic, and unless specifically dimensioned, the locations of fixtures, equipment, and the routing of piping are approximate and shall not be scaled from the drawings. It is the responsibility of the Contractor to coordinate work of his Subcontractors.

Contractor shall require that various Subcontractors carefully examine and familiarize themselves with the drawings covering work of other trades, and that they consult frequently with all other trades so that work may be properly coordinated. The diagrammatic nature of the drawings and the job conditions will not always permit installation in the location shown. When this situation occurs, it shall be brought to the Construction Project Manager's attention. Contractor shall remove and relocate such items at his own expense if so directed by the Construction Project Manager.

END OF SECTION

## SECTION 01 31 20 - PROJECT MEETINGS

### 1. GENERAL

#### 1.01 GENERAL

- A. Project meetings will be held to accomplish the following:
  - 1. Coordinate the work of the project.
  - 2. Establish communication relationship between the Contractor and Construction Project Manager.
  - 3. Establish sound working procedures.
  - 4. Review job progress, quality of work and approval and delivery of materials.
  - 5. Expedite the work to completion within the scheduled time limit.

#### 1.02 PRECONSTRUCTION CONFERENCE

- A. The Construction Project Manager will call the preconstruction conference at the site of the work. He will notify all parties concerned of the time and place of the meeting.
- B. The meeting will be conducted by the Construction Project Manager. In order to ensure completeness, uniformity and orderly procedures, an agenda for the meeting may be developed.
- C. The Contractor shall submit a schedule showing his proposed order of work and indicating anticipated beginning time and completion time of the major items of work.

#### 1.03 PROGRESS MEETINGS

- A. Meetings shall be held at the jobsite on a weekly basis at the Construction Project Manager's discretion.
- B. The meeting will be used for coordination between Contractor, Owner, Sub-contractors, Suppliers and any other interested parties.
- C. The Contractor shall submit an updated schedule showing any deviations from previously submitted schedules.

END OF SECTION

## SECTION 01 33 00 - SUBMITTALS

### 1. GENERAL

#### 1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Other provisions pertaining to submittals are included in the General Conditions, the drawings and in the various sections of the specifications. Additionally, the Construction Project Manager may request submittals for any project component to verify compliance with project requirements.

#### 1.02 SUBMITTAL REQUIREMENTS

- A. General: All submittals shall be identified by project title, and number and shall include Contractor's name, date and revision date. In addition, shop drawings, product data and samples shall include names of subcontractor and supplier, applicable specification section number and Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with contract documents.
- B. Shop drawings: Submit electronic copy of each shop drawing required by the specifications. Show the information, dimensions, connections and other details necessary to ensure that the shop drawings accurately interpret the contract documents. Show adjoining work in such detail as required to indicate proper connections. Where adjoining connected work requires shop drawings or product data, submit such information for review at the same time so that connections can be accurately checked.
- C. Product data: Submit electronic copy of each item of product data required by the specifications. Modify product data by deleting information which is not applicable to the project or by marking each copy to identify pertinent products. Supplement standard information, if necessary, to provide additional information applicable to project.
- D. Effects of Review of Contractor's Submittals: Review of Drawings, method of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Construction Project Manager on behalf of the Owner, and the Contractor shall not have claim under the Contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed. A mark of "APPROVED" or "APPROVED AS NOTED" shall mean that the Construction Project Manager has no objection to the Contractor, upon the Contractor's own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

#### 1.03 SCHEDULE

- A. The Contractor shall provide the following schedules and submit them not later than 5 days after notice to proceed or as noted in the Bid Documents.
  - 1. Contractor's construction schedule
  - 2. Contractor's list of subcontractors
  - 3. The Contractor's list of subcontractors and schedule of submittals shall be based upon the Contractor's progress schedule so that the work can progress in accordance with the approved progress schedule.
  - 4. Contractor's Schedule of Values.

- B. The Contractor shall immediately advise the Construction Project Manager of any proposed changes in his submitted schedules. If, in the opinion of the Construction Project Manager, any submitted schedule is inadequate to ensure completion of work within the time limit, or is otherwise not in accordance with the specification, or if the work is not being adequately or properly prosecuted in any respect, the Construction Project Manager shall have the right to require the Contractor to submit new schedules providing for proper and timely completion of the work.
  
- C. During the term of this Contract, the Construction Project Manager may require any schedule to be modified so that the changes in the work of this contract or related contracts (if any) are properly reflected in the schedule.

END OF SECTION

## SECTION 01 45 00 – QUALITY CONTROLS

### 1. GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. Work under this section includes all testing required by the contract as specified herein and further specified in the technical sections.

#### 1.02 COSTS

- A. Paid by Owner:

- 1. For Testing Laboratory services specified by this section.
- 2. For Special Inspections of steel and concrete specified by the building code and in the contract documents.

- B. Paid by Contractor:

- 1. For re-inspections and retesting required because of defective work or ill-timed notices.

#### 1.03 QUALIFICATIONS OF LABORATORY

- A. Engage independent Laboratory acceptable to Construction Project Manager and Building Official.
- B. Meet “Recommended Requirements for Independent Laboratory Qualification,” latest edition, published by American Council of Independent Laboratories; 1725 K Street, N.W. Washington, D.C. 20036.
- C. Meet ASTM E-329 latest edition, “Standards of Recommended Practice for Inspection and Testing agencies for Concrete and Steel as used in Construction.”

#### 1.04 LABORATORY’S DUTIES

- A. Provide qualified personnel for specified inspections, sampling and testing.
- B. Ascertain and certify compliance with contract documents.
- C. Promptly submit written inspection and test reports to Construction Project Manager, Contractor, Building Official and Project Engineer.
- D. Include the following on Test Reports:
  - 1. Date issued
  - 2. Project title and location
  - 3. Testing Laboratory name and address
  - 4. Inspector’s name
  - 5. Date of inspection or sampling
  - 6. Record of temperature and weather
  - 7. Date of test
  - 8. Identification of product tested
  - 9. Test location in project

10. Type of inspection or test
11. Observations regarding compliance with Contract Documents

E. Laboratory is not authorized to:

1. Release, revoke, alter, or enlarge on Contract Document requirements
2. Approve or accept any portion of work
3. Assume any duties of Contractor
4. Stop work

1.05 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with Laboratory personnel, provide access to work and to manufacturer's operations.
- B. Provide to Laboratory representative samples of materials to be tested in required quantities.
- C. Furnish casual labor and facilities:
  1. For access to work to be tested
  2. To obtain and handle test samples at site
  3. To facilitate inspections and tests
  4. For Laboratory's exclusive use for storage and curing of test samples until removed to Laboratory
- D. Notify Laboratory at least 48 hours in advance of operations to allow personnel assignments and testing scheduling.
- E. Repair test holes to match original conditions.

1.06 LIABILITY

- A. Laboratory service is provided for Owner's self-assurance and does not relieve Contractor's responsibility to comply with Contract Documents.

2. DETAILED REQUIREMENTS

2.01 SUBGRADE AND AGGREGATE BASE

- A. Test according to ASTM D1557 Standard Proctor.
- B. Test at four locations per lift or as directed by the Construction Project Manager.
- C. Test any footing trench that the Construction Project Manager suspects to be insufficiently solid.

2.02 CAST IN PLACE CONCRETE

- A. Test concrete slump as follows:
  1. Follow ASTM C 143 and C 172.

2. Prepare tests from same batch as that employed in preparing strength-test specimens, unless otherwise directed.
3. If measured slump falls outside specified limits retest immediately from another portion of same load. In event of second failure concrete shall be considered to fail specification requirements.

B. Test concrete compressive strength as follows:

1. Follow ASTM C 31, C 39 and C 172.
2. Prepare not less than three test cylinders, for each class of concrete, not less than once per day, nor less than once for each 150 cubic yards of concrete, nor less than once for each 5000 cubic feet of surface area for slabs or walls.
3. Break one cylinder at 7 days of age, and break remainder at 28 days, unless otherwise directed.
4. If any one set of two cylinders does not develop full design strength at 28 days of age, cores and load testing may be called for. All coring and load testing costs shall be paid by contractor.

C. Test concrete air content as follows:

1. Follow ASTM C 231.
2. Test each cylinder containing air entrainment.

D. Other information:

1. Temperature
2. Time of batch and discharge
3. Field added water (not allowed)

2.04 DEFECTIVE WORK

- A. Remove and replace any work found defective or not complying with requirements of contract documents, at no additional cost to Owner.
- B. Work will be checked as it progresses, but failure to detect any defective work or materials shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Construction Project Manager for final acceptance.

3. EXECUTION

3.01 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION



## **SECTION 01 50 00 – TEMPORARY FACILITIES**

### 1. GENERAL

#### 1.01 CONTRACTOR ACTIVITIES

- A. Contractor shall comply with all governing laws, codes and regulations.
- B. Contractor shall pay required fees related to construction and contractor's activities.
- C. Temporary facilities and construction site shall be maintained in a clean and sanitary condition at all times and shall not interfere with Owner's normal use of existing facilities.
- D. Utilities shall not be used in a wasteful manner.

#### 1.02 ELECTRICITY

- A. Electrical power is available from existing site electrical service. Use of power and connection point must be coordinated with Construction Project Manager. In no case shall use of power interfere with maintenance operations. Provide and protect service to construction area by means of construction-type power cords.
- B. Contractor shall supply all necessary temporary power for construction at any time site power becomes unavailable.

#### 1.03 WATER

- A. Water is available from existing maintenance site. Use of water and connection point must be coordinated with Construction Project Manager. In no case shall use of water interfere with maintenance operations.
- B. Contractor shall supply all necessary water for construction at any time site water becomes unavailable.

#### 1.04 SANITARY FACILITIES

- A. The Contractor shall provide adequate toilet facilities for all workmen and Construction Project Managers employed on the work. The Contractors shall maintain the same in a sanitary condition from the beginning of the work until completion and shall then remove the facilities and disinfect the premises. All portions of the work shall be maintained at all times in a sanitary condition.

#### 1.05 TRAFFIC CONTROL

- A. Within Property Lines: Erect barricades sufficient to prevent injury to persons or damage to property. Construction shall conform to requirements of regulatory agencies having jurisdiction.

#### 1.06 PROTECTION OF INSTALLED WORK

- A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

- B. Repair and/or replace all damaged work.

1.07 CLEANING DURING CONSTRUCTION

- A. Control accumulation of waste materials and rubbish; periodically dispose of off-site.

1.08 SPECIAL SITE WORKING CONDITIONS

- A. The grounds adjacent to this work will be in continuous normal working operations, by ODOT crews and employees.
- B. The construction area will be designated (and changed periodically as necessary) to minimize inconvenience from construction on ODOT crews and employees. The Contractor will be responsible for establishing construction areas.

1.09 REMOVAL

- A. Remove temporary materials, equipment, services, and construction prior to substantial completion inspection.
- B. Clean and repair damage by installation or use of temporary facilities. Remove underground installations; grade site as indicated.

END OF SECTION

## **SECTION 01 60 00 – MATERIALS AND EQUIPMENT**

### 1. GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. This section includes general requirements pertaining to materials and equipment. Any such requirements as may be specified elsewhere or required by law are additional to the provisions included in this section.

#### 1.02 SOURCE OF MATERIALS

- A. No source has been provided for any of the materials required for construction of this project. The Contractor shall make his own arrangements to obtain this material at his own expense and all costs of acquiring, producing and placing this material in the finished work will be considered incidental to the bid. Preference shall be given to domestic products.

#### 1.03 QUALITY AND QUANTITY

- A. Material and equipment: Material and equipment shall be new and of a quality equal to that specified or accepted, and shall be furnished in quantities required to avoid delays in the progress of the work. Mechanical and electrical equipment shall be the products of established manufacturers of good reputation regularly engaged in the fabrication of such equipment.
- B. Work shall be executed in conformity with the Owner accepted standard practice of the trade so as to contribute to maximum efficiency of operation, accessibility and appearance, minimum cost of maintenance and construction of future alternations and additions. It shall be so executed that the completed work will conform and adjust itself to any existing installation.
- C. When materials are specified to conform to ASTM, Federal, or other reference specifications, the materials delivered to the site shall bear the manufacturer's printed labels stating that the materials meet the requirements of such referenced specifications.

#### 1.04 MANUFACTURER'S INSTRUCTIONS

- A. Perform work in accord with manufacturer's instructions.
- B. Do not omit preparatory or installation procedures required by manufacturer.
- C. Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformance with specified requirements.
- D. Should job conditions or specified requirements conflict with manufacturer's instructions, consult Construction Project Manager.
- E. Do not proceed with work without clear instructions.

#### 1.05 TRANSPORTATION AND HANDLING

- A. Factory-packed products shall be delivered in the manufacturer's original containers in new, unused and undamaged condition and shall be free of any defects.

- B. Products shall be transported and handled in such a manner as to prevent their damage.
- C. Arrange for delivery of products within the time limits established by the Construction Project Manager.
- D. Furnish workmen to receive and unload products delivered to the site. Do not deliver, or have delivered, any products to the site unless such forces are available.

1.06 STORAGE AND PROTECTION

- A. Neatly pile, store and protect products in locations where directed.
- B. Protect products subject to damage by temperature or other weather conditions.

END OF SECTION

## SECTION 01 73 29 – CUTTING AND PATCHING

### 1. GENERAL

#### 1.01 DESCRIPTION

- A. Perform all cutting, fitting, and patching, including any attendant excavation and backfill, required to complete work and to:
1. Make work fit together properly.
  2. Integrate with other work.
  3. Uncover work for installation of ill-timed work.
  4. Remove and replace defective and non-conforming work.
  5. Remove samples of installed work for testing.
  6. Provide penetrations through non-structural surfaces for mechanical and electrical work.

#### 1.02 SUBMITTALS

- A. Submit written request for cutting approval to Construction Project Manager well in advance of any cutting which affects:
1. Structural integrity of any completed or existing work.
  2. Waterproof integrity of any weather-exposed or moisture-resistant work.
  3. Efficiency, operational life, maintenance, or safety of any completed or existing work.
  4. Visual qualities of any sight-exposed or moisture-resistant.
- B. Request shall include:
1. Project identification.
  2. Location and description of affected work
  3. Necessity for cutting or alteration
  4. Description of proposed work
  5. Alternatives to cutting and patching

### 2. PRODUCTS

#### 2.01 MATERIALS

- A. Products similar to those specified elsewhere in this Project Manual:
1. Follow those specifications.
- B. Other Products:
1. Follow Construction Project Manager's instructions.

### 3. EXECUTION

#### 3.01 EXISTING CONDITIONS

- A. Inspect existing conditions and identify work subject to damage or movement caused by proposed cutting and patching.
- B. After uncovering, inspect conditions affecting performance of work.
- C. Report unsatisfactory and questionable conditions to Construction Project Manager.
- D. Do not proceed with work until Construction Project Manager provides further instructions.

#### 3.02 PREPARATION

- A. Protect other portions of project work against damage and discoloration.
- B. Protect work exposed by cutting against damage and discoloration.

