

**SECTION IV**

**GENERAL CONSTRUCTION ITEMS**

## CERTIFICATION PAGE

The documents for this Project were prepared by me or under my direct supervision:

**Technical Specifications:** E-020, C-102, C-105, E-110, E-180, E-190, P-101, P-152, P-208, ODOT 00730, ODOT 00744, P-217, E-210, P-605, P-610, P-620, D-701, D-705, D-751, E-906, E-907, T-901, T-905, and L-125

Pages or sheets covered by this seal:

**Drawings: 1-24 and 28**



**KEN JERNSTEDT AIRFIELD  
NEW T-HANGAR, TURF TAXILANE AND SITE IMPROVEMENTS**

**Tracy May, P.E.  
Precision Approach Engineering, Inc.  
May 2025**

**ITEM E-020 GENERAL REQUIREMENTS**

**020-1.1** This item shall consist of preparatory work, furnishing submittals, and other operations, including, but not limited to, work necessary to set up barricades, complete utility locates; set up and dismantle all temporary offices, buildings, facilities, and utilities; and perform site restoration and cleanup. This item shall also include all items required for construction phasing and safety during construction of this project, whether specified on the drawings or not. In addition, included shall be all costs associated with shutdowns outlined on the drawings or shown in the specifications. No additional compensation shall be due Contractor for planned shutdowns.

**020-1.2** This item shall also include all work required for construction survey and staking, as well as location or identification of existing utilities.

**020-2.1 LOCATION AND DRAWINGS.**

a. Location. The location of the work is at the **KEN JERNSTEDT AIRFIELD, HOOD RIVER, OREGON**. A vicinity map is shown on Sheet 1 of the Drawings.

b. Drawings. The Drawings for the construction of “**NEW T-HANGAR, TURF TAXILANE AND SITE IMPROVEMENTS**” Airport Improvements Program, AIP Project No. **3-41-0026-020-2025 (Taxilane)**, Infrastructure Investment and Jobs Act, IIJA Project No. **3-41-0026-021-2025 (T-Hangar)** consist of 28 sheets, and dated May 2025.

**020-3.1 DISPOSAL.** All materials shall be disposed of offsite, unless otherwise shown on the drawings. Arrangements for the disposal of all other materials shall be made by the Contractor. No direct payment will be made for disposal of unused materials.

**020-4.1 SITE INVESTIGATION AND REPRESENTATION.** The Contractor acknowledges that they have satisfied themselves as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, disposal, handling, and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

a. The Contractor further acknowledges that they have satisfied themselves as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site, all exploratory work done by the Owner, as well as from information presented by the Drawings and Specifications made a part of this Contract. Any failure by the Contractor to acquaint themselves with all the available information will not relieve them from the responsibility for properly estimating the difficulty or cost of successfully performing the work.

b. The Contractor warrants that as a result of their examination and investigation of all the aforesaid data, they can perform the work in a good and workmanlike manner and to the satisfaction of the Owner. The Owner assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the Owner. Representations for which liability is not expressly assumed by the Owner in the Contract shall be deemed only for the information of the Contractor.

c. Dewatering. It is anticipated that dewatering will be required to lower the water table, remove standing water, or lower the moisture content of soils encountered to achieve workability and compaction. In addition, dewatering may be required to properly grade ditches, lay pipe or cable in trenches, or for making foundations suitable for embankment or base materials. Soft or yielding materials which can be stabilized by dewatering shall not be classified as unsuitable foundation. No direct payment for dewatering shall be made and all costs incurred shall be considered as incidental to the appropriate bid items.

**020-5.1 FIRE PREVENTION AND PROTECTION.** The Contractor shall perform all work in a fire-safe manner. They shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable local and state fire prevention regulations and where the regulations do not cover, with applicable parts of the National Fire Prevention Standard for "Safeguarding Building Construction Operations," (NFPA No. 241).

**020-6.1 GENERAL CONSTRUCTION RESPONSIBILITIES AND PROCEDURES.**

a. Haul Routes and Maintenance. Any haul roads and access roads shall be constructed by the Contractor at their expense. The Contractor shall perform all necessary maintenance of haul routes during construction and shall perform all work as necessary to restore the routes used by their equipment to their original condition at the conclusion of construction. New roadways shall be obliterated and original vegetation reestablished. Existing roadways, runways, taxiways, and aprons shall be patched or overlaid as necessary to restore them to original condition.

Haul routes shall be sprinkled with water as necessary to prevent dust diffusion during the course of the work. Should soil conditions require gravel placement to maintain a satisfactory haul road, it shall be done at the Contractor's expense.

Turfed areas surrounding roadways, runways, taxiways, and aprons that are disturbed as a result of the Contractor's operations shall be restored to new condition.

All maintenance and restoration work shall be completed to the RPR's satisfaction before final payment is awarded. No direct payment will be made for this work.

b. Responsibility for damage to existing structures. Where any existing structures or facilities which are intended to remain are damaged by the Contractor during demolition or construction, the Contractor shall promptly repair or replace the damaged portion or facility at their expense.