#### 3.03 PERFORMANCE

- A. Provide proper surfaces for patching and finishing.
- B. Employ qualified installer or fabricator to perform cutting and patching for:
  - 1. Weather-exposed or moisture-resistant surfaces.
  - 2. Sight-exposed finished surfaces.
- C. Cut concrete, asphalt and other rigid materials with masonry saw or core drill. Do not overcut at corners.
- D. Restore cut or removed work with new products to provide work complete in accordance with contract documents.
- E. Where patching occurs, refinish entire surface to provide even finish to match adjacent work.

#### 3.04 CLEANING & REPAIRING

- A. Including work of other trades, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
- B. Remove debris from project site upon work completion or sooner, if directed.

END OF SECTION

## **SECTION 01 74 00 – CLEANING AND WASTE MANAGEMENT**

### **PART 1 GENERAL**

#### **1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE**

- A. Special Conditions - Section 01 00 00.
- B. Temporary Facilities - Section 01 50 00.
- C. Project Closeout – Section 01 77 00.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Use only those which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only those recommended by Manufacturer of surface to be cleaned.
- C. Use only on surfaces recommended by cleaning material manufacturer.

### **PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. Follow cleaning Material and Surface Manufacturer's instructions.

#### **3.02 DURING CONSTRUCTION**

- A. Remove rubbish and debris on weekly basis.
- B. Clean surfaces prior to coating and continue cleaning as needed until painting is complete.
- C. Schedule cleaning so that resultant dust and contaminants will not fall on wet or newly coated surfaces.

#### **3.03 FINAL CLEANING**

- A. Perform final cleaning prior to Occupancy or Final Completion, whichever of the two is earlier.
- B. Employ skilled workmen for final cleaning.
- C. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign matter from all exposed interior and exterior surfaces.
- D. Hose clean exterior paved surfaces; rake clean other surfaces of grounds, after removal of temporary facilities. Remove nails and other ferrous metal debris from grounds with magnetic pick-up.

- E. Remove rubbish dirt and extraneous materials from the interiors of conduits, catch basins, manholes, and other construction work.

END OF SECTION



## SECTION 01 77 00 – PROJECT CLOSEOUT

### 1. GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. Contractor shall provide all labor, material, and equipment to remove all temporary structures, all debris and surplus materials from the work site; to clean all interior and exterior surfaces, and equipment; to submit to the Owner all required test reports, guarantees, warranties, bonds, printed equipment operating and maintenance instructions, maintenance manuals, record drawings, and the like as required by the specifications.

#### 1.02 FINAL CLEANUP

- A. Contractor shall perform the final cleanup of the project with meticulous care.
  - 1. Debris and excess materials shall be removed from the site and disposed of properly.
  - 2. Repair, patch and touch-up marred surfaces to match specified finish and adjacent surfaces.
  - 3. Clean all exposed surfaces of debris, dirt, marks and dust.
  - 4. Maintain cleaning until final acceptance.

#### 1.03 PROJECT RECORD DRAWINGS (AS-BUILT)

- A. Maintain, at the jobsite, one set of the contract drawings for recording as-built conditions. Mark (in red) changes made during the course of construction.
- B. Upon completion of the work, turn over the one marked-up set of prints to the Construction Project Manager.
- C. Requests for partial payment will not be approved if the marked-up prints are not kept current and request for final payment will not be approved until the marked-up prints are delivered to the Construction Project Manager.
- D. Where specified elsewhere in the technical specification, furnish the Construction Project Manager with corrected reproducible tracings of work included in the contract.

#### 1.04 OPERATIONS AND MAINTENANCE MANUALS

- A. Provide notebooks containing all product data, warranty, operation and maintenance data in a neat and organized format.
- B. Provide two copies of all O&M notebooks for each piece of equipment.
- C. Provide an electronic copy of all O&M documentation in Adobe .pdf format on CD or DVD disk.

- D. Requests for final payment will not be approved until the required manuals are delivered to the Construction Project Manager.

1.05 FINAL INSPECTION, TESTING AND START-UP

A. Final Inspection and Testing

- 1. Final inspection of the work by the Construction Project Manager will be made within 5 days after receipt of the Contractor's written request. All field tests and adjustment procedures described in the specifications must be completed, and all defects or omissions noted must be corrected.
- 2. Substantial Completion and Final Completion notes shall be submitted in accordance with the General Conditions.

B. Field Tests

- 1. All systems shall be tested by the Contractor to the satisfaction of the Project Manager before any facility is finally tested prior to being placed into operation. Tests shall be made to determine whether the equipment has been properly assembled, aligned, adjusted and connected. Any changes, adjustments or replacements required to make the equipment operate as specified shall be carried out by the Contractor as part of the work.
- 2. Testing shall be witnessed by the Construction Project Manager.

1.06 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to Final Inspection, fully instruct Owner's operating and maintenance personnel in the operation, adjustment, and maintenance of products, equipment, and systems.

END OF SECTION

## SECTION 03 11 00 – CONCRETE FORMING

### 1. GENERAL

#### 1.01 DESIGN & ENGINEERING

- A. Formwork Design and Engineering, as well as Construction, are the Contractor's responsibility.

#### 1.02 RELATED WORK

- A. Concrete Reinforcement – Section 03 21 00.
- B. Cast-In-Place Concrete – Section 03 30 00.

#### 1.03 COORDINATION

- A. Coordinate with other Trades affecting or affected by Work of this Section.

#### 1.04 QUALITY ASSURANCE

- A. Reference Standards: Conform to recommendations of ACI 318 and ACI 347.
- B. Design and Engineering: Formwork Design and Engineering are the Contractors responsibility.

### 2. MATERIALS

#### 2.01 FORMS

- A. Wood plank forms:
  - 1. Material: Lumber
  - 2. Species: Douglas Fir or Hemlock
  - 3. Casting Face Texture: Smooth
  - 4. Casting Face Appearance: No loose Knots or Knot Holes; maximum Knot size 1-1/2 inch and well scattered.
  - 5. Size: Support Concrete at rate poured without visible deflection
  - 6. Extent of Work: Provide only at Footing and Flatwork perimeters, unless otherwise indicated.
- B. Plywood forms:
  - 1. Material: APA B-B Plyform, Plywood class 1, or MDO
  - 2. Thickness: As required by Concrete placement rate without visible deflection
  - 3. Casting Face Texture: Smooth
  - 4. Extent of Work: Provide at vertical wall faces
- C. Preformed column forms:
  - 1. Material: Seamless coated tube forms; Sleaf, Sonotube, or Burke as approved
  - 2. Thickness: As required by Concrete placement rate without visible deflection

3. Casting Face Texture: Smooth
4. Extent of Work: Provide at vertical columns

D. Form ties:

1. Manufacturer: Bowman, Richmond, Burke, Dayton, or approved
2. Type: Plastic Cone as recommended by Manufacturer for conditions of use
3. Breakback Distance from Concrete Face: 1 inch
4. Do not use Wood Spacers

2.02 EMBEDDED ITEMS

- A. Steel Reinforcement: Refer to Section 03 21 00
- B. Anchor Bolts: Refer to Section 05 50 00
- C. Miscellaneous imbedded items

2.03 FORM TREATMENT MATERIALS

- A. Form Release Agent: Non staining, non-grain-raising, free of mineral oils, and leaving no bond inhibiting residues.

2.04 FORM JOINT CAULKING COMPOUND

- A. Manufacturer & Brand: Sonneborn Sonolac, Dap Acrylic Latex, or approved

3. EXECUTION

3.01 PROTECTION

- A. Protect other Work against damage and discoloration caused by work of this Section.

3.02 INSTALLATION

- A. Conform to shapes, lines, and dimensions shown on drawings. Brace and tie together to ensure that position and shape are maintained. Make tight to prevent concrete leakage. Arrange Joints as indicated or directed. Form any surface indentations shown on Drawings. Provide access openings as required for cleaning and inspection of Forms and embedded items prior to placing concrete. Locate where not exposed to view.
- B. Coordinate with others for installation of all cast in place items, allowing sufficient time between the erection of forms and placing of concrete to allow the various trades to properly install their work.

3.03 EARTH FORMS

- A. Provide only with Engineer's written approval. Hand trim where necessary. Remove loose soil.

3.04 PLYWOOD FORMS

- A. At Forms for Exposed Concrete, fill Form Panel joints with Form Joint Caulking Compound, and strike Compound flush with Panel on face adjacent to exposed Concrete, or cover Joints with thin, smooth, plastic, Pressure-sensitive Tape. Forms shall be constructed and caulked so that joint lines are not visible in the finished concrete.

3.05 BRACING

- A. Provide as required to meet load requirements.
- B. Protect against undermining or settlement when placed on ground.
- C. Anchor as required to prevent upward or lateral Formwork movement during Concrete placement.
- D. Provide sufficient longitudinal and vertical bracing of forms to prevent bows between support points.

3.06 FORM TIES

- A. Provide as required to meet load requirements.
- B. Unless otherwise indicated or approved, locate equidistant and symmetrical; align vertically and horizontally. At Forms for Exposed Concrete seal Form Ties against leakage with Form Joint Caulking Compound.

3.07 OPENINGS & CHASINGS

- A. Provide Openings and Chasings for Mechanical and Electrical Work. Sizes and locations as directed by Mechanical and Electrical Trades.

3.08 ALLOWABLE TOLERANCES FOR CONCRETE

- A. Variation from level:
  - 1. 1/4 inch in 10 ft.
  - 2. 3/16 inch in any Bay or 20 ft. maximum.
  - 3. 3/8 inch in 40 ft. or more. maximum.
- B. Variation of Building Lines: 1/4 inch in any 20 ft. maximum.
- C. Variation in Cross Sectional Dimensions: Minus 1/8 inch; plus 1/8 inch.
- D. Variation in Surface Tolerance: 1/8 inch in any 10 ft. measured with 10 ft. straight-edge.
- E. Maximum Deflection of Form Facing Material between Supports:  $0.0025 \times \text{Span}$  Column & Wall Locations. Accurately size and locate within 1/8 inch plus or minus.

3.09 TREATMENT OF FORMS

- A. Wood Plank and Plywood Forms:

1. Prior to each use: Apply Form Coating to contact surfaces in accordance with Manufacturer's directions.
2. When treating previously set Forms, prevent Coatings from covering Reinforcing Steel or existing Concrete where bond is required.
3. Prevent Coatings from collecting in puddles.

### 3.10 EMBEDDED ITEM INSTALLATION

- A. Steel Reinforcement: Refer to Section 03 21 00.
- B. Steel Fabrications: Refer to Section 05 50 00.
- C. Anchor Bolts:
  1. Secure in accordance with approved setting drawings.
  2. Set with templates to assure accurate bolt positioning.

### 3.11 ADJUSTMENTS

- A. Reposition to true alignment prior to, during, and after Concrete placement, if necessary.
- B. During concrete placement, in areas where formwork develops weakness, settlement, or distortion, stop concrete placement, remove placed concrete, and replace or strengthen Formwork.

### 3.12 FORM CLEANING

- A. Remove debris and foreign matter from Formwork prior to concrete placement.
- B. Remove loose rust and foreign matter from reusable Hardware prior to installation into Formwork.

### 3.13 FORM REMOVAL

- A. Leave forms and shoring in place until concrete has attained sufficient strength to safely support own weight and imposed loads.
- B. Remove forms at time and in manner to insure safety of structure, and without concrete surface damage.
- C. At exposed concrete, form-removal time shall be uniform to avoid color differences.
- D. Remove top forms from any sloping concrete surfaces as soon as concrete is self-supporting. Repair and finish, if necessary, and cure immediately

### 3.14 FORM RE-USE

- A. Withdraw projecting Nails and clean Concrete Form contact surfaces.
- B. Replace with new material when necessary or when directed.
- C. Re-use Forms only when contact-surfaces equal those specified for original use.

3.15 PRODUCT CLEANING & REPAIRING

- A. Including Work of other Trades, clean, repair and touch-up, or replace when directed, Products which have been soiled, discolored, or damaged by work of this Section.
- B. Remove Debris from Project Site upon work completion or sooner, if directed.

END OF SECTION

## SECTION 03 21 00 – CONCRETE REINFORCEMENT

### 1. GENERAL

#### 1.01 COORDINATION

- A. Coordinate with other trades affecting or affected by work of this section.

#### 1.02 PRODUCT DELIVERY, STORAGE & HANDLING

- A. Protect against damage and coverage by mud or ice.
- B. Tag each piece or bundle and indicate size, grade, and location.

#### 1.03 FIELD MEASUREMENTS

- A. Verify prior to fabrication.
- B. If field measurements differ slightly from drawing dimensions modify work as required for accurate fit. If measurements differ substantially, notify Construction Project Manager prior to fabrication.

#### 1.04 SUBMITTALS

- A. Provide electronic reinforcement shop drawings for approval a minimum of one week prior to placement.

### 2. PRODUCTS

#### 2.01 REINFORCING BARS

- A. Bars are to be formed from steel conforming to ASTM A-706 where welding of bars will occur and ASTM A-615 at all other bars. Bars shall be grade 60.
- B. Epoxy Coated Bars: All bars in the salt containment structure as noted on drawings shall be epoxy coated in accordance with ASTM A 775.
- C. See drawing details for specific sizes and configurations.

#### 2.02 TIE WIRE

- A. Tie wires are to be black annealed steel conforming to federal specification QQ-W-461. Minimum wire size is 16 gauge.

#### 2.03 ACCESSORIES

- A. Products shall be constructed of concrete, ceramic, plastic, or metal. Hot-dip galvanize any metal accessories adjacent to exposed concrete surfaces.
- B. Manufacturing standard shall be the Manual of Standard Practice, published by Concrete Reinforcing Steel Institute; 180 N. LaSalle Street; Chicago, IL 60601. Copies



can be obtained from Institute. Extent of work shall include all accessories necessary for proper Reinforcement placement, spacing, support, and fastening.

- C. Accessories: Conform to requirements of Reference Standards. Provide all items necessary for proper placing, spacing, supporting, and fastening of reinforcement in place. Provide galvanized or stainless steel metal accessories where portions will be exposed in finished surfaces.

#### 2.04 FABRICATION

- A. Follow Manual of Standard Practice published by Concrete Reinforcing Steel Institute.

#### 2.05 ALLOWABLE FABRICATION VARIATION FROM DRAWING DIMENSIONS

- A. Sheared length shall be plus or minus 1 inch.
- B. Tie dimensions shall be plus or minus 1/2 inch.
- C. All other bend dimensions shall be plus or minus 1 inch.

### 3. EXECUTION

#### 3.01 EXISTING CONDITIONS

- A. Verify that surfaces to receive Reinforcement are accurately sized and located, square, plumb, rigid, secure, and otherwise accurately prepared.
- B. Prior to starting work, notify General Contractor about defects requiring correction. Do not start work until conditions are satisfactory.

#### 3.02 PROTECTING WORK OF OTHER SECTIONS

- A. Protect against damage and discoloration caused by work of this Section.