**MATERIALS**

**020-7.1 SUBMITTALS, CERTIFICATIONS AND PERMITS.** As required by the Specifications or shown on the Drawings, the Contractor shall develop and submit material and project submittals, prepare and provide design and design drawings as required, furnish shop drawings, and furnish material certifications as required to procure required permits, reviews, approvals and complete the project.

a. The date when the Contractor provides the submittal(s) to the RPR shall be included in the Contractor's project schedule. All submittals shall have assigned due dates that correspond with approved schedule start dates for related activities allowing a minimum fifteen (15) calendar days, or otherwise specified in the Specifications, for the RPR's review as well as adequate time for fabrication and delivery of the material. The RPR shall not be held responsible for late or inadequate submittals provided by the Contractor. Materials shall not be incorporated into the work without the submittal, shop drawing, or material certification reviewed by the RPR.

b. Prior to submission, the Contractor shall review each submittal and indicate with signature on an original letter that they have reviewed and approved the submittal and that it conforms to the Contract Documents. If this original letter is not included, the submittal and/or shop drawing will be returned without any action by the RPR.

Submittal data shall be presented in a clear, precise, and thorough manner. Original catalog sheets are preferred, however, photocopies are acceptable provided they are of good quality and legible. The Contractor shall clearly and boldly mark each copy to identify pertinent products or models applicable to the project. At the time of each submittal, the Contractor shall identify any proposed deviations or substitutions from the Contract Documents.

Review by the RPR is only for conformance with the Contract Documents. Review does not cover dimensions, quantities, accuracy, fit, compatibility or any assembly for which the item under review may be a component. Review action does not authorize deviation from Contract Documents or substitution of materials.

c. The RPR will complete the review within a reasonable period of time depending upon the size, complexity and number of submittals received. Every effort will be made to review submittals within ten (10) calendar days of receipt by the RPR, however, the RPR will not be responsible for any project impacts should the review period exceed the ten (10) calendar days.

**020-7.2 TEMPORARY FACILITIES.** The Contractor shall provide all temporary facilities as required for performing the work.

**020-7.3 TEMPORARY WATER.** The Contractor shall make all arrangements for obtaining water and pay all costs for same. Water shall be potable water obtained from a municipal source or well. The use of reclaimed water is not allowed. The use of additives, such as chemicals, abrasive materials, detergents, or salt water is not allowed.

**020-7.4 TEMPORARY ELECTRIC POWER.** The Contractor shall make all arrangements for electric power for use during the construction period until final acceptance by the Owner, and pay all costs for same.

**020-7.5 SECURITY FENCING.** Construct a temporary security fence around the Contractor's staging area. Maintain the fence during construction period and provide security for the Contractor's existing materials and facilities.

**020-7.6 PARKING FACILITIES.** Provide parking facilities for personnel working on the project. Employee or equipment parking will be permitted only in areas specifically designated for the Contractor's use. No employee-owned vehicles shall be permitted within the airside area of the airport.

**020-7.7 RECORD DRAWINGS.** The Contractor shall maintain a set of full size drawings on site noting changes in project layout, details, and other information shown on the drawings. Record drawings shall contain the names, addresses, and phone numbers of the Prime Contractor and Subcontractors used.

**020-7.8 CONSTRUCTION SURVEY AND STAKING.** The Contractor shall perform all survey activities necessary to control the many phases of work required to construct the Project to the lines and grades as shown, established, or specified in the Specifications or shown on the Drawings. The survey shall be conducted by a surveyor licensed in the State of Oregon and conducted under the supervision of a PLS.

**020-7.9 CONTRACTOR'S STAGING AREA.** An area has been set aside on the Owner's property for the Contractor's use as a staging area for personnel, equipment, and materials. The approximate site location is shown on the Drawings. The RPR will define the actual location in the field. In the event additional space is required for the Contractor's operations, the Contractor shall make arrangements with the Owner. The staging area shall be kept in a neat and orderly condition. The area shall be restored to its original condition at the conclusion of the work.

**020-7.10 SAFETY PLAN COMPLIANCE DOCUMENT.** The Contractor shall submit and comply with a Safety Plan Compliance Document (SPCD) as required in the Construction Safety and Phasing Plan. The SPCD shall incorporate the requirements of the Construction Safety and Phasing Plan (CSPP).

**020-7.11 RADIO.** The Contractor shall provide a minimum of two radios, one carried by the safety officer and the other by the Superintendent, unless otherwise agreed to with the RPR and Owner. The radios shall have dual power source; i.e., battery and a car/truck plug in, and be capable of communication on the airport VHF frequency (See CSPP). Radio checks shall be made daily as coordinated with the RPR and Owner.

**020-7.12 PROJECT WINTERIZATION AND SHUTDOWNS.** It is planned that the project will be shut down and/OR winterized. At such time that project is shut down, and the Contractor has verified with the RPR that all erosion control measures are in place to protect the work, the contract time will be suspended until notification is given to resume work. During the shutdown or winterization period, the Contractor is responsible for maintaining permit requirements and all conditions contained in the erosion and sediment control plan (ESCP) as noted on the Drawings, conform with Specification Section C-102, and meet all CSPP requirements, including maintaining and repairing portable low-profile barricades. The contractor shall inspect the project site monthly during the winterization period for compliance with project requirements. The Contractor shall be on call to repair, replace or supplement items not meeting project requirements within 48 hours of a request by the RPR or owner/airport. All costs associated with Project Shut Downs of Winterization, including, de-mobilization and re-mobilization shall be considered incidental to the Temporary Erosion Control and Mobilization Bid Items.

## CONSTRUCTION METHODS

**020-8.1 LAYOUT OF TEMPORARY FACILITIES.** Set up construction facilities in a neat and orderly manner within designated area. Accomplish all required work in accordance with applicable portions of these Specifications, or as approved. Confine operations to work area shown.

**020-8.2 OBSTRUCTIONS.** Some obstructions may not be shown. Bidders are advised to carefully inspect the existing facilities before preparing their bids (proposals). The removal of minor obstructions such as rocks and other debris shall be anticipated and accomplished, even though not shown or specifically mentioned.

**020-8.3 TEMPORARY SHUTDOWN.** The Contractor shall cease operations during periods indicated on the drawings. During this time, the Contractor shall secure all materials within the staging area, set up barricades, cones, or other safety measures as specified or as directed by the RPR.

**020-8.4 RECORD DRAWINGS, TEST RESULTS, SURVEY NOTES AND QUANTITY COMPUTATIONS.** At the conclusion of the work, the Contractor shall furnish the RPR with one set of record drawings. This shall be a full-size set of Contract drawing prints accurately marked to reflect current conditions or any changes in geometric layout of project items, changes in details, drainage structure grade and invert elevations, and changes in work that occurred during the course of the project. The Contractor shall provide a report containing all test results, separated by material type as required by the specifications and a copy of all survey notes and computations made in connection with the work to the RPR.

The Contractor shall furnish the RPR with survey notes of "finish grades" for all improvement in this project. The data shall include as a minimum:

1. Elevations at centerline, all lateral grade breaks, drainage swales, and outside edges of pavement every 25 feet for newly paved or newly constructed areas.
2. Edge of pavement in new pavement and turfed areas.
3. Locations, rim elevations, and inverts of new, raised or lowered; cleanouts, drainage structures, catch basins and manholes.
4. Elevation and location of all survey reference points or any new disturbed, or replaced, benchmark or control point.
5. Any work performed by change order that can be reflected in the Drawings.

The Contractor shall provide a complete summary of all drawings, diagrams, notes, calculations and computations used to determine measurement for pay quantities and submit them to the RPR with each payment request.

Final payment will not be made until the "record drawings", survey data, test results, and all other items under this specification have been submitted.

## METHOD OF MEASUREMENT

**020-9.1** No direct measurement for work specified under Section GENERAL REQUIREMENTS shall be made with the exception of Construction Survey and Staking.

**020-9.2** The measurement for the quantity of Construction Survey and Staking shall be partial payments and will be allowed as follows;

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, delivery of all Project Closeout materials as required by GP 90-11, the final 10%.

**BASIS OF PAYMENT**

**020-10.1** No direct payment for work specified under Section GENERAL REQUIREMENTS shall be made with the exception of Construction Survey and Staking. Payment for work specified under Section GENERAL REQUIREMENTS, with the exception of Construction Survey and Staking, shall be considered incidental to the Contract price.

**020-10.2** Payment shall be made at the Contract lump sum for Construction Survey and Staking. This price shall be full compensation for all construction surveying, for furnishing all materials, labor, equipment, tools, submittal of all required documentation, and incidentals necessary to complete the item.

Payment will be made under:

Bid Item No. A-1	Construction Survey and Staking - per Lump Sum
Bid Item No. B-1	Construction Survey and Staking - per Lump Sum

## **ITEM C-102 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL**

### **DESCRIPTION**

**102-1.** This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

### **MATERIALS**

**102-2.1 GRASS.** Not Used

**102-2.2 MULCHES.** Not Used

**102-2.3 FERTILIZER.** Not Used

**102-2.4 SLOPE DRAINS.** Not Used

**102-2.5 SILT FENCE.** Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

**102-2.6 OTHER.** All other materials shall meet commercial grade standards and shall be approved by the RPR before being incorporated into the project.

### **CONSTRUCTION REQUIREMENTS**

**102-3.1 GENERAL.** In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The Contractor shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

**102-3.2 SCHEDULE.** Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.



**102-3.3 CONSTRUCTION DETAILS.** The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; that are required for temporary stabilization of the site prior to project winterization; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

**102-3.4 INSTALLATION, MAINTENANCE AND REMOVAL OF SILT FENCE.** Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR.

## **METHOD OF MEASUREMENT**

**102-4.1** No separate measurement for payment shall be made for temporary erosion and pollution control. Temporary erosion and pollution control work shall be considered necessary and incidental to the work of this Contract.

**102-4.2** Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

#### **BASIS OF PAYMENT**

**102-5.1** No payment will be made separately or directly for temporary erosion and pollution control. Temporary erosion and pollution control work shall be considered necessary and incidental to the work of this Contract

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

#### **REFERENCES**

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

##### **Advisory Circulars (AC)**

AC 150/5200-33      *Hazardous Wildlife Attractants on or Near Airports*

AC 150/5370-2      *Operational Safety on Airports During Construction*

##### **ASTM International (ASTM)**

ASTM D6461 *Standard Specification for Silt Fence Materials*

##### **United States Department of Agriculture (USDA)**

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport personnel

END OF ITEM C-102

#### **ITEM C-105 MOBILIZATION**

**105-1 DESCRIPTION.** This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site and other facilities necessary for work on the project except as provided in the contract as separate pay items.