#### 3.03 INSTALLATION

- A. Bend bars without heat. Field bending of partially embedded bars is not permitted without Construction Project Manager's written approval. Field bend bars only with approved equipment design specifically for the application. Field bending of epoxy coated bars is not permitted.
- B. Place bars securely to prevent displacement during pour.
- C. Support epoxy coated rebar on coated supports, on supports of dielectric materials, or other acceptable materials. Tie epoxy coated bars to with nylon, epoxy, or plastic-coated tie wire or other acceptable materials.
- D. Bars shall be lapped as shown on drawings, or where not shown as follows. Lap #7 bars 42" minimum. Lap #6 bars 30" minimum. Lap #5 bars 24" minimum. Lap #4 bars 20" minimum. Lap #3 bars 16" minimum.

#### 3.04 ALLOWABLE PLACEMENT VARIATION FROM DRAWING DIMENSION

- A. Concrete cover shall be plus or minus 1/4 inch.

- B. Spacing between bars shall be plus or minus 1/4 inch.
- C. Bar relocation to avoid interference with other reinforcement, conduits, or embedded items shall be 1 bar diameter, unless otherwise approved by Construction Project Manager.

3.05 PRODUCT CLEANING & REPAIRING

- A. Prior to concrete placement, remove loose flaky rust, mud, oil, and other bond-reducing coatings.
- B. Including work of other trades, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this Section.
- C. Remove debris from project site upon work completion or sooner, if directed.

END OF SECTION

## SECTION 03 30 00 – CAST IN PLACE CONCRETE

### 1. GENERAL

#### 1.01 COORDINATION

- A. Coordinate with other trades affecting or affected by work of this section.

#### 1.02 PRODUCT DELIVERY, STORAGE, & HANDLING

- A. Protect against damage and discoloration.
- B. Conform to ASTM C-94.

#### 1.03 WEATHER PRECAUTIONS

- A. Use cold weather provisions when temperatures are below 40 degrees Fahrenheit.
  - 1. Follow Standard Specification for Cold Weather Concreting, ACI 306.
  - 2. Do not place concrete during cold weather until protection materials and equipment are at or near project site.
  - 3. Do not place concrete on frozen subgrade.
  - 4. Remove ice and snow from reinforcing, forms, embedded items, and other contact surfaces.
  - 5. Raise and maintain temperature of all surfaces in contact with concrete above 40 deg. F prior to Concrete placement.
  - 6. Do not use salts or chemical admixtures to prevent concrete freezing.
  - 7. Terminate any water curing at least 24 hours before any anticipated freezing temperatures.
  - 8. Locate and direct any heaters or ducts so as not to cause overheating or over drying of concrete or create fire hazards.
  - 9. Directly exhaust flue gases from any combustion heaters to outside of any enclosures.
  - 10. Following protection period, allow concrete to cool gradually.
  - 11. Assume responsibility, including costs, for testing suspected frozen concrete.
  - 12. Remove and replace freeze-damaged concrete at contractor's expense.
- B. Place concrete according to the following warm weather provisions when air temperature exceeds 85 degrees Fahrenheit or when wind speeds exceed 10 miles per hour.

1. Follow Standard Specification for Cold Weather Concreting, ACI 305.
2. Maximum Concrete temperature at time of placement shall not be greater than 80 deg. F.
3. Mix concrete minimum possible time, and place as soon as possible thereafter.
4. Sprinkle forms, reinforcing, embedded items, and subgrade with cool water immediately prior to concrete placement.
5. Protect unstripped formwork and exposed concrete surfaces against excessive drying with water spray, or other approved method.
6. Assume responsibility, including costs, for testing damage-suspected concrete.
7. Remove and replace damaged concrete at contractor's expense.

1.04 ADVANCE NOTICES

- A. Coordinate with testing laboratory at least 24 hours before intended concrete placement.
- B. Place no concrete until formwork and reinforcement have been observed by ODOT Construction Project Manager, testing laboratory representative and local regulating jurisdiction.

1.05 SUBMITTALS

- A. Provide concrete mix design for each class of concrete one week prior to anticipated placement.

1.06 TESTING

- A. Sampling and Testing will be done in accordance with ASTM C31, and C39, by an independent testing laboratory approved by the Engineer, and paid for by Owner. Test results to be sent directly to the Engineer, Project Manager, and Building Official. Contractor shall coordinate with testing laboratory and arrange for testing.
- B. Samples for strength tests of each class of concrete placed each day shall be taken not less than once each day, or not less than once for each 100 cubic yards of concrete or as follows. For required concrete strengths of 6,000 psi, test each delivery truck unless otherwise directed by ODOT Project Manager. Not less than three cylinders shall be taken for each sample. Test 1 cylinder from each sample at 7 days and 1 cylinders at 28 days. Retain 1 cylinder for testing if the 28 day break does not meet specifications. Note that reference standards require slump and air content tests to be made each time samples are taken for concrete strength tests.
- C. Core samples and tests may be required at Contractor's expense if required cylinder tests are not taken as specified, or if 28 day test on any one cylinder falls more than 20% below specified strength, or if average of any three cylinders is less than specified strength.
- D. If core tests fall below specified design strength, replace structural portion in question at Contractor's expense.

2. PRODUCTS

2.01 PORTLAND CEMENT

- A. Type I and II cement conforming to ASTM C-150.
- B. Use the same manufacturer and brand for all exposed concrete.

2.02 AGGREGATE

- A. Conform to ASTM C-33.
- B. Maximum size is 1 inch and not more than one-fifth of narrowest dimension between sides of forms, one-third of depth of slab, nor three-fourths of narrowest space between reinforcing bars.
- C. Aggregates for exposed concrete shall be of matching size and shall come from same source.

2.03 HIGH RANGE WATER REDUCING ADMIXTURES

- A. Conform to ASTM C-494, type A.
- B. Use where required to achieve specified slump.

2.04 CALCIUM CHLORIDE

- A. Calcium chloride is not allowed.

2.05 BONDING AGENT

- A. At dry surfaces use Dayton Superior Day-Chem Ad Bond (J-40), Euclid Euco Weld, Sonneborn Sonocrete, or approved alternate.
- B. At damp surfaces use Euclid Euco Epoxy 452 MV or 620, Sika Sikadur Hi-Mod, or approved alternate.

2.06 CAPILLARY FILLER

- A. Product shall be BASF MasterLife 300D Crystalline Capillary Waterproofing Admixture, or approved alternate.
- B. 15 pounds per cubic yard or as recommended by manufacturer.
- C. Use at containment walls.

2.07 CRACK REDUCING ADMIXTURE

- A. Product shall be BASF MasterLife CRA 007 Crack-Reducing Admixture, or approved alternate.
- B. 1.25 gallons per cubic yard or as recommended by manufacturer.
- C. Use at containment walls.

2.08 SILICA FUME

- A. Product shall be BASF MasterLife Rheomac SF 100 densified silica fume, or approved alternate.
- B. Place silica fume at a rate of 50 pounds per cubic yard or as recommended by the admixture supplier.
- C. Use at containment walls.

2.09 SYNTHETIC MACROFIBER

- A. Product shall be BASF MasterFiber MAC 2200 CB Synthetic Macrofiber with Chemical Bond for Low Deflection Applications, or approved alternate.
- B. 5 pounds per cubic yard or as recommended by manufacturer.
- C. Use at all concrete exposed to view in completed construction.

2.10 FLYASH

- A. Flyash may be used as a replacement for up to 20 percent of the total cement content.

2.11 CONCRETE WET CURING FOR CONTAINMENT WALLS

- A. Use wet curing methods at all concrete exposed at completion of construction.
- B. Wet curing includes continuous wetting using curing blankets. Water must be supplied via soaker hose or equivalent for the duration of the curing period. Concrete surface shall not be allowed to become surface dry during the curing period.
- C. Curing blankets shall be SKAPS GE 160 white, or approved alternate from ODOT Qualified Products List.
- D. Wet curing of walls shall be maintained for 7 days, minimum.

2.12 CONCRETE WET CURING FOR ALL OTHER CONCRETE

- A. Use wet curing methods at footings and concealed concrete.
- B. Wet curing includes continuous wetting using curing blankets. Water must be supplied via soaker hose or equivalent for the duration of the curing period. Concrete surface shall not be allowed to become surface dry during the curing period.
- C. Curing blankets shall be SKAPS GE 160 white, or approved alternate from ODOT Qualified Products List.
- D. Wet curing shall be maintained for 7 days, minimum.

2.13 MIXING CONCRETE

- A. Mix design shall conform to ACI 318.
- B. Ready mix type shall conform to ASTM C-94.

- C. Assume responsibility for mix design and product performance.
- D. Minimum 28 day compressive strength, locations, and minimum cement content shall be as follows.
  - 1. At all concrete, not including containment walls: 4,500 psi concrete. Maximum water cement ratio: 0.45.
  - 2. At containment walls: 6,000 psi concrete. Maximum water cement ratio: 0.38.
- E. Maximum slump shall be as noted. Concrete with greater slump will be rejected and must be replaced at contractor's expense. No water is permitted to be added at the job site after sampling.
  - 1. At all concrete, not including containment walls: 5 inches plus or minus 1 inch.
  - 2. At containment walls: 8 inches maximum with high range water reducing admixture.
- F. Admixtures shall be provided by the same manufacturer and shall be compatible for common use as approved by the manufacturer.

#### 2.14 CONCRETE STABILIZER

- A. Product shall be BASF Delvo Stabilizer, or approved alternate.
- B. May be used at contractors option at no additional cost to ODOT.

#### 2.15 NON-SHRINK GROUT

- A. Portland cement based grout conforming to ASTM C 1107, Grade A, B, and C.
- B. Product shall be W.R. Meadows 588 non-shrink, non-gaseous precision grout, or approved alternate.
- C. Minimum strength at 3 days shall be 5000 psi.

#### 2.16 SURFACE PATCHING COMPOUND

- A. Cementitious based "sacking" compound from ODOT Qualified Products List, or approved alternate.
- B. Product must be compatible with substrate and proposed use.

### 3. EXECUTION

#### 3.01 EXISTING CONDITIONS

- A. Verify that formwork, reinforcement, and embedded items are accurately and securely placed, clean, water and frost-free, and ready to receive concrete.
- B. Prior to starting work, notify General Contractor about defects requiring correction.

- C. Do not start work until all conditions are satisfactory.

### 3.02 PROTECTING WORK OF OTHER SECTIONS

- A. Protect against damage, splatter, and discoloration caused by work of this Section.

### 3.03 SURFACE PREPARATION

- A. Remove foreign matter from surfaces and areas to receive concrete.
- B. Sprinkle subgrades and other porous surfaces with water to eliminate suction.

### 3.04 AIR CONTENT

- A. Maximum air content is 2%.
- B. No air entrainment is to be provided.

### 3.05 PLACING CONCRETE

- A. Convey and place by methods which will prevent material separation and loss. Avoid segregation of material due to excessive vibration, or drops in excess of 6 feet. Avoid damage to forms.
- B. Deposit continuously, or in layers that will not form seams or weakened planes. Place as near final location as possible. Movement by vibrator is not permitted. Stop pours only at joints where shown or approved. Concrete may be placed by pumping, but the use of aluminum pipe is prohibited.
- C. Place concrete within 90 minutes of time indicated on the batch ticket. ODOT Construction Project Manager may reject all material not placed within the time limit.
- D. Placement of concrete can be extended to 2.5 hours maximum from time indicated on batch ticket with the use of concrete stabilizer proportioned according to manufacturer's recommendations.

### 3.06 CONSOLIDATING CONCRETE

- A. Employ mechanical, high-frequency vibrators to consolidate concrete around reinforcement, into corners and angles of forms, and to exclude rock pockets, air bubbles, and honeycomb.
- B. Hold vibrator in one spot no longer than 15 seconds and keep in constant motion, insert and withdraw at points approximately 18 inches on center.
- C. Maintain vibrator in vertical position when penetrating concrete.
- D. Transporting concrete with vibrator is not permitted.
- E. Maintain spare vibrator at job site during concrete placement.

### 3.07 CURING CONCRETE

- A. Cure cast-in-place concrete with water. Begin curing as soon after placement as possible without damaging the freshly placed concrete.



- B. Keep exposed surfaces not covered by waterproof forms damp by applying water with a fog nozzle until the surface has set sufficiently to allow covering with water. Provide water supply for the duration of curing to maintain minimum water loss due to evaporation.
- C. Wet cure using curing blankets as follows:
  - 1. Prevent premature drying defined as the loss of surface sheen when the evaporation rate at the surface exceeds the bleed rate.
  - 2. Cover the concrete with a single layer of clean curing blanket immediately after finishing. Place blanket with white side up. Thoroughly wet fabric within 15 minutes of fabric placement. Overlap the edges at least 12 inches.
  - 3. Provide soaker hoses for additional soaking of the initial covering. Place over the full width of the concrete placement, at a maximum of 10 foot intervals. Do not allow initial wetting of blanket to dry before soaker hoses are in place and operational. Operate soaker hoses continuously to keep the blanket saturated for the entire cure period.
- D. Keep exposed surfaces not covered by waterproof forms damp by applying water with a fog nozzle until the surface has set sufficiently to allow covering with curing blanket using a soaker hose to maintain wetting during the cure period.

### 3.08 FINISHING FORM TIE HOLES

- A. After form tie removal, cover broken steel with epoxy 1/4" thick minimum.
- B. Fill holes with non-shrink grout mixed as dry as feasible. Ram grout solid. Finish surface smooth.

### 3.09 VOIDS & GRAVEL POCKETS

- A. Replace or repair where necessary and where directed by Construction Project Manager. Imperfections shall be "sacked" with a surface patching compound to provide a smooth and uniform finish at all permanently exposed surfaces.
- B. Where sacking is required, it shall extend beyond the imperfection as required to blend in appearance with surrounding concrete to the satisfaction of the Construction Project Manager.

### 3.10 EXPOSED VERTICAL FINISHES

- A. Exposed surfaces shall be smooth and free of distortions, fins, voids and other defects. Imperfections shall be "sacked" with a surface patching compound to provide a smooth and uniform finish at all permanently exposed surfaces.
- B. Variations shall not exceed 1/8" in 10' when measured with a straight edge.

### 3.11 HORIZONTAL CONCRETE FINISHES

- A. Scream all horizontal concrete to true levels or slopes.

- B. Bring to true surfaces with suitable float.
- C. Provide hard trowel finish at exposed concrete, top of footings and below grade horizontal concrete. Trowel to produce smooth, hard, dense surface, free from trowel marks.

3.12 ALLOWABLE FLATWORK TOLERANCES

- A. All Surfaces are to be true to within 1/8 inch in 10 feet.

3.13 EPOXY INSTALLATION

- A. Follow manufacturer's installation instructions.
- B. Support imbedded dowel perpendicular to concrete surface in center of hole.
- C. Do not disturb within 6 hours of required cure based on manufacturer's literature.