**105-2 MOBILIZATION LIMIT.** Mobilization shall be limited to 10 percent of the total project cost.

**105-3 POSTED NOTICES.** Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. Contractor shall also post all notices required by the State the work is being performed in. These notices must remain posted until final acceptance of the work by the Owner.

**105-4 ENGINEER/RPR FIELD OFFICE.** An Engineer/RPR field office is not required.

#### **METHOD OF MEASUREMENT**

**105-5 BASIS OF MEASUREMENT AND PAYMENT.** Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

#### **BASIS OF PAYMENT**

##### **105-6 PAYMENT WILL BE MADE UNDER:**

Bid Item No. A-2	Mobilization - per Lump Sum
Bid Item No. B-2	Mobilization - per Lump Sum

#### **REFERENCES**

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

##### **Office of Federal Contract Compliance Programs (OFCCP)**

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

##### **United States Department of Labor, Wage and Hour Division (WHD)**

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

**SECTION V**  
**TECHNICAL SPECIFICATIONS**

**ITEM E-110 DEMOLITION****DESCRIPTION**

**110-1.1** This item covers the labor and materials necessary for demolition and disposal of all items shown on the plans, including: old electrical structures and equipment, PAPI units and foundations, wind cones and associated fixtures and foundations, electrical signs and sign bases, drain pipe, drainage structures, electrical fixtures, conduit and cables, duct markers, buried cable, and backfilling and re-compaction of disturbed areas. This item includes removal from the site of all demolition materials except those items specifically identified by the RPR or shown on the drawings to be salvaged, reused, provided to the owner, and placed in the stored location identified by the Owner or Engineer. The removal of pavement marking is not part of this specification.

Removal of storm drain pipe, conduit, wire, and other structures not specifically identified for payment herein or on the drawings shall be considered incidental to this Specification.

**CONSTRUCTION METHODS**

**110-2.1 UTILITIES.** The Contractor shall be responsible for determining specific locations for all existing utilities in the area of demolition prior to beginning demolition. All utilities not identified on the drawings for removal are to be protected. The Contractor shall be responsible for coordinating and meeting the requirements of the utility companies and FAA.

**110-2.2 REMOVAL OF STRUCTURES.** All pipe, conduit, culverts, electrical handholes, edge light cans and fixtures, conduit, cable, and other facilities identified for removal or encountered in excavation shall be removed in their entirety including foundations, pipes, asphalt, and all other appurtenances. Underground circuiting, including existing wire, conduit, and duct banks shall be removed and disposed of offsite when encountered, unless otherwise directed by the RPR or shown on the drawings.

Locations of structures shown for removal are approximate and shall be field verified by the Contractor. Additional structures, not shown on the drawings, may require removal as directed by the RPR.

All materials and piping, except as specified for salvage, within the limits of the demolition, shall be removed from the site and become the property of the Contractor unless otherwise shown on the drawings or identified herein.

**110-2.3 CONCRETE REMOVAL.** The contractor shall remove the concrete features dimensioned or otherwise identified on the drawings. All material removed from the demolition areas shall be disposed off-site. Concrete removal is included in the lump sum unit cost for work covered under this Specification with the exception of concrete pavement removal if identified on the drawing.

**110-2.4 BACKFILLING.** The contractor shall backfill all demolition areas approximately to the level of adjacent surfaces, as applicable.

Unless otherwise specified, backfill material and compaction of items removed from non-paved areas shall meet the requirements specified in Section P-152. Demolition debris shall not be used as backfill material. In all areas not backfilled to ground level, the Contractor shall erect safety barriers around the excavation.

In paved areas, backfilling of trenches where pipe, conduit, drainage or electrical structures have been removed shall conform to the trench backfill requirements as shown on the drawings. All costs of labor, equipment, and materials required to complete this item shall be considered incidental to this Specification.

**110-2.5 PAVEMENT MARKING REMOVAL.** Pavement Marking Removal shall be included in the Specification Section P-101, Surface Preparation/Removal of Existing Pavements.

**110-2.6 PAVEMENT REMOVAL.** Asphalt and concrete pavement removal shall be included in the Specification Section P-101, Surface Preparation/Removal of Existing Pavements.

**MEASUREMENT**

**110-3.1** No separate measurement for payment shall be made for demolition, alteration, or salvage of items shown on the Drawings. Demolition work shall be considered necessary and incidental to the work of this Contract.

**BASIS OF PAYMENT**

**110-4.1.** No payment will be made separately or directly for demolition, alteration, or salvage of items shown on the Drawings. Demolition work shall be considered necessary and incidental to the work of this Contract.

END OF ITEM E-110

**ITEM E-180 GEOTEXTILE FABRIC****DESCRIPTION**

**180-1.1** This item shall consist of furnishing and placing geotextile fabric as shown on the drawings or as directed by the RPR.

**EQUIPMENT AND MATERIALS**

**180-2.1 GEOTEXTILE FABRIC.** Non-Woven geotextile fabric shall meet the requirements of 2024 Oregon Department of Transportation (ODOT) Section 02320 and Table 1 below.