3.14 NON-SHRINK GROUT INSTALLATION

- A. Follow manufacturer's installation instructions.
- B. Do not retemper set grout.
- C. Thoroughly compact grout free of air pockets; do not vibrate grout.
- D. Cure grout in accordance with manufacturer's recommendations.

3.15 EMBEDDED ITEMS

- A. Place as indicated on drawings plumb and true to required alignment. Secure in place to prevent movement during concrete placement.
- B. Carefully consolidate concrete around items to prevent voids.

3.16 CONCRETE TESTING AND SAMPLING

- A. Coordinate with testing laboratory to ensure samples are taken when required.
- B. Take three concrete cylinders from for each concrete pour, or as directed by the Construction Project Manager.
- C. Test concrete slump from each load as directed by the Construction Project Manager.

3.17 DEFECTIVE WORK

- A. Remove and replace any surfaces which show excessive cracks, slabs which do not drain properly, vertical surfaces containing pockets or improperly consolidated concrete and other defective concrete.
- B. On surfaces scheduled to receive covering remove, by grinding if necessary, any defects of sufficient magnitude to show through covering.

- C. Remove honeycombed and other defective concrete down to sound concrete and replace. If chipping is necessary, shape edges perpendicular to surface or slightly undercut. Do not feather Edges.
- D. If tests indicate that concrete has failed to meet specifications, replace substandard material, unless otherwise directed.

### 3.18 CLEANING & PATCHING

- A. Immediately following removal of forms or curing membranes, inspect all concrete surfaces and patch all pour joints, voids, form tie holes, honeycombed areas and other imperfections before concrete is thoroughly dry. Patch shall match adjacent surfaces unless noted otherwise for special finishes.
- B. Remove ledges and bulges.
- C. Remove debris from project site upon work completion or sooner, if directed.

### 3.19 PROTECTING COMPLETED WORK

- A. Protect work specified herein against damage and discoloration.

END OF SECTION

## **SECTION 05 50 00 – MISCELLANEOUS FABRICATED STEEL**

### 1. GENERAL

#### 1.01 COORDINATION

- A. Coordinate with other Trades affecting or affected by Work of this Section.

#### 1.02 REFERENCED SPECIFICATIONS

- A. The following references, codes and standards are hereby made a part of this Section and all structural and miscellaneous metal work shall conform to the applicable requirements except as otherwise specified herein or shown on drawings.
  - 1. American Institute of Steel Construction's Specifications for Design, Fabrication and Erection of Structural Steel for Buildings, latest edition.
  - 2. Architectural Metal Handbook of the National Association of Architectural Metal Manufacturers, latest edition.
  - 3. American Welding Society's Standard Code for Arc and Gas Welding in Building Construction, latest edition.

#### 1.03 PRODUCT STORAGE & HANDLING

- A. Store fabricated steel above ground on platforms, skids, or other approved supports.
- B. Store other materials in weather-tight and dry locations.
- C. Store packaged materials in original unbroken containers.
- D. Protect against damage and discoloration.

#### 1.04 FIELD MEASUREMENTS

- A. Verify prior to fabrication.
- B. If field measurements differ slightly from drawing dimensions modify work as required for accurate fit.
- C. If measurements differ substantially, notify Construction Project Manager prior to fabrication.

### 2. PRODUCTS

#### 2.01 STEEL SHAPES

- A. Conform to ASTM A36.

#### 2.02 STEEL PIPE

- A. Conform to ASTM A53 Type E.

2.03 THREADED FASTENERS & ANCHOR BOLTS

- A. Anchor bolts, threaded rods and nuts shall conform to ASTM F1554, Grade 55.
- B. Washers shall conform to ANSI B-27.2.
- C. See drawings for size and configuration.

2.04 FINISH

- A. Hot dip galvanize. Conform to ASTM A36.
- B. Clean all parts of rust, slag, oil, mill scale and other impurities or imperfections.

2.05 FABRICATION

- A. Form to accurate sizes and shapes, with sharp lines and angles, and in accordance with AISC Minimum Fabrication Standards.
- B. Punch and shear to leave clean Surfaces.
- C. Weld permanent connections and grind all exposed welds smooth.
- D. Provide holes and connections for work of other trades.
- E. Fabricate to true lines, weld joints and grind smooth.
- F. Defective work.
  - 1. Work found to be defective, missing or damaged shall be immediately replaced with proper work. Provide such replaced work and the inspection for same at no additional cost to ODOT.
  - 2. Straightening of any materials, if necessary, shall be done by a process and in a manner that will not injure the materials, and which is approved by the Construction Project Manager. Sharp kinks or bends shall be cause for rejection. Heating will not be allowed.
  - 3. If defects or damaged work cannot be corrected in the field, the material shall be returned to the shop or new parts furnished, as the Construction Project Manager directs. Replace all work at no additional cost to ODOT.

2.06 SHOP TREATMENT

- A. Welds, burrs and rough surfaces shall be ground smooth after fabrication in order to prepare surfaces for finish.

3. EXECUTION

3.01 EXISTING CONDITIONS

- A. Verify that surfaces and structures to receive fabricated steel are accurately sized and located, square, plumb, true, rigid, secure, and otherwise properly prepared.

- B. Prior to starting work, notify General Contractor about defects requiring correction.
- C. Do not start work until conditions are satisfactory.

3.02 PROTECTING WORK OF OTHER SECTIONS

- A. Protect against damage and discoloration caused by work of this Section.

3.03 INSTALLATION

- A. Follow manufacturers' instructions and drawing details.
- B. Install to true lines, plumb and level, and as detailed or required for rigidity and permanence.

3.04 TOUCH UP

- A. Touch up damaged galvanized surfaces with zinc-rich paint. Match original coating thickness, and apply in accordance with ASTM A-780.
- B. Touch up painted surfaces with same type and color as finish coat.

3.05 PRODUCT CLEANING & REPAIRING

- A. Remove loose rust, heavy mill scale, oil, dirt, and other bond-reducing foreign substances from members scheduled to receive finish.
- B. Leave surfaces ready for finishing specified in other Sections.
- C. Including work of other trades, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this Section. Remove debris from project site upon work completion or sooner, if directed.

END OF SECTION

## SECTION 07 41 13 – METAL ROOF PANELS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. The work includes, but is not necessarily limited to, furnishing and installation of all preformed metal roofing, and accessories as indicated on the drawings and specified herein.

#### 1.02 RELATED SECTIONS

- A. Pre-engineered Metal Building: Section 13 34 19.
- B. Metal Wall Panels: Section 07 42 13.

#### 1.03 REFERENCES

- A. ASCE 7: Minimum Design Loads for Buildings and Other Structures.
- B. ASTM A653: Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
- C. ASTM A792: Steel Sheet, 55 % Aluminum Zinc Alloy Coated by the Hot Dip Process.
- D. ASTM D523: Specular Gloss.
- E. ASTM E1680: Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
- F. ASTM E1592: Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- G. ASTM E1646: Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
- H. ASTM E2140: Weather Penetration of Metal Roof Panel Systems by Static Water Pressure Head.
- I. FM Approvals Standard 4471: Class 1 Panel Roofs.
- J. SMACNA Architectural Sheet Metal Manual.
- K. UL 580: Standard for Tests for Uplift Resistance of Roof Assemblies.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Testing and Certification.
  - 1. Wind Uplift:
    - a. Achieve Factor Mutual Class 1-75 at 5' span and Class 1-120 at 2'-6" span.
    - b. Tests shall be established in accordance with ASTM E1592.
    - c. Meet Class 90 per UL 580 in addition to building code requirements.
    - d. Seaming requirements specified elsewhere in this section may exceed design requirements for uplift.
  - 2. Weather Tightness:
    - a. Pass ASTM E 1680 for air infiltration.
    - b. Pass ASTM E 1646 for water leakage.
    - c. Pass ASTM E 2140 for water penetration.

### 1.05 SUBMITTALS

- A. Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing required. Include data substantiating that materials comply with these specifications.
- B. Detailed shop drawings must be submitted for approval prior to fabrication. Shop drawings shall indicate the factory coating specifications and other data as necessary to clearly describe gauges, profiles, fastener types and panel attachment spacing.
- C. Indicate locations of field and factory-applied sealant. Provide details for edge conditions, seams, joints, corners, panel profiles, and assembly.
- D. Prior to ordering products, submit Manufacturer's standard color Samples for ODOT Construction Project Manager's selection.
- E. Prior to starting work, submit 12" long Panel Samples showing shape and a representative color chip for ODOT Construction Project Manager's acceptance, when requested.
- F. Submit list of installer completed projects utilizing the system specified, including names and contact information for architects and contractors.
- G. Submit proof of panel system design capacities per manufacturer's IBC Code Compliance report listing or via submitted calculations.

### 1.06 QUALITY ASSURANCE

- A. Installer must be approved by the Panel Manufacturer in writing prior to work commencing.
  - 1. Installer shall meet the following:
    - a. Has successfully applied five metal roofs of comparable size and complexity which reflects a quality weathertight installation in the region where the work will be performed.
    - b. Have been in business for a minimum period of five years in the region where the work will be performed.
- B. Manufacturer's Qualifications:
  - 1. Manufacturer shall have a minimum of 10 years experience supplying metal roofing to the region where the work is to be done.
  - 2. Shall comply with current independent testing and certification as specified.
  - 3. Panel Manufacturers without full supporting literature; Flashings & Details Guides, Guide Specifications and Technical Support, shall not be considered equivalent to the specified product.
- C. Alternate Manufacturers deviating from basis of design: The following criteria must be submitted. Alternate systems will not be considered for approval unless each of these items has been submitted for review prior to bid opening in accordance with the ITB.
  - 1. Alternate product acceptance is at the sole discretion of ODOT.
    - a. Submit each item listed under 1.5 & 1.6
    - b. A list of a minimum of five (5) jobs where the proposed alternate material was used under similar conditions. References shall include project date, completion date, project name, size of the project, a copy of the warranty, and contact information for the owner/architect.
    - c. Proof that the manufacturer has been in business for the required period specified.



### 1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Comply with manufacturer's recommendations for off-loading materials.
- B. Handle panels with non-marring slings.
- C. Do not bend panels.
- D. Store panels above ground, with one end elevated for drainage.
- E. Protect panels against standing water and condensation between adjacent surfaces.
- F. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and allow to air dry.
- G. Store accessory items in a dry place.
- H. Protect all materials against damage and discoloration.
- I. Remove any strippable film coating prior to installation and do not allow it to remain on the panels in extreme cold, heat or in direct sunlight.

### 1.08 PROJECT CONDITIONS

- A. Examine the conditions and substrates in which metal roofing work is to be installed. Substrate shall be installed level, flat and true to avoid panel stresses.
- B. Field measurements shall be taken prior to fabrication of panels.
- C. Proceed with roofing installation only after conditions are satisfactory.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. AEP Span, A Division of ASC Profiles Inc.
- B. Alternates as approved.
- C. Metal roof panels shall be from the same supplier as metal wall panels specified under Section 07 42 13.

### 2.02 MATERIALS

- A. Panels:
  - 1. Base Metal:
    - a. Material: Steel conforming to ASTM A792.
    - b. Yield strength: 50,000 psi; with aluminum-zinc alloy coating conforming to ASTM A792, Class AZ50.
  - 2. Exterior Finish:
    - a. Dura Tech<sup>®</sup> 5000: Polyvinylidene Fluoride, full 70 percent Kynar 500<sup>®</sup> or Hylar 5000<sup>®</sup>, consisting of a baked-on 0.15-0.25 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 8 to 15 when tested in accordance with ASTM D523 at 60 degrees.
    - b. Color: Selected from manufacturer's standard colors by ODOT Construction Project Manager.

3. Interior Finish:
  - a. Dura Tech 5000/mx Marine 20 Year: Polyvinylidene Fluoride, full 70 percent Kynar 500® or Hylar 5000®, consisting of a baked-on 0.70-0.80 mil corrosion resistant primer, a baked-on 0.70-0.80 mil finish coat and a baked-on 0.40-0.50 clear coat with a specular gloss of 15 to 25 when tested in accordance with ASTM D523 at 60 degrees.
  - b. Color: Bright white.
4. Configuration
  - a. Basis of Design Panel: Span-Lok HP by AEP Span, 24 gauge.
  - b. Profile: Roof panels shall have 16" net coverage with 2" high standing seams.
  - c. Provide panels in full length from ridge to eave.
  - d. Roofing panels shall be factory formed. Field formed panels are not acceptable.
  - e. Factory-Applied high-grade butyl mastic sealant within the confines of panel's female leg, designed to seal against adjacent male panel leg.
- B. Accessories:
  1. Clips: Provide clip designed to allow panels to thermally expand and contract. Clip shall incorporate a self-centering feature to allow 1 inch of movement in both directions along panel length. Clip type shall be selected to meet negative (uplift) pressures as specified. Provide factory-installed sealant to provide continuity of seal at clip locations.
  2. Fasteners: Concealed corrosion resistant galvanized steel as recommended by panel manufacturer.
  3. Sealant: Field-Applied tape Sealant: Butyl type, 1/8" x 1".
  4. Connection Hardware:  
Shall be designed to allow the roof system including panels, flashings, endlaps, rake and ridge conditions to move with thermal expansion/contraction from a fixed eave condition.
- C. Flashing & Fabrication:
  1. Protective metallic coating, material, gauge and finish to match panels. Do not use lead or copper. Remove any strippable film prior to installation.
  2. Fabricate flashings and accessories in longest practical lengths.
- D. Seams:
  1. Panel seams shall interlock entire length of seam.
  2. Design standing seam to lock up and resist joint disengagement during design wind uplift conditions as calculated according to local building codes.
  3. Provide pre-installed sealant within confines of panel's female leg to aid in resistance of leaks and provide panel-to-panel seal while allowing expansion and contraction movement.
  4. Seams shall be continuously locked or crimped together by mechanical means during installation. Seaming tools shall be sourced from manufacturer's recommended vendor.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Panels shall be installed only when substrate and/or subframe is installed and aligned true in

plane, accurate, and secured in place.

- B. Verify that installation may be made in accordance with approved shop drawings and manufacturer's installation instructions.

### 3.02 PREPARATION

A. Field Measurements:

1. Verify prior to fabrication.
2. If field measurements differ from drawing dimensions, notify Engineer prior to fabrication.

B. Protection:

1. Treat, or isolate with protective material, any contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
2. Require workmen walking on roofing panels to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material which could cause damage or discoloration.
3. Protect Work of other trades against damage and discoloration.

C. Surface Preparation.

1. Clean and dry surfaces prior to applying sealant.

### 3.03 INSTALLATION

A. Panels:

1. Install per approved Submittal Drawings and manufacturer's installation instructions.
2. Panel-to-panel connections: Mechanically seamed using manufacturer's recommended seaming tool over the full length of panel.
3. Remove any strippable protective film prior to installation.
4. Lap panels starting at the north and working south across roof.
5. Do not stretch or compress panel side-laps.
6. Secure panels without warp or deflection.