**180-2.2 FIELD SEAM STITCHING EQUIPMENT.** Use field seam stitching equipment that provides an acceptable lock-type stitch as recommended by the geotextile manufacturer and approved by the RPR.

**180-2.3 CERTIFICATION.** The Contractor shall furnish the vendor's certified test reports for each lot of geotextile fabric shipped to the project. The report shall be delivered to the RPR before permission is granted for use of the geotextile fabric. The furnishing of the vendor's certified test report for the material shall not be interpreted as a basis for final acceptance. All such test reports shall be subject to verification by testing samples of geotextile fabric received for use in the project.

**Table 1**  
**GEOTEXTILE PROPERTY VALUES <sup>1</sup>**

Geotextile Property	ASTM Test Method	Unit	Minimum Values	
			Woven	Non-Woven
Grab Tensile Strength (minimum) Machine & Cross Machine Directions	D 4632	lb	180	113
Grab Failure Strain (minimum) Machine and Cross Machine Directions	D 4632.	%	< 50	≥ 50
Tear strength (minimum)	D 4533	lb	68	41
Puncture strength (minimum)	D 6241	lb	371	223
Apparent Opening Size (AOS) (maximum) U.S. Standard Sieve	D 4751	--	30	30
permittivity (minimum)	D 4491	sec-1	0.05	0.05
Ultraviolet Stability Retained Strength (minimum)	D 4355 (at 500 hours)	%	50	50
<sup>1</sup> All geotextile properties are Minimum Average Roll Values (MARV). The test results for any sampled roll in a lot shall meet or exceed the values shown in the table.				

**CONSTRUCTION METHODS**

**180-3.1 ACQUISITION AND STORAGE.** Provide complete rolls of geotextile as furnished by the manufacturer and protect against damage and deterioration. Store all geotextile rolls in a dry place and off the ground at all times according to ASTM D 4873. Cover all rolls and partial rolls with a dark protective covering when received. The geotextile will be rejected for use if the RPR determines it has defects, deterioration, or has been damaged.

**180-3.2 PLACEMENT.** Prepare the surface receiving the geotextile to a smooth condition free of obstructions, depressions, and debris unless otherwise directed. Do not drag the geotextile on the ground or mishandle in any way.

Loosely place the geotextile without wrinkles so placement of the overlying material will not tear the geotextile. Lap or sew the geotextile at the ends and sides of adjoining sheets as specified.

Correct geotextile failures, as evidenced by soil pumping or roadbed distortion, by removing any covering material in the affected area and placing a geotextile patch on the exposed geotextile according to specifications for repair of the geotextile. Cover the patch with the specified cover material and compact before proceeding.

**180-3.3 OVERLAPS.** Minimum overlap requirement is 24 inches.

**180-3.4 FIELD SEAMS.** Field seams shall conform to ODOT Section 00350.41.

**180-3.5 PROTECTION OF GEOTEXTILE.** Protect the geotextile at all times from ultraviolet (UV) rays, contamination by surface runoff, and construction activities.

Traffic or construction equipment will not be permitted directly on the geotextile. When placed for construction, cover the geotextile with specified cover material as soon as possible. Do not leave in uncovered condition for more than 5 days.

Place cover material on the geotextile in a manner that the geotextile is not torn, punctured, or shifted. Use a minimum 6-inch-thick cover layer, or twice the maximum aggregate size, whichever is thicker. End-dumping cover material directly on the geotextile will not be permitted.

**180-3.6 REPAIR OF GEOTEXTILE.** Repair or replace all torn, punctured, or contaminated geotextiles during construction at no cost to the Owner. Repair by placing a patch of the specified geotextile over the affected area. Overlap the existing geotextile with the patch according to overlap specifications. Where geotextile seams are required to be sewn, repair any damaged sheet by sewing unless otherwise indicated on the drawings, or as directed by the RPR.

#### METHOD OF MEASUREMENT

**180-4.1** The quantity of geotextile fabric installation will be measured along the lines and grades of the installation to the nearest square yard of surface area actually covered according to the plans or as required.

#### BASIS OF PAYMENT

**180-5.1** Payment shall be made at the contract unit price per square yard for geotextile fabric. This price shall be full compensation for all preparation of the existing surface, furnishing and installation of the geotextile, including all labor, equipment, tools, and incidentals necessary to complete the item. No separate payment will be made for constructing laps, seams, joints, and patches.

Payment will be made under:

Bid Item No. B-3

Geotextile Fabric - per Square Yard

#### REFERENCES

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

#### ASTM International (ASTM)

ASTM D 3405	Specification for Joint Sealants, Hot Poured, for Concrete and Asphalt Pavement
ASTM D 4632	Breaking Load and Elongation of Geotextiles (Grab Method)
ASTM D 276	Identification of Fibers in Textiles
ASTM D 4354	Sampling of Geotextiles for Testing

END OF ITEM E-180



## ITEM E-190 SITE GRADING

### DESCRIPTION

**190-1.1** This item shall consist of materials and work necessary to backfill, grade, and compact areas under this contract in accordance with these specifications, and conforming to the lines and grades shown on the drawings or as directed by the RPR.