B. Allowable Erection Tolerance: maximum alignment variation is 1/2 inch in 40 feet.

C. Flashing:

1. The panels shall be fixed at the eave. The ridge and rake assemblies shall be designed to allow the roof panels to move lengthwise with expansion/contraction for panel temperature changes up to a minimum of 150 degrees.
2. Install flashings to allow for thermal movement.
3. Overlap roof panels at least 6 inches.
4. Remove strippable protective film, if used, immediately preceding flashing installation.

D. Cutting and fitting:

1. Neat, square and true. Torch and abrasive wheel cutting are prohibited.
2. Cut with shearing tools or suitable saw.
3. Debur saw-cut edges after cutting panel.

#### 3.04 PANEL DAMAGE AND FINISH SCRATCHES

- A. Do not apply touch-up paint to damaged paint areas that involve minor scratches. Notify Construction Project Manager for inspection, unacceptable panels shall be replaced.
- B. Panels or flashings that have severe paint and/or substrate damage shall be replaced as directed by the Construction Project Manager.

#### 3.05 CLEANING

- A. At completion of each day's work and at work completion, sweep panels and flashings clean. Do not allow fasteners, cuttings, filings or scraps to accumulate.
- B. Remove debris from Project Site upon work completion or sooner, if directed.

END OF SECTION

## SECTION 07 42 13 – METAL WALL PANELS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. The work includes, but is not necessarily limited to, furnishing and installation of all preformed metal wall panels, and accessories as indicated on the drawings and specified herein.

#### 1.02 RELATED SECTIONS

- A. Pre-engineered Metal Building: Section 13 34 19.
- B. Metal Roof Panels: Section 07 41 13.

#### 1.03 SUBMITTALS

- A. Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing required. Include data substantiating that materials comply with these specifications.
- B. Detailed shop drawings must be submitted for approval prior to fabrication. Shop drawings shall indicate the factory coating specifications and other data as necessary to clearly describe gauges, profiles, fastener types and locations.
- C. Prior to ordering products, submit Manufacturer's standard color Samples for ODOT Construction Project Manager's selection.
- D. Prior to starting work, submit 12" long Panel Samples showing shape and a representative color chip for ODOT Construction Project Manager's acceptance, when requested..

#### 1.04 QUALITY ASSURANCE

- A. Installer must be approved by the Panel Manufacturer in writing prior to work commencing.
  - 1. Installer shall meet the following:
    - a. Has successfully applied five metal roofs of comparable size and complexity which reflects a quality weathertight installation in the region where the work will be performed.
    - b. Have been in business for a minimum period of five years in the region where the work will be performed.
- B. Manufacturer's Qualifications:
  - 1. Manufacturer shall have a minimum of 10 years experience supplying metal roofing to the region where the work is to be done.
  - 2. Shall comply with current independent testing and certification as specified.
  - 3. Panel Manufacturers without full supporting literature; Flashings & Details Guides, Guide Specifications and Technical Support, shall not be considered equivalent to the specified product.

#### 1.05 DELIVERY, STORAGE, AND PROTECTION

- A. Comply with manufacturer's recommendations for off-loading materials.
- B. Handle panels with non-marring slings.
- C. Do not bend panels.

- D. Store panels above ground, with one end elevated for drainage.
- E. Protect panels against standing water and condensation between adjacent surfaces.
- F. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and allow to air dry.
- G. Store accessory items in a dry place.
- H. Protect all materials against damage and discoloration.
- I. Remove any strippable film coating prior to installation and do not allow it to remain on the panels in extreme cold, heat or in direct sunlight.

#### 1.06 PROJECT CONDITIONS

- A. Examine the conditions and substrates in which metal roofing work is to be installed. Substrate shall be installed level, flat and true to avoid panel stresses.
- B. Field measurements shall be taken prior to fabrication of panels.
- C. Proceed with roofing installation only after conditions are satisfactory.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. AEP Span, A Division of ASC Profiles Inc., Super Span.
- B. Alternates as approved.
- C. Metal wall panels shall be from the same supplier as metal roof panels specified under Section 07 41 13.

#### 2.02 MATERIALS

- A. Panels
  - 1. Base Metal:
    - c. Material: Steel conforming to ASTM A653 (formerly ASTM A446), G-90 Galvanized, grade 40 for 24 gauge.
    - a. Protective Coating: Conform to ASTM A653 (formerly ASTM A525) G-90 Galvanized.
  - 2. Exterior Finish:
    - c. Dura Tech<sup>®</sup> 5000: Polyvinylidene Fluoride, full 70 percent Kynar 500<sup>®</sup> or Hylar 5000<sup>®</sup>, consisting of a baked-on 0.15-0.25 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 8 to 15 when tested in accordance with ASTM D523 at 60 degrees.
    - d. Color: From manufacturer's standard colors to match color of roof panels specified under Section 07 41 13.
  - 3. Interior Finish:
    - a. Dura Tech 5000/mx Marine 20 Year: Polyvinylidene Fluoride, full 70 percent Kynar 500<sup>®</sup> or Hylar 5000<sup>®</sup>, consisting of a baked-on 0.70-0.80 mil corrosion resistant primer, a baked-on 0.70-0.80 mil finish coat and a baked-on 0.40-0.50 clear coat with a specular gloss of 15 to 25 when tested in accordance with ASTM D523 at 60 degrees.

- b. Color: Bright white
- 4. Configuration:
  - a. Basis of Design Panel: PBR by AEP Span.
  - b. Profile: 36" net coverage, ribs with depth of 1.25" at 12" on center.
  - c. Unless otherwise shown on drawings or specified herein, panels shall be full length. Fabricate flashings and accessories in longest practical lengths.
  - d. Panels shall be factory formed. Field formed panels are not acceptable.
- B. Accessories:
  - 1. Fasteners:
    - a. Exposed fasteners: Long life color matched cast head with self-sealing neoprene washers.
    - b. Provide at locations recommended by manufacturer.
- C. Trim and Flashings:
  - 1. Trim and flashings shall be of 24 gauge prefinished metal to match wall panels to provide a complete and finished installation at all openings and corners.
  - 2. Fabricate flashings and accessories in longest practical lengths.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Panels shall be installed only when substrate and/or subframe is installed and aligned true in plane, accurate, and secured in place.
- B. Verify that installation may be made in accordance with approved shop drawings and manufacturer's installation instructions.

### 3.02 PREPARATION

- A. Field Measurements:
  - 1. Verify prior to fabrication.
  - 2. If field measurements differ from drawing dimensions, notify Engineer prior to fabrication.
- B. Protection:
  - 1. Treat, or isolate with protective material, any contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
  - 2. Protect Work of other trades against damage and discoloration.
- C. Surface Preparation.
  - 1. Clean and dry surfaces prior to applying sealant.

### 3.03 INSTALLATION

- A. Panels:
  - 1. Install per approved Submittal Drawings and manufacturer's installation instructions.
  - 2. Install panel seams vertically.

3. Lap panels starting at the north and working to the south and starting at the east side and working to the west, as applicable.
  4. Do not stretch or compress panel side-laps.
  5. Secure panels without warp or deflection.
- B. Allowable Erection Tolerance: maximum alignment variation is 1/4 inch in 20 feet.
- C. Flashing:
1. Follow manufacturer's installation instructions.
  2. Install flashings to allow for thermal movement.
  3. Remove strippable protective film, if used, immediately preceding flashing installation.
- D. Cutting and fitting:
1. Neat, square and true. Torch and abrasive wheel cutting are prohibited.
  2. Cut with shearing tools or suitable saw.
  3. Debur saw-cut edges after cutting panel.

#### 3.04 PANEL DAMAGE AND FINISH SCRATCHES

- A. Do not apply touch-up paint to damaged paint areas that involve minor scratches. Notify Construction Project Manager for inspection, unacceptable panels shall be replaced.
- B. Panels or flashings that have severe paint and/or substrate damage shall be replaced as directed by the Construction Project Manager.

#### 3.05 CLEANING AND REPAIRING

- A. At completion of each day's work and at work completion, sweep panels and flashings clean. Do not allow fasteners, cuttings, filings or scraps to accumulate.
- B. Remove debris from Project Site upon work completion or sooner, if directed

END OF SECTION



## **SECTION 13 34 19 – METAL BUILDING SYSTEMS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Pre-engineered, shop-fabricated structural steel building frame.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 07 41 13 – Metal Roof Panels.
- B. Section 07 42 13 – Metal Wall Panels.

#### **1.03 REFERENCE STANDARDS**

- A. AISC 360 - Specification for Structural Steel Buildings; American Institute of Steel Construction, Inc.
- B. ASTM A 36 - Standard Specification for Carbon Structural Steel.
- C. ASTM A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- E. ASTM A 490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
- F. ASTM A 529 - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
- G. ASTM A 570 - Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled.
- H. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- I. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- J. ASTM A 992 - Standard Specification for Structural Steel Shapes.
- K. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.
- L. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- M. Metal Building Manufacturer's Association – Metal Building Systems Manual.

#### **1.04 DESIGN REQUIREMENTS**

- A. Design members to withstand applied loads in accordance with the current adopted Oregon Structural Specialty Code and as noted on drawings.
- B. Design of Building shall be prepared by a professional engineer licensed in the State of Oregon. Drawings and calculations shall be sealed by the design engineer.
- C. Configuration of building, frames, columns and bracing shall be as shown on drawings.
- D. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 130 degrees F.
- E. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.
- F. Design Loads shall be as identified on the drawings.

#### **1.05 SUBMITTALS**

- A. See Section 01 33 00 - Submittals, for submittal procedures.
- B. Product Data: Provide data on profiles, component dimensions, fasteners.

- C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections, attachments, and openings; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation; framing anchor bolt settings, sizes, and locations from datum, foundation loads; indicate welded connections with AWS welding symbols; indicate net weld lengths; provide professional seal and signature. Provide electronic set to owner for approval prior to preparation of Plan Review Documents.
- D. Samples: Submit one sample of precoated metal panels for each color selected, 12"x12" inch minimum in size illustrating color and texture of finish and edge condition.
- E. Plan Review Documents: Provide drawings and calculations sealed by a professional engineer as required for permit submittal. Plans shall show column and bracing reactions for all load conditions. Reaction summary shall list individual reactions from dead load, snow load, wind load, earthquake, and collateral load in addition to maximum reactions based on load combinations. Provide in format and number required by the local building jurisdiction.
- F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.
- G. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement, requirements, sizes and special instructions
- H. Project Record Documents: Record actual locations of concealed components and utilities. Record any changes and provide accompanying approval documentation.
- I. Engineering Data: .
  - 1. Show all design loads as specified herein and all reactions (vertical and horizontal) necessary for verification and coordination of foundation design.
  - 2. Clearly show each reaction diagrammatically for this specific structure, including those due to any special loadings noted in the specifications or on the plans.
  - 3. Indicate location, direction, and magnitude, for every critical combination of loadings, at every point of reaction to foundation system.
  - 4. Indicate horizontal reactions for wind loading based upon OSSC Analysis Methods, or MBMA methods, whichever is greater in any given instance.
  - 5. Standard tables, diagrams, or computer print-outs which do not include all loadings or conditions shown, or which require interpolation for spans, bay spacings, loadings, reactions, or other required data, will not be accepted.
  - 6. All Engineering Data submitted shall indicate the Project or building name and bear the seal of an engineer licensed to practice in the State of Oregon.

#### **1.06 QUALITY ASSURANCE**

- A. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a professional engineer experienced in design of this Work.
  - 1. Design Engineer Qualifications: Licensed in the State of Oregon.
  - 2. Conform to Oregon Structural Specialty Code for submission of design calculations as required for acquiring permits.
  - 3. Cooperate with regulatory agency or authority and provide data as requested.
  - 4. The Building Manufacturer shall be responsible for any damages caused by failure to clearly indicate in their submittals all structural reactions to the foundation system, including those imposed by secondary members and bracing.
- B. Perform work in accordance with AISC 360 - Specification for Structural Steel Buildings.
- C. Perform welding in accordance with AWS D1.1.
- D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- E. Erector Qualifications: Company specializing in performing the work of this section with minimum five years of experience. Erector shall be certified or otherwise approved by building Manufacturer.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Pre-Engineered Buildings:
  - 1. Pacific Building Systems.
  - 2. VP Buildings.
  - 3. Butler Manufacturing Company.
  - 4. Web Steel Buildings.
  - 5. Nucor Building Systems.
  - 6. Behlen Building Systems.
  - 7. Metallic Building Co.
  - 8. Star Buildings.
  - 9. Alternates as approved.

### **2.02 PRE-ENGINEERED BUILDING**

- A. Single span rigid frame.
- B. Primary Framing: Rigid frame beams and columns, braced end frames and end wall columns, and lateral bracing. Members shall have solid webs (No open web trusses).
- C. Secondary Framing: Purlins and Girts, and other related items.
- D. Wall System: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly and insulation, and accessory components.
- E. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly, insulation, and accessory components.
- F. Roof Slope: As noted on drawings.

### **2.03 MATERIALS – PRIMARY FRAMING**

- A. Structural Steel Members: All primary material is to be ASTM A-36, ASTM A-570, or ASTM A-572, or ASTM A-529 Grade 50 with a minimum yield point of 50,000 psi.
- B. All primary structural framing members shall be built-up flange sections. Minimum web thickness is 5/16" and minimum flange thickness is 3/8".
- C. All structural connections shall be shop welded butt-plates which are punched or drilled for field bolted assembly.
- D. Post and beam end frames shall be wide flange shapes or three plate built up sections.
- E. Bolts, Nuts, and Washers: ASTM A 325 or A 490.
- F. Welding Materials: Type required for materials being welded. All flange welds shall be continuous submerged arc fillet welds as made on an automatic beam welder. Other welds shall be made using gas metal-arc process with an argon mix shielding gas. Welds shall be made on both sides of flange.
- G. Field welding is not permitted without written approval from Construction Project Manager.
- H. Clips are to be shop welded to outer flanges for field bolted attachment of secondary framing to the primary frames.
- I. Frames shall be anchored to foundation bolts.
- J. Finish: hot dip galvanized.

### **2.04 MATERIALS – SECONDARY FRAMING**

- A. Structural Steel Members: All material used for cold-formed members shall conform to ASTM A-570 Grade 55, with a minimum yield point of 55,000 psi. Minimum thickness is 16 gauge. Secondary framing includes girts, purlins, base channels and miscellaneous cold-formed members.
- B. Finish: Coating is ASTM A 653, G90 galvanizing. Painting is not allowed.
- C. All light-gauge, cold-formed members shall be manufactured by precision roll or brake forming.
- D. Bolts, Nuts, and Washers: ASTM A 307.

- E. Zee shaped members used for purlins shall be 8" or greater depth as required for structural loads and girts shall be 8", or plus or minus 1/2" form size noted. Zees may be simple span or lapped for continuous design.
- F. Space purlins as determined by structural load requirements. Provide all required structural bracing. Standing seam metal roofing shall not be considered to provide bracing support to purlins.
- G. Cee shaped members used for base channels or girts shall be 8" when required.
- H. Flange braces shall be factory precut and punched 2"x2"x1/8" minimum angle or as required by design. Flange braces shall be bolted to a pre-welded clip at frame and to the purlin or girt with one of the following methods to minimize conflict with the insulation system vapor barrier.
  - 1. Provide connection angle fastened to flange of purlin or girt.
  - 2. Cut one leg of brace angle and bend remaining leg to mate flat flange of purlin or girt and fasten.
  - 3. Provide knife plate projection off of purlin or girt web for brace connection.

## 2.05 COMPONENTS

- A. Metal Roof Panels: Specified in Section 07 41 13.
- B. Metal Wall Panels: Specified in Section 07 42 13.
- C. Thermal Tape: Provide thermal tape on all roof purlins to provide separation between top of purlin and bottom of roof panel.
- D. Gutter: Provide manufacturers standard gutter and downspout system in color to match building trim.

## 2.06 FABRICATION - FRAMING

- A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position. Inspect prior Work by others and report any discrepancies affecting Work of this Section to the Engineer. Proceeding with purchases or operations of this Section implies acceptance of prior Work.

### 3.02 ERECTION - FRAMING

- A. Erect Pre-engineered Metal Building in strict accordance with approved shop drawings, and the Manufacturer's erection drawings and specifications.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
- C. Set column base plates to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval.
- E. Erect in accordance with manufacturer's instructions and recommendations.
- F. Coordinate special inspection of high strength bolting.
- G. In the event of discrepancies between the Contract Documents, and the Manufacturer's recommendations, bring such discrepancies to the Engineer's attention. In the event that discrepancies are not made known prior to bidding, the Contractor shall make such modifications as may be directed by the Engineer to carry out the original intent of the design at no additional cost to the Owner. Particularly note required clearances for openings and the installed work of other trades. Variations in girt and purlin locations and depths, wall bracing, roof beam lateral bracing, and anchor bolt locations and spacings etc. are to be expected since the Drawings are general in regard to work of this Section, due to these types of variations between Products of the respective approved Manufacturers.

**3.03 ERECTION - WALL AND ROOF PANELS**

- A. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Use concealed fasteners at roof connections.
- E. Install sealant and gaskets to prevent weather penetration.

**3.04 INSTALLATION - ACCESSORIES**

- A. Install accessories in accordance with manufacturer's instructions.
- B. Seal wall and roof accessories watertight and weather tight with sealant.

**3.05 TOLERANCES**

- A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
- B. Siding and Roofing: 1/8 inch from true position.

**3.06 CLEANING AND REPAIR**

- A. Remove all dents and touch up paint all scratches or blemishes to all finished surfaces. No ferrous metal shall remain unfinished. For the purposes of this paragraph, factory primed or galvanized finished are included as finished surfaces, as well as factory prefinished colored surfaces. Repairs and touch-up painting shall match adjacent surfaces sufficiently that, in Engineer's opinion, they are not visible from 5 feet away.

END OF SECTION

## **SECTION 22 05 00 – BASIC PLUMBING REQUIREMENTS**

### PART 1 - GENERAL

#### 1.01 CONTRACT CONDITIONS

- A. Work of this Division is bound by the Contract General Conditions, this Specification, and accompanying Drawings.
- B. Coordinate with other trades affecting or affected by work of this section.

#### 1.02 SUBMITTALS

- A. Provide submittals for all materials and components.

#### 1.03 COORDINATION

- A. Contractor shall coordinate with work of all other trades for proper execution of the work.
- B. If field measurements differ slightly from drawing dimensions modify the work as required for accurate fit. If measurements differ substantially, notify Project Construction Manager.

#### 1.04 FIELD MEASUREMENTS

- A. System layout on drawings is diagrammatic and may not be exact.
- B. Notify general contractor of conflicts prior to performing any work.

#### 1.05 QUALITY ASSURANCE

- A. Contractor shall have a minimum of 5 years of experience in the installation of similar systems.
- B. All work shall be in accordance with all applicable codes, rules and laws of the jurisdiction having authority.
- C. Installer shall be a licensed plumber in the State of Oregon.
- D. Notify Construction Project Manager at least 48 hours prior to covering work so inspections can be made

### PART 2-PRODUCTS

#### 2.01 DRAIN PIPE AND FITTINGS

- A. Polyvinyl Chloride (PVC) Schedule 40 Pipe and Fittings: Conforming to ASTM D1785 and ASTM D2466 or ASTM D3034 as noted on plans. Connections may be rubber gaskets formed from Nitrile (NBR) or solvent welded, unless noted otherwise on plans. Connections shall be made in accordance with manufacturer's instructions.
- B. PVC Fittings: Supply in sizes, schedules, configurations and shapes as required to install drainage system as shown on drawings.

2.02 PLASTIC SUMP BASIN

- A. Manufacturer: Nyloplast, 770-932-2443, 3130 Vernona Ave., Buford, GA, 30518 or approved alternate.
- B. Size: 36" diameter. Overall height as shown on drawings.
- C. Material: PVC pipe stock reformed using a thermoforming process to the specified configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. Joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The flexible elastomeric seals shall conform to ASTM F477. The pipe bell spigot shall be joined to the main body of the basin. The raw material used to manufacture the pipe stock shall conform to ASTM D1784 cell class 12454.
- D. Grate and Frames: Traffic rated ductile iron grate and frame sized to fit basin. Ductile iron shall conform to ASTM A536 grade 70-50-05. Ductile iron components shall be painted black.

2.03 CATCH BASIN BASIN

- A. Manufacturer: Advantage Precast, Inc., 503-390-2048, 1302 Candlewood Dr. NE, Keizer, OR 97303, or approved alternate.
- B. Size: 24" by 24" inside dimensions with 24" deep sump, conforming to plumbing code requirements
- C. Material: Precast concrete catch basin with minimum compressive strength of 4,000 psi.
- D. Grate and Frames: Fabricated bar grates matching catch basin size.

2.04 OTHER MATERIALS

- A. Recommended by manufacturer and subject to Construction Project Manager's acceptance.
- B. Provide all required to complete and make system operational.

PART 3- EXECUTION

3.01 EXISTING CONDITIONS

- A. Verify that site conditions are acceptable for installation of work as specified. Do not start work until conditions are satisfactory.
- B. Verify that the work of this Section may be installed in accordance with all pertinent codes and regulations and the approved Shop Drawings.
- C. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 INSTALLATION

- A. Install all products in accordance with manufacturer's installation instructions.
- B. Verify clearances for all components prior to assembly.

- C. Set all components to true and accurate grades as shown on drawings.
- D. Insure that all components are clear of obstructions and working properly before and after installation.
- E. Insure all installations are watertight.

### 3.03 TESTING

- A. Fill new sumps and piping with clean water to level of rim. Let sit for 24 hours and measure drop in water level.
- B. Water level drop of less than 1/2" is considered passing. Drop of greater than 1/2" is considered failing and requires correction.
- C. Pump clean water out of system to bottom of all sumps and discharge on site

### 3.04 CLOSING IN UNINSPECTED WORK

- A. Do not cover up or enclose work until it has been properly and completely inspected and approved. Should any of the work be covered up or enclosed prior to all required inspections and approvals; uncover the work as required and, after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Construction Project Manager and at no additional cost to the Owner.

### 3.05 CORRECTIONS

- A. Correct installation of system components is critical to proper function of completed system. Incorrect installations will not be accepted and shall be corrected at contractors expense.

### 3.06 CLEANING & REPAIR

- A. Including work of other trades, clean, repair and touch-up, or replace when directed, products which have been soiled, discolored, or damaged by work of this section.
- B. Remove debris from project site upon work completion or sooner, if directed.

END OF SECTION



## SECTION 26 00 00 - BASIC ELECTRICAL REQUIREMENTS

### PART 1 - GENERAL

#### 1.01 INTENT AND DESCRIPTION OF WORK

- A. The Work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce such construction and all materials and equipment incorporated or to be incorporated in such construction.
- B. The Electrical Drawings are diagrammatic and do not necessarily show all wiring, number or types of fittings, etc. required by the electrical systems. Provide all labor, materials, equipment, and services to construct and install a complete and operable electrical system as diagrammed or scheduled on the drawings, specified herein, or required by code or enforcing agencies. Plan exact locations with respect to architectural drawings, measurements on job and work of other trades.
- C. The Work shall include, but is not necessarily limited to:
  - 1. Complete electrical service and distribution system.
  - 2. Complete lighting and power systems, including branch circuits, wiring devices, lighting fixtures etc.
  - 3. Provide lockout devices and disconnects and connect all electrical equipment.
  - 4. Grounding.
  - 5. Control wiring where required to be run in conduit.

#### 1.02 REGULATORY REQUIREMENTS

- A. Conform to the requirements of the Oregon Electrical Specialty Code, latest adopted edition. If any conflict occurs between adopted code rules and this Specification, the codes are to govern. Nothing in these drawings and specifications shall be construed to permit work not conforming with governing codes.
- B. All electrical equipment shall bear the label of the testing laboratories recognized by the State of Oregon as meeting the testing standards for minimum electrical safety.
- C. Materials shall, where rated, be UL listed and conform to applicable ANSI, NFPA, NEMA, ISA and OSHA, or other recognized standards.

#### 1.03 DESIGN

- A. Major components of electrical system are shown on the drawings. Work must incorporate as a minimum the components and functionality shown on the drawings.
- B. Configuration of electrical system circuits and specific components are by the contractor. Configuration must incorporate as a minimum the components and functionality shown on the drawings.

#### 1.04 QUALITY ASSURANCE

- A. For fabrication and installation of Work under this Section, use only thoroughly trained and experienced workmen, completely familiar with the Products, methods of installation, and applicable codes and ordinances governing the Work. Workmen shall be licensed in accordance with State laws as required to perform the Work.

- B. All work shall be in accordance with all applicable codes, rules and laws of the jurisdiction having authority.

#### 1.05 SUBMITTALS

- A. Provide submittals or product data for all equipment, light fixtures and materials.

#### 1.06 DESCRIPTION

- A. Furnish labor, supervision, and permits and provide all materials and equipment required to complete the work specified herein and shown on the Drawings.
- B. Provide complete and fully operational systems with facilities and services to meet requirements indicated in accordance with applicable codes and ordinances.
- C. The Drawings indicate schematic locations. Verify all locations with actual field conditions and avoid installation conflicts.
- D. Maintain record drawings to reflect installed circuiting.

#### 1.07 PERMITS AND FEES

- A. Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for all permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work in this Division.

#### 1.08 COORDINATION

- A. Contractor shall coordinate with work of all other trades for proper execution of the work.
- B. Notify general contractor of conflicts prior to performing any work.

#### 1.09 PROJECT/SITE CONDITIONS

- A. Install work in locations shown on Drawings, modify and make minor adjustments as required to fit actual conditions.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. All materials shall be new, of the best quality and free from defects. They shall be designed to insure satisfactory operation and operating life in the environmental conditions which will prevail where they are being installed.
- B. Each type of material shall be of the same make and quality. The materials furnished shall be of the standard products of manufacturer's regularly engaged in the production of such equipment.
- C. Fixtures and equipment shall be current models for which replacement items or component parts are readily available. Unless otherwise provided, all electrical items used shall be substantially the same as items of manufacturer which, on the date of opening bids, have been in successful commercial use and operation for not less than one year in projects and units of comparable size.

- D. Protection. Materials and equipment delivered to the site shall be stored and protected in such a manner as to effectively prevent damage from climatic conditions, condensation, dust, physical abuse. A location shall be chosen which will not interfere with the operations of other contractors or the Owner. Storage and handling shall be performed in manners which will afford maximum protection to the equipment and materials.
- E. All equipment shall be one brand, as much as is possible, and one style of circuit breakers so as to minimize maintenance parts inventories.
- F. The main electrical characteristics of the panels for the project shall be suitable to operate at the voltages, phase and frequency as required. All bus shall be braced to withstand the available fault current of the system. All bus shall be copper. Enclosures shall be stainless steel.
- G. Identification cards in panel doors shall be machine printed to identify all circuits. Spare blank cards shall also be provided in each door. Panels shall be fitted with flush lift latches and shall have hinges on the side rather than on the top. Outdoor enclosures shall have full piano hinges and shall be gasketed.
- H. Ground fault circuit interrupters (GFCI) designed to protect against hazards caused by ground faults shall be compatible with other adjacent breakers in the panel. GFCI shall be used where required by code.
- I. Provide all conduit, junction boxes, risers, UG entries and appurtenances as required for all systems. Needed connections with existing circuits shall also be provided.

## 2.02 QUALITY

- A. Without any additional charge, replace or repair any work or Material which develops defects, except from abuse, within one year from the Owner's written acceptance.

## PART 3 - EXECUTION

### 3.01 CODES, ORDINANCES AND REGULATIONS

- A. All work shall conform to all applicable Federal, State and Local Codes, Ordinances, Regulations and Laws.
- B. All work shall conform to the current edition of the National Electrical Code and the Oregon Electrical Specialty Code.
- C. Furnish products listed and classified by the Underwriters Laboratories, Inc. as suitable for the purpose specified and shown.
- D. Code requirements shall be considered a minimum guide for the work. Where Drawings or Specifications require wiring or materials in excess of Code minimum, install work as called for in contract documents.

### 3.02 COORDINATION

- A. Coordinate work with shop drawings of other Specification Divisions. Coordinate work with other trades and determine in advance where conflicts occur.
- B. Report immediately any error, conflict or discrepancy in the Drawings, Specifications and/or existing conditions. Do not proceed until clarifications of all errors, conflicts or

discrepancies have been made.

### 3.01 INSTALLATION AND WORKMANSHIP

- A. Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer to conform with the contract documents. The installation shall be accomplished by workmen skilled in this type of work.
- B. Coordinate the work of this Section with the work of other sections and trades. Study all drawings that form a part of this contract and confer with the various trades involved to eliminate conflicts between the work of this Section and the work of other trades. Check and verify outlet locations indicated on Architectural drawings, door swings, installation details and layouts of suspended ceilings and locations of all plumbing, heating and ventilating equipment.
- C. Install all electrical system components in accordance with applicable codes and regulations and in accordance with standard industry practice.
- D. Install specific components in accordance with manufacturer's published installation instructions and recommendations.
- E. Work shall be performed in a neat and professional manner. Sloppy or poorly executed work shall be removed and replaced at no additional cost to ODOT.

### 3.02 CUTTING OF BUILDING CONSTRUCTION

- A. Obtain permission from the Engineer prior to cutting. Locate cuttings so they will not weaken structural components. Cut carefully and only the minimum amount necessary. Cut concrete with diamond core drills except where space limitations prevent the use of such drills.
- B. All construction materials damaged or cut into during the installation of this work must be repaired or replaced with materials of like kind and quality as original materials by skilled labor experienced in that particular building trade.

### 3.03 DRAWINGS/OPERATING MANUALS

- A. At the project completion, provide to Construction Project Manager one complete set of drawings "red-lined" to show "As-Installed" conditions of all electrical work.
- B. Provide schematic drawings for all electrical systems that differ from the contract drawings at the conclusion of the project. The schematic drawings shall be clearly legible and fully descriptive of the system installation and operation.