### MATERIALS

**190-2.1** Material used to backfill and grade Site Grading areas shall be fine, readily compactible, granular soil selected from excavations, as approved by the RPR, and shall conform to the requirements for embankments as specified in Section P-152-2.8 and in conformance with the grades shown on the drawings.

### CONSTRUCTION METHODS

**190-3.0 GENERAL.** All areas of Site Grading work shall be reviewed in the field after layout of limits as shown on the drawings and coordinated with the RPR before construction. Unless otherwise specified, all work shall comply with Section P-152 Excavation and Embankment.

**190-3.1 EQUIPMENT.** All equipment necessary for the proper construction of this work shall be on the project, in first-class working condition, and approved by the RPR before construction is permitted to start.

**190-3.2 PREPARING UNDERLYING COURSE.** All vegetation shall be stripped to a minimum 4-inch depth and the subgrade shall be compacted to a firm unyielding condition. The subgrade shall be accepted by the RPR before any pavement grinding placement begins. Any ruts or soft yielding places caused by improper drainage conditions, hauling, or any other cause shall be corrected, compacted and rolled to smooth grades.

**190-3.3 PLACING AND SPREADING.** The material shall have satisfactory moisture content when rolling is started, and any minor variations prior to or during rolling shall be corrected by sprinkling or aeration, if necessary.

**190-3.4 FINISHING AND COMPACTING.** After spreading, the backfill material shall be thoroughly compacted to a dense and unyielding condition as approved by the RPR. Blading and rolling shall be done alternately, as required or directed, to obtain a smooth, even, and uniformly compacted surface.

The shoulders shall not be rolled when the underlying surface is soft or yielding or when the rolling causes undulation in the underlying course. In areas inaccessible to a roller, the material shall be tamped thoroughly with mechanical tampers. If necessary, the sprinkling during rolling shall be in the amount and by equipment approved by the RPR.

**190-3.5 SURFACE TEST.** After the shoulders have been completely compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified, reshaped, re-compacted, and otherwise manipulated as the RPR may direct until the required smoothness and accuracy are obtained. The finished surface shall not vary more than  $\pm 0.05$  foot from plan elevation at any point.

**190-3.6 PROTECTION.** Work on the shoulders shall not be accomplished during freezing temperatures. When the backfill material contains frozen material or when the underlying course is frozen, the construction shall be stopped.

**METHOD OF MEASUREMENT**

**190-4.1** Site Grading will be measured by the square yard of selected backfill material placed, graded, compacted, and measured in its final position. No payment will be made for grading outside the limits authorized by the RPR. Measurement shall not include material that is stockpiled, and not graded or compacted.

**BASIS OF PAYMENT**

**190-5.1** Payments shall be made at the Contract unit price per square yard of Site Grading. This price shall be full compensation for furnishing all materials; for all preparation, hauling, placement, grading, and compaction of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Bid Item No. B-4

Site Grading - per Square Yard

END OF ITEM E-190

## **ITEM P-101 PREPARATION/REMOVAL OF EXISTING PAVEMENTS**

### **DESCRIPTION**

**101-1** This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, pavement marking removal, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

### **EQUIPMENT AND MATERIALS**

**101-2** All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

**101-2.1** All equipment shall be specified hereinafter, required to satisfactorily remove pavement, pavement marking, and seal pavement cracks as described in Section 101-3, or as approved by the Engineer. In general, no equipment used for marking removal shall cause damage to the pavement to remain in place.

**101-2.2 ROUTER.** Not Used.

**101-2.3 CRACK SEALANT.** Not Used.

**101-2.4 PAVEMENT MARKING REMOVAL.** All existing pavement markings scheduled for demolition shall be removed by mechanical means using Ultra-High Pressure (UHP) water. Hydro-blasting equipment must simultaneously recover all liquid and solid debris in conjunction with the marking removal process.

### **CONSTRUCTION METHODS**

#### **101-3.1 REMOVAL OF EXISTING PAVEMENT.**

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

**a. Concrete pavement removal.** Not Used.

**b. Asphalt concrete pavement.** Areas of full depth pavement to be removed are depicted on the drawings. The RPR will verify the exact boundaries in the field after survey layout in accordance with the design. Asphalt pavement to be removed shall be saw cut to the full depth of the asphalt pavement around the perimeter of the area to be removed. Cuts in areas where existing pavement is to be matched shall be made with a power saw. Asphalt pavement removed shall be disposed of off-site.

Where applicable, care shall be exercised during removal to minimize disturbance to existing materials and utilities. Any damage to adjoining pavement or utilities, as a result of either the cutting or contractor operations, will be repaired by the Contractor at no cost to the Owner. Disturbed base material shall be re-compacted. No direct payment for sawcutting or re-compacting shall be made.

**c. Repair or removal of Base, Subbase, and/or Subgrade.** All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

**101-3.2 PREPARATION OF JOINTS AND CRACKS PRIOR TO OVERLAY/SURFACE TREATMENT.** Not Used.

**101-3.3 REMOVAL OF FOREIGN SUBSTANCES/CONTAMINATES prior to remarking.** Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface

of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

High-pressure water shall be used to remove all foreign substances and contaminants. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

#### **101-3.4 CONCRETE SPALL OR FAILED ASPHALTIC CONCRETE PAVEMENT REPAIR.**

- a. **Repair of concrete spalls in areas to be overlaid with asphalt.** Not Used.
- b. **Asphalt pavement repair.** Not Used.