### 3.04 CLEANUP

- A. Contractor shall continually remove debris, cuttings, crates, cartons, etc., created by this work. Such clean up shall be done at sufficient frequency to eliminate hazard to the public, other workmen, the building or the Owner's employees.
- B. Contractor shall carefully clean cabinets, panels, wiring devices, cover plates, light fixtures, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces of apparatus shall be removed and new finish equal to the original applied.

3.05 WORKMANSHIP AND INSPECTION

- A. Workmanship shall be of the best quality and none but competent electricians shall be employed. All shall be under the supervision of a competent foreman. All completed work shall represent a neat and professional appearance. All work and materials shall be subject to inspection at any and all times by representatives of the Engineer.

END OF SECTION

## **SECTION 31 11 00 – CLEARING AND GRUBBING**

### **PART 1 GENERAL**

#### **1.01 WORK INCLUDED**

A. Miscellaneous concrete, paving, utilities and other items as noted.

#### **1.02 RELATED WORK**

A. Earthwork – Section 31 20 00.

B. Erosion Control – Section 31 25 00.

#### **1.03 JOB CONDITIONS**

A. Take all precautions necessary to isolate dust and noise to the immediate area. Verify with ODOT's Representative methods to be used to minimize disruption of adjacent property.

B. Protect construction, vegetation, bench marks and monuments in areas to remain undisturbed until Final Completion. Leave in as good condition as found. Protect all trees not designated to be removed.

### **PART 2 PRODUCTS (N/A)**

### **PART 3 EXECUTION**

#### **3.01 PREPARATION AND SITE INSPECTION**

A. Inspect entire site and all objects to be removed and to be preserved; determine all requirements for disconnection, capping or protection of existing utilities, as applicable.

#### **3.02 REMOVAL OF MATERIAL**

A. All materials noted to be removed shall become the property of the contractor unless noted otherwise; and shall be removed from the site immediately or by joint agreement with the Construction Project Manager.

B. Remove materials using proper methods. Comply with Oregon DEQ and other jurisdictional requirements. Obtain proper permits for removal, transportation, and disposal. Permits must be obtained by the contractor or their sub-contractor.

C. Remove all demolition materials in their entirety without damaging features to remain.

#### **3.03 DEMOLITION**

A. Remove all existing construction designated to be removed or required to be removed for the completion of the Work.

#### **3.04 CLEARING AND GRUBBING**

A. Completely clear areas to be occupied by structures, fills or other improvements indicated on the Drawings, and scalp to remove all roots, grass, and other debris. Remove all stumps and roots to a depth of 18", and treat remaining ends of such stumps

and roots over 3" in diameter with herbicide to prevent regrowth. Remove trees only where so noted on the Drawings.

3.05 DISPOSAL OF DEBRIS

- A. Remove from site and legally dispose of all debris unless otherwise noted on the Drawings.

END OF SECTION

## SECTION 31 20 00 - EARTHWORK

### PART 1 GENERAL

#### 1.01 RELATED WORK

- A. Clearing and Grubbing – Section 31 11 00.
- B. Erosion Control – Section 31 25 00.

#### 1.02 WORK INCLUDED

- A. Excavating, backfilling, trenching and compaction for structures.

#### 1.03 WORK INCLUDED BUT SUBJECT TO COST ADJUSTMENTS

##### A. Rock:

1. Definition: All material which by actual demonstration cannot in the Construction Project Manager's opinion, be reasonably excavated with a 3/4 yard manufacturer's rated backhoe equipped with a general duty ripper and rock points, or similar approved equipment and which is, in fact, systematically drilled and blasted.
2. Reimbursed Expense: Should rock, as defined herein, be encountered Owner will pay extra for removal and take credit for Earth Excavation omitted, in accordance with the General Conditions.
3. Volume: The volume of rock for which the Owner will pay extra will be defined as that which is within the required vertical depth of the excavation and 1'-0" on either side of the footing. No payment shall be made for any method of rock removal other than systematic drilling and blasting. If material which would be classified as rock as defined above is mechanically removed with excavating equipment of a larger size than specified above, it shall be understood that any added costs for the removal of material by this method shall be included in the unit price for common excavation.

##### B. Plastic Soils:

1. Definition: Soft, loose, or wet ground that is incapable of supporting material, equipment, personnel, or structure.
2. Reimbursed Expense: Should plastic soils, as defined herein be encountered, which are not indicated in the Contract Documents, Owner will pay extra for dewatering or removal in accordance with the General Conditions.

- C. Buried Objects: Should Wells, Cisterns, Tanks, Cesspools, etc., be encountered, which are not indicated in the Contract Documents, the Owner will pay extra for removal or filling as directed by the Construction Project Manager, in accordance with the General Conditions and Contract Documents.



1.04 PROJECT CONDITIONS

- A. Notify all affected utilities at least 48 hours in advance of actual excavation.
- B. Field locate all utilities including but not limited to gas, water, sewer, telephone, power and storm drain lines in advance of trenching operations.

1.05 GEOTECHNICAL REPORT

- A. A geotechnical report has been prepared by Branch Engineering and is available for contractors review and use.
- B. Project work shall be performed in accordance with geotechnical report recommendations.

1.06 TESTING

A. Soil Bearing:

- 1. Notify Engineer when excavations are complete.
- 2. Do not begin fills, formwork or concrete work until Engineer approves.
- 3. Provide loaded truck for proof rolling and coordinate testing with Construction Project Manager.

B. Compaction:

- 1. Definition: Ratio expressed as percentage of dry density of material compacted in field to maximum dry density of same material as described by ASTM D1557.
- 2. Compaction tests taken when and where directed by Construction Project Manager.
- 3. Tests paid for by Owner if test results indicate specified compaction has been achieved, re-tests for noncompliant compaction shall be paid for by Contractor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Crushed aggregate fill: Washed, sound, durable rock free of soft, friable, thin, elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, or other deleterious substance. 3/4 inch minus mechanically crushed aggregate. No more than 5% passing the No. 200 sieve. Material shall be free of non-aggregate debris.
- B. Open Graded Surface Rock: Washed, sound, durable rock free of soft, friable, thin, elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, or other deleterious substance. Surfaces are to be angular with 100% passing the 3" sieve and 95% retained on the 1" sieve. No more than 5% passing the No. 1/2" sieve. Material shall be free of non-aggregate debris.

- C. Provide a sample of proposed aggregate fill for analysis by testing laboratory.

### PART 3 EXECUTION

#### 3.01 EXCAVATION

- A. Contractor shall inspect the site before starting work. The Contract Documents shall be examined and checked with the field layout to correct any discrepancies that may exist.
- B. The general location of all known underground utilities and other property likely to be encountered in excavation has been shown on the drawings where known. Data shown has been compiled from the best available sources but is to be used for informational purposes only, and its accuracy is not guaranteed.
- C. General: Remove and dispose of all materials encountered to obtain required sub-grade elevations. Do not carry excavations deeper than necessary. All over-excavated areas shall be corrected at the Contractor's expense with crushed aggregate fill to the satisfaction of the Construction Project Manager. Remove unacceptable or excess material from the site. Immediately after excavation is completed, the Construction Project Manager upon notification will make an inspection to determine if testing or additional excavation is required. The Contractor shall provide a minimum of forty-eight hours notice for inspection.
- D. Excavate to lines and grades shown or established. The subgrade upon which the fill or structure is to be placed shall be firm, undisturbed and true to grade. Notify Construction Project Manager of unacceptable conditions prior to proceeding.
- E. Locate excavated material in such a manner that it does not create a hazard to pedestrian or vehicular traffic, nor interfere with existing drainage. If stockpiles are to remain during rainy periods, grade and cover as required to prevent compaction, erosion, and water infiltration.
- F. Known utilities and structures expected to be adjacent to or encountered in the work are shown on the drawings. It is expected that there may be discrepancies and omissions in the location of utilities and structures shown, and no responsibility is assumed by ODOT, Owner, designer, or Construction Project Manager for their accuracy. The Contractor shall be responsible for the actual locating and protecting of existing utilities.
- G. The surface of the excavation shall be restored to original condition. All grading, subgrade preparation, and surfacing shall be installed accurately to the satisfaction of the Construction Project Manager. Where the excavation is made in a paved surface, it shall be cut with a saw on the edge of the excavation to provide a vertical joint.
- H. If existing pavement areas that will be left in place are damaged due to hauling or to any other activity of the Contractor, they shall be replaced at the Contractor's expense as directed by the Construction Project Manager.
- I. Spillage of excavation materials on paved areas shall be immediately cleaned up by the Contractor. If required by the Construction Project Manager, cleanup shall include brooming and flushing with water.

- J. Contractor is responsible for design and installation for all required shoring necessary to complete excavations.
- K. Unless otherwise noted on the Drawings, remove excess excavated and fill materials from site and legally dispose.

### 3.02 UNEXPECTED HAZARDOUS WASTE CONTAMINATION

- A. If unanticipated hazardous substances are discovered during construction, that threaten the health and safety of workers, the public, or the environment, do the following. Immediately remove all affected employees and secure the area to prevent access and notify the Construction Project Manager immediately and provide written notification within 24 hours, setting forth a description of the incident.
- B. The Construction Project Manager will attempt to resolve the unanticipated situation expeditiously. Delays to work due to the discovery of unexpected contamination will be considered for exclusion from contract time.

### 3.03 WATER AND FROST

- A. Keep earth under footings free from frost.
- B. Provide and operate pumping equipment, and provide temporary drainage structures as required to keep excavations free from standing water.
- C. Should bearing surfaces be softened by water or frost, re-excavate to solid bearing and fill as specified for excess excavation.

### 3.04 BACKFILL

- A. Backfill sequentially as work progresses to prevent contamination of imported materials.
- B. Do not place backfill until all underground/underslab utilities are in place and approved by the Construction Project Manager or building officials, as required.
- C. Compact in layers as filled to the density required on drawings, but not less than 95% relative maximum density according to ASTM D1557, at optimum moisture using approved vibrating mechanical compacting equipment.
- D. Place in maximum 8" thick loose layers. Compact to required density before placing subsequent layer.
- E. ODOT will pay for compaction testing for building base and where deemed necessary by Construction Project Manager. Contractor shall coordinate with ODOT to provide test samples of proposed material so that testing can be completed in a timely manner.

### 3.05 GRADING

- A. Contractor responsible for grading and staking shall verify all grades prior to starting grading and when finish grading is completed, to insure proper drainage.
- B. Should site conditions, elevations or slopes conflict with elevations shown on the Drawings, consult the Engineer prior to beginning grading operations.

- C. Grade entire area to smooth, level or evenly sloped uniform surfaces between elevations indicated on Drawings.

END OF SECTION

## SECTION 31 25 00 – EROSION CONTROL

### 1. GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. The Contractor shall maintain and construct temporary erosion control structures as necessary to prevent erosion.

#### 1.02 EROSION CONTROL REQUIREMENTS

- A. All work shall conform to the requirements and guidelines given in the ODOT Routine Road Maintenance “Blue Book” Water Quality and Habitat Guide Best Management Practices, Revised 2014. The “Blue Book” is available from ODOT.
- B. Prior to any construction activity, provisions shall be made for the interception of all potential silt-laden runoff that could result from construction activity. Interception shall preclude any silt-laden runoff from discharging from the proposed construction to downstream properties. Specific laws, ordinances and resolutions regarding pollution prevention and natural resource preservation that may affect this project include, but are not limited to, the following:
  - 1. Federal Clean Water Act
  - 2. ORS 468-740 and OAR 340-41-455 (3)
- C. Erosion control methods shall conform to the guidelines of the ODOT General Permit 1200CA.
  - 1. Contractor shall submit a written Erosion and Sediment Control Plan (ESCP) to the Construction Project Manager prior to the start of construction.
  - 2. The ESCP shall be in conformance with regulatory guidelines.
- D. Contractor shall obtain an Erosion Control Permit and shall comply with all permit provisions, when required by local jurisdiction having regulatory authority.

### 2. PRODUCTS

#### 2.01 BIOFILTER BAGS

- A. Provide minimum size 18” x 6” x 30” plastic mesh bags with ½” openings filled with approximately 45 pounds of clean, 100% recycled wood-product waste.

#### 2.02 SAND BAGS

- A. Provide 24” x 12” x 6” durable, weather-resistant, tightly woven bags sufficient to prevent leakage of filler material. Fill bags with at least 75 pounds of firmly packed fine aggregate 3/8” minus or 3/8” to 3/16” pea gravel.

#### 2.03 SEDIMENT FENCE

- A. Provide prepared fence with integral 2 x 2 wood stakes. Embed base of fence in soil to block sediment passage.

2.04 OTHERS

- A. Provide other products and materials as necessary for a successful ESCP.

3. EXECUTION

3.01 GENERAL

- A. All erosion control products and materials shall be installed in accordance with the manufacturer's recommendations and shall conform to the requirements of applicable permits.
- B. Maintain all erosion control and sediment prevention elements to ensure that no sediments are allowed to leave the construction area. Make necessary adjustments to the erosion control plan throughout the project as required.
- C. Inspect erosion control elements at least once every 7 days, but within no more than 24 hours in the event of a significant rainfall event. Correct any deficiencies immediately upon discovery.
- D. All sediment barriers shall remain in place for the duration of work and shall be removed after surface restoration and cleanup has occurred.
- E. Erosion Control plans show a method for control of sediments. Contractor may propose an alternate approach that provides equivalent or better protection. Alternate proposals must be approved by ODOT Construction Project Manager and local jurisdiction prior to use.

END OF SECTION

## **SECTION 32 01 16 – ASPHALT PAVEMENT FOG SEAL**

### 1. GENERAL

#### 1.01 DESCRIPTION

- A. This item shall consist of furnishing and applying emulsified asphalt fog coat seal over asphalt concrete pavement in accordance with these specifications. The fog coat referred to in these Specifications is a treatment applied to existing asphalt concrete Pavement surfaces to renew and seal the Pavement surface.

### 2. PRODUCTS

#### 2.01 MATERIALS

- A. Provide Emulsified Asphalt conforming to the requirement of ODOT's publication, "Standard Specifications for Asphalt Materials". Copies of the publication are available from the ODOT Pavement Services Engineer. The applicable specifications are those contained in the current publication on the date the Project is advertised. The materials may be conditionally accepted at the source or point of loading for transport to the Project.
- B. Fog Coat: CSS-1, CSS-1h, OR HFRS-P1 as selected by contractor. Types are as defined in the Oregon Standard Specifications for Construction 2018.
- C. For every part Emulsified Asphalt, add not more than one part water. Add water at point of supply or point of application as directed, and mix with Emulsified Asphalt. The exact proportion of added water will be determined in a manner acceptable to the Engineer.

### 3. EXECUTION

#### 3.01 PREPARATION OF UNDERLYING SURFACES

- A. Immediately before applying the fog coat, the surface shall be cleaned as required and dry. Clean all loose material by brooming, flushing with water or other approved methods.