#### **101-3.5 COLD MILLING.** Not Used.

- a. **Patching.** Not Used.
- b. **Profiling, grade correction, or surface correction.** Not Used.
- c. **Clean-up.** Not Used.

#### **101-3.6 PREPARATION OF ASPHALT PAVEMENT SURFACES.** Not Used.

**101-3.7 MAINTENANCE.** The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

#### **101-3.8 PREPARATION OF JOINTS IN RIGID PAVEMENT PRIOR TO RESEALING.** Not Used.

##### **101-3.8.1 REMOVAL OF EXISTING JOINT SEALANT.** Not Used.

**101-3.8.2 CLEANING PRIOR TO SEALING.** Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface-dry prior to installation of sealant.

**101-3.8.3 JOINT SEALANT.** Joint material and installation will be in accordance with Item P-605 .

#### **101-3.9 PREPARATION OF CRACKS IN FLEXIBLE PAVEMENT PRIOR TO SEALING.** Not Used.

##### **101-3.9.1 PREPARATION OF CRACK.** Not Used.

##### **101-3.9.2 REMOVAL OF EXISTING SEALANT.** Not Used.

##### **101-3.9.3 Crack Sealant.** Not Used.

##### **101-3.9.4 REMOVAL OF PIPE AND OTHER BURIED STRUCTURES.**

- a. **Removal of Existing Pipe Material.** Not used.
- b. **Removal of Inlets/Manholes.** Not used.

### **METHOD OF MEASUREMENT**

**101-4.1 Pavement Removal, Full Depth.** The unit of measurement for pavement removal shall be the number of square yards removed by the Contractor. Any pavement removed outside the limits of removal because the

pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal.

**101-4.2 Removal of Foreign Substances/contaminates.** No measurement for payment will be made separately or directly for removal of foreign substances/contaminates. Removal of foreign substances/contaminates shall be considered necessary and incidental to the Pavement Marking, White/Yellow, Two Coat bid item.

#### **BASIS OF PAYMENT**

**101-5.1 PAYMENT.** Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Bid Item No. B-5                      Asphalt Pavement Removal, Full Depth – per Square Yard

#### **REFERENCES**

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

##### **Advisory Circulars (AC)**

AC 150/5380-6    Guidelines and Procedures for Maintenance of Airport Pavements.

##### **ASTM International (ASTM)**

ASTM D6690      Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

## ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

### DESCRIPTION

**152-1.1** This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

The Contractor shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations; and all pumping or other approved measures for the removal or exclusion of water, including storm water, reaching the site from any source so as to prevent damage to the site. Slopes on the sides of temporary excavations shall be such as to ensure safe execution of the work in accordance with applicable governmental requirements and regulations.

**152-1.2 CLASSIFICATION.** All material excavated shall be classified as defined below:

**a. Unclassified excavation.** Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature which is not otherwise classified and paid for under one of the following items.

**b. Muck excavation.** Muck excavation shall consist of the removal and disposal of deposits or mixtures of soils and organic matter not suitable for foundation material. Muck shall include materials that will decay or produce subsidence in the embankment. It may consist of decaying stumps, roots, logs, humus, or other material not satisfactory for incorporation in the embankment.

**152-1.3 UNSUITABLE EXCAVATION.** Unsuitable material shall be disposed of offsite. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

Unsuitable material is defined as material the Engineer determines to be incapable of being compacted to specified density using ordinary methods at optimum moisture.

Excessive moisture in the material is not, by itself, sufficient cause for determining that the material is unsuitable. In-place drying techniques shall be employed prior to defining the material as unsuitable. In-place drying methods shall consist of windrowing, discing, turning, and otherwise manipulating the material to achieve drying and compaction. Vibratory or steel drum compaction equipment and rubber-tired excavation equipment shall not be used in unstable areas unless approved by the Engineer. No separate measurement or payment will be made for in-place drying.

**152-1.4 AGGREGATE FOR MUCK EXCAVATION BACKFILL.** Aggregate used as backfill in areas of muck excavation shall conform to the requirements of P-208.

### CONSTRUCTION METHODS

**152-2.1 GENERAL.** Before beginning excavation, grading, and embankment operations in any area, the area shall be completely stripped, approximately, 6 inches in depth, to remove all vegetation.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of offsite.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside of the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches , to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches in their greatest dimension will not be permitted in the top 6 inches of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

**a. Blasting.** Blasting shall not be allowed.

**152-2.2 EXCAVATION.** No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

An electronic copy of the existing ground DTM file will be issued to the successful bidder. An electronic document media release agreement between the successful bidder and RPR shall be executed prior to release of any electronic documents.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

**a. Selective grading.** When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

**b. Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed of off Airport property. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard for Muck Excavation. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. Undercutting in areas of new pavement construction shall be backfilled with base material meeting all requirements of. Aggregate For Muck Excavation Backfill. . Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as Muck Excavation .