#### 3.02 WEATHER LIMITATIONS

- A. Do not place the fog coat when the air temperature is below 60 degrees Fahrenheit, or when the Engineer determines that weather or surface conditions are detrimental to proper construction.

#### 3.03 EQUIPMENT

- A. Provide a pressure distributor, hauling vehicles, and other necessary Equipment to ensure efficient operation and construction to meet specified results. Provide Equipment in such number and capacities as will provide coordinated and uniform progress of the Work.

- B. Provide an asphalt distributor designed, equipped, maintained, and operated so the Emulsified Asphalt material is applied uniformly at even heat. The distributor shall be capable of applying the asphalt on variable surface widths, at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard, and with uniform pressure. The variation allowed from any specified rate shall not exceed 0.02 gallons per square yard. Provide distributor Equipment that includes a tachometer, pressure gauges, accurate volume measuring devices and a thermometer for measuring temperature of tank contents. Provide distributors equipped with a positive power unit for the asphalt pump, and full circulation spray bars adjustable both laterally and vertically. Set the bar height for triple lap coverage.

3.04 APPLICATION OF FOG COAT

- A. Construct the fog coat with a single spread of asphalt.
- B. Apply asphalt at a uniform rate, normally within a range of 0.20 to 0.75 gallons per square yard of surface. The exact rate of application will be determined by the Engineer.

END OF SECTION



## SECTION 32 12 14 - ASPHALT TACK COAT

### 1. GENERAL

#### 1.01 DESCRIPTION

- A. This item shall consist of furnishing and applying emulsified asphalt material to curbs, existing pavement (including between lifts of pavement) or joints and sawcut edges in accordance with these specifications.

### 2. PRODUCTS

#### 2.01 MATERIALS

- A. Emulsified Asphalt: CSS-1, CSS-1h, CMS-2, CMS-2S, CMS-2h, CRS-1, CRS-2, HFRS-2, OR HFMS-2 as selected by contractor. Types are as defined in the Oregon Standard Specifications for Construction 2018.
- B. Provide emulsified asphalt meeting the requirements of ODOT's publication "Standard Specifications for Asphalt Materials". Copies of the publication are available from the ODOT Pavement Services Engineer.
- C. Excessive delay in the use of the emulsified asphalt or excessive pumping of the emulsified asphalt may significantly reduce the viscosity and may make the material unsuitable for tack coat use. For this reason limit pumping between the bulk storage tank, hauling transportation, field storage tanks and distributor to an absolute minimum to maintain proper viscosity. Final acceptance of emulsified asphalt will be at the point of application.

### 3. EXECUTION

#### 3.01 PREPARATION OF UNDERLYING SURFACES

- A. Immediately before applying the tack coat, the surface to be tacked shall be cleaned as required and dry. Clean all loose material by brooming, flushing with water or other approved methods.

#### 3.02 WEATHER LIMITATIONS

- A. The tack coat shall be applied only when the existing surface is dry, when the surface temperature in the shade is 50 deg. F or above, and when the weather is not foggy or rainy.

#### 3.03 EQUIPMENT

- A. Provide an asphalt distributor designed, equipped, maintained and operated so the emulsified asphalt material may be applied uniformly at even heat. The distributor shall be capable of applying the asphalt on variable surface widths up to 16 feet, at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard, and with uniform pressure. The variation allowed from any specified rate shall not exceed 0.02 gallons per square yard. Provide distributor equipment that includes a tachometer,

pressure gages, accurate volume measuring devices and a thermometer for measuring temperature of tank contents. Provide distributors equipped with a positive power unit for the asphalt pump, and full circulation spray bars adjustable both laterally and vertically. Set the bar height for triple lap coverage.

3.04 APPLICATION OF TACK COAT

- A. Apply the asphalt with a pressure distributor conforming to 3.03, unless otherwise permitted. Apply the asphalt to the prepared surface at a rate between 0.05 and 0.20 gallons per square yard as directed and with the emulsified asphalt temperature between 140 deg. F and 185 deg. F as recommended by the manufacturer.
- B. Following the application, the surface shall be allowed to cure without being disturbed for such period of time as may be necessary to permit drying out and setting of the tack coat. The surface shall then be maintained by the Contractor until the next course has been placed. Suitable precautions shall be taken by the Contractor to protect the surface against damage during this interval. Asphalt concrete pavement shall be placed before tack coat loses its tackiness.

END OF SECTION

## SECTION 32 12 16 – ASPHALT CONCRETE PAVING

### 1. GENERAL

#### 1.01 DESCRIPTION

- A. This item shall consist of furnishing and placing asphalt concrete surface course composed of mineral aggregate and asphaltic material, mixed in a central mixing plant and placed on a prepared course in accordance with these specifications, and shall conform to the dimensions, typical cross sections, lines and grades shown on the plans or established by the Construction Project Manager. The terms "Hot Mixed Asphalt Concrete (HMAC)", "Asphalt Concrete Pavement (ACP)", and "Asphalt Concrete" are synonymous.
- B. When specified on the plans, the surface course shall be constructed in two or more courses. Each course shall be constructed to the depth, typical section, or elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course. No single course shall exceed two inches in thickness.

#### 1.02 RELATED WORK

- A. Section 31 20 00 - Earthwork.
- B. Section 32 01 16 – Asphalt Pavement Fog Seal.
- C. Section 32 12 14 - Asphalt Tack Coat.

### 2. PRODUCTS

#### 2.01 MATERIALS

- A. Asphaltic Concrete: The asphaltic concrete materials and aggregate gradation shall conform in all respects to the requirements set forth in the Oregon Department of Transportation Oregon Standard Specifications for Construction. The various classes of asphaltic concrete are noted below. The mix design shall be in accordance with these specifications.
- B. The hot mixed asphalt concrete shall be a hot plant mixed, uniformly coated mixture of asphalt cement, graded aggregate and additives as required.
- C. All asphalt concrete supplied on the job shall conform to the requirements of a Level 3 HMAC meeting the broadband limits for a 3/8" dense graded mix as defined in the Oregon Standard Specifications for Construction 2018, Section 00744.12.
- D. Provide a Job Mix Formula in accordance with Oregon Standard Specifications for Construction 2018, Section 00744.13. Test results for the job mix formula shall be submitted to the Construction Project Manager for review if requested. The Construction Project Manager will be the sole judge in determining the acceptability of test methods and test results in establishment of the job mix formula. Approval of the job mix formula does not relieve the Contractor in any way of the responsibility for delivery to the job site of an asphalt concrete mixture meeting the requirements of the project.
- E. The applicable ODOT gradation represents the limits which shall determine suitability of aggregate for use from the sources of supply. The final gradation decided on within

the limits designated in the table shall be dense graded and shall not vary from the low limit on one sieve to the high limit on the adjacent sieves, or vice versa. In no case will the gradation of the asphalt concrete surface course be allowed to extend outside the limits of the broadband specification.

- F. Produce coarse and fine Aggregate from crushed Rock or other inert material of similar characteristics. Aggregate shall be in accordance with Oregon Standard Specifications for Construction 2018, Section 00744.10.
- G. Furnish asphalt cement and additives in accordance with Oregon Standard Specifications for Construction 2018, Section 00744.11.
- H. Produce and place AC within the JMF tolerances and limits defined in Oregon Standard Specifications for Construction 2018, Section 00744.14.
- I. Testing and acceptance shall be in accordance with the Oregon Standard Specifications for Construction 2018, Sections 00744.16 and 00744.17.

### 3. EXECUTION

#### 3.01 WEATHER AND SEASONAL LIMITATIONS

- A. The surface course shall be constructed only upon a dry surface, when the surface temperature in the shade is 50 degrees Fahrenheit or above, and when the weather is not foggy or rainy. The temperature requirements may be waived, but only when so approved, in writing by the Construction Project Manager.

#### 3.02 EQUIPMENT

- A. Equipment for hauling, placing and finishing shall be of the proper size and configuration to place and compact material to the lines grades and compactions shown or specified. Equipment shall be in good working condition and free from materials or conditions that would adversely impact the placement or quality of asphalt pavement.
- B. Provide self-propelled steel-wheeled or vibratory rollers specifically designed to compact AC and capable of reversing without backlash. Provide a sufficient number of appropriately weighted rollers to compact the mixture. Equip vibratory rollers with amplitude and frequency controls. Do not operate in vibratory mode for Lifts thinner than two times the maximum Aggregate size for the type of AC being compacted.

#### 3.03 TRANSPORTATION AND DELIVERY OF THE MIXTURE

- A. Produce AC within the temperature ranges recommended by the asphalt cement Supplier for the grade of asphalt being used on the Project. Establish the allowable mixing and placement temperature ranges by the JMF. Measure the mixture temperature at the discharge of the mixer. Measure the placement temperature behind the paver. The allowable production temperatures may be adjusted based on the asphalt cement Supplier's recommendation if approved by the Engineer. The maximum mixture temperature and the minimum placement temperature shall be between 350 degrees Fahrenheit at the mixer and 240 degrees Fahrenheit behind the paver.
- B. No loads of mixture shall be transported from the mixing plant to the point of use so late in the day as to prevent the spreading and compacting of the mixture during daylight, unless otherwise approved by the Construction Project Manager. If placing of material during other than daylight hours is permitted by the Construction Project Manager, adequate lighting shall be provided at no additional cost.

- C. Haul, deposit and place AC according to Oregon Standard Specifications for Construction 2018, Section 00744.43.

#### 3.04 PREPARATION FOR PLACING

- A. Immediately before placing the bituminous mixture, the existing underlying course shall be cleaned of loose or deleterious material.
- B. Construct a tack coat prior to placing each lift of asphalt concrete, at saw cut edges and against concrete structures according to Section 32 12 14. A tack coat is not required prior to placing asphalt concrete on aggregate base.
- C. The mixture shall be laid only upon an approved underlying course which is dry and in suitable condition, and when weather conditions are favorable. No mixture shall be placed when the air temperature in the shade and away from artificial heat is 50 degrees Fahrenheit, or lower, unless so directed by the Construction Project Manager.
- D. Contractor shall verify that all valve boxes, manholes, catch basins, and other appurtenances and structures are exposed and adjusted to finish grade. Adjustment of these structures is considered incidental to paving work.

#### 3.05 MACHINE SPREADING

- A. Upon arrival, the mixture shall be immediately spread to the full width required with an approved asphalt paver. It shall be struck off in a uniform layer of such depth that, when the work is completed, it will have the required thickness and will conform to the grade and surface contour required.
- B. Contractor shall provide a 10 foot straightedge, and continually confirm grade and acceptable tolerances through the paving operation. The pavement surface shall not vary by more than 1/4" when checked with a 10 foot straightedge.
- C. Exposed vertical edges of paved strips shall be free of all accumulations of dirt or other foreign material before any mixture is spread in an adjacent pass. If joint faces become dry or dusty, the contact surfaces should be given a light tack coat.
- D. In areas where, because of irregularities or unavoidable obstacles, the use of mechanical spreading and finishing equipment is impractical, the mixture may be hand spread. It shall be spread with rakes in a uniformly loose layer to the full width required and of such depth that, when the work is completed, it will have the required thickness and will conform to the grade and surface contour shown on the plans. Contractor shall avoid segregation of materials in hand spreading operations.
- E. Vertical surfaces of existing pavement and curbs, walls, catch basins, manholes, and the like, against which asphaltic concrete is to be placed, shall be completely painted with tack coat immediately ahead of placing the asphaltic concrete pavement. Against curb faces, the Contractor shall apply the tack in a neat workmanlike manner so as not to blacken the curb or wall face above the finished surface.
- F. At longitudinal joints, bond, compact and finish the new AC equal to the AC against which it is placed. Place the AC in Panel widths which hold the number of longitudinal joints to a minimum. Offset the longitudinal joints in one Panel by at least 6 inches from the longitudinal joints in the Panel immediately below.

3.06 COMPACTION OF MIXTURE

- A. After spreading, the mixture shall be thoroughly and uniformly compacted with power rollers. Rolling of the mixture shall begin as soon after spreading as it will bear the roller without undue displacement or hair checking.
- B. Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until all roller marks are eliminated, the surface is of uniform texture and true to grade and cross section. Compaction shall be in accordance with the Oregon Standard Specifications for Construction 2018, Section 00744.49.
- C. In areas not accessible to the roller, the mixture shall be thoroughly compacted with hot hand tampers.
- D. Any mixture which becomes loose and broken, mixed with dirt, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work will be done at the Contractor's expense. Skin patching shall not be allowed.

3.07 ADJOINING PAVEMENTS DESIGNATED TO REMAIN

- A. The matching edge of all existing pavements designated to remain shall be saw cut the full depth of the pavement in a straight and true line. The saw cut edge shall be protected from damage until the finished surface has been completed. Edges which are damaged shall be re-sawn the entire length of the matching joint prior to placing the finished surface. No additional payment shall be made for saw cutting pavement, it shall be considered incidental to the work.
- B. Where drawings call for feathering of a new overlay to match an existing pavement surface, the new edge thickness shall be gradually reduced as shown on the drawings to form a uniform edge of zero thickness to the extent physically possible.

3.08 SHAPING EDGES

- A. While the surface is being compacted and finished the Contractor shall carefully trim the outside edges of the pavement to the proper alignment. Edges so formed shall be beveled while still hot with the back of a rake or a smoothing iron and thoroughly compacted by tampers or by other satisfactory methods.

3.09 SURFACE TESTS

- A. The finished surface shall not vary more than one-quarter inch for the surface course when tested with a 10 foot straightedge applied in any direction.
- B. After the completion of final rolling, the smoothness of the course shall be tested; humps or depressions exceeding the specified tolerances or that impede drainage on the surface shall be immediately corrected by removing the defective work and replacing with new material, as approved by the Construction Project Manager. This shall be done at the Contractor's expense.
- C. Finished surfaces shall be smooth and free of abrupt changes even at grade changes or transitions shown on the drawings. Transitions and grade changes shall be smooth and gradual so as not to create a noticeable effect when driven over in a vehicle.

3.10 PROTECTION OF WORK

- A. Including work in other sections, correct any defects in material and work, as directed, at the Contractor's expense. These include segregation of materials, non-uniform texture, fouled surfaces preventing full bond between successive spreads of mixture, and as noted below. No adjustment in Contract time will be made for corrective work.
- B. Boils and Slicks - Immediately remove and replace boils and slicks with suitable materials.
- C. Roller Damage to Surface - Immediately correct any displacement with the addition of fresh mixture, or by other approved methods regardless of thickness or course.
- D. Nonspecification Compaction - Immediately take corrective measures when it is determined that specified compaction density is not achieved.
- E. Other Defects - Remove and replace any asphalt concrete that: Is loose, broken, or mixed with dirt; Shows visually too much or too little asphalt; Is defective in any way.
- F. Remove and replace asphalt concrete defects, excesses or deficiencies at the contractor's expense.

END OF SECTION