**c. Over-break.** Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was

unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

**d. Removal of utilities.** The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans and Item E-110. All existing foundations shall be excavated at least 2 feet below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

**152-2.3 BORROW EXCAVATION.** Not Used.

**152-2.4 DRAINAGE EXCAVATION.** Not Used.

**152-2.5 PREPARATION OF CUT AREAS OR AREAS WHERE EXISTING PAVEMENT HAS BEEN REMOVED.** In those areas on which a subbase or base course is to be placed, the top 12 inches of subgrade shall be compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

**152-2.6 PREPARATION OF EMBANKMENT AREA.** All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

**152-2.7 CONTROL STRIP.** The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

**152-2.8 FORMATION OF EMBANKMENTS.** The material shall be constructed in lifts as established in the control strip, but not less than 6 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.



Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due of rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within  $\pm 2\%$  of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The Contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D698. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the Contractor for every 500 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. Under all areas to be paved, the non-cohesive embankments shall be compacted to a depth of 12 inches and to a density of not less than 100 percent of the maximum density and cohesive soil embankments shall be compacted to a depth of 12 inches of not less than 90 percent of the maximum density as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, unless otherwise indicated on drawings or directed by the RPR, no compaction will be required on the top 4 inches ) which shall be prepared for a seedbed in accordance with Item T-901 .

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. The Contractor's independent testing laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches in their greatest dimensions will not be allowed in the top 12 inches of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer

material shall be used to fill the voids with forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment materials shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lifts shall not be constructed above an elevation 4 feet below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

**152-2.9 PROOF ROLLING.** The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. After compaction is completed, the subgrade area shall be proof rolled with a 20 ton Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 100 psi in the presence of the RPR. Apply a minimum of 1 coverage, or as specified by the RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch or show permanent deformation greater than 1 inch shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

**152-2.10 COMPACTION REQUIREMENTS.** Compaction requirements apply equally to subgrade or soil preparation established by cutting or filling material. The subgrade under areas to be paved shall be compacted to a depth of 12 inches and to a density of not less than 100 percent of the maximum dry density for non-cohesive soils and 95 percent of the maximum dry density for cohesive soils as determined by ASTM D698. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within  $\pm 2\%$  of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the  $\frac{3}{4}$  inch (19.0 mm) sieve, follow the methods in ASTM D698. Tests for moisture content and compaction will be taken at a minimum of 500 S.Y. of subgrade. All quality assurance testing shall be done by the Contractor's independent testing laboratory in the presence of the RPR, and density test results shall be furnished upon completion to the RPR for acceptance determination.

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

**152-2.11 FINISHING AND PROTECTION OF SUBGRADE.** Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

**152-2.12 HAUL.** All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

**152-2.13 SURFACE TOLERANCES.** In those areas on which a subbase or base course is to be placed, the surface shall be tested by the Contractor in the presence of the RPR for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

- a. **Smoothness.** The finished surface shall not vary more than  $\pm \frac{1}{8}$  inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.
- b. **Grade.** The grade and crown shall be measured on a 50-foot grid and shall be within  $\pm 0.05$  feet of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to be placed, grade shall not vary more than 0.10 feet from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

**152-2.14 TOPSOIL.** When topsoil is specified or required as shown on the plans, it shall be salvaged from stripping or other grading operations. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved Construction Safety and Phasing Plan (CSPP), and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans. No direct payment will be made for topsoil under Item P-152. The quantity removed and placed directly or stockpiled shall be paid for at the contract unit price per cubic yard for "Unclassified Excavation." No additional payment for rehandling of topsoil shall be provided.

## METHOD OF MEASUREMENT

**152-3.1** Measurement for payment specified by the cubic yard shall be computed by the average end areas of design cross sections for computation of neat line design quantities. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the RPR.

**152-3.1** The quantity of unclassified and muck excavation to be paid for shall be the number of cubic yards measured in its original position. Unsuitable excavation will be included in the measurement of unclassified excavation. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

**152-3.2** The quantity of Aggregate For Muck Excavation Backfill shall not be measured for payment but shall be considered incidental to the Muck Excavation bid item.

#### **BASIS OF PAYMENT**

**152-4.1** Unclassified excavation and Muck Excavation payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

**152-4.2** Aggregate For Muck Excavation Backfill shall be considered incidental to the Muck Excavation bid item.

Payment will be made under:

Bid item No. B-6	Muck Excavation - per Cubic Yard
Bid item No. B-7	Unclassified Excavation - per Cubic Yard

#### **REFERENCES**

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

##### **American Association of State Highway and Transportation Officials (AASHTO)**

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
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##### **ASTM International (ASTM)**

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft <sup>3</sup> (2700 kN-m/m <sup>3</sup> ))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

##### **Advisory Circulars (AC)**

AC 150/5370-2	Operational Safety on Airports During Construction Software
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FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

##### **U.S. Department of Transportation**

FAA RD-76-66	Design and Construction of Airport Pavements on Expansive Soils
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END OF ITEM P-152

**ITEM P-208 AGGREGATE BASE COURSE****DESCRIPTION**

**208-1.1** This item shall consist of a base course composed of coarse aggregate bonded with fine aggregate base. It shall be constructed on a prepared subgrade or subbase course per these specifications and shall conform to the dimensions and typical cross-section shown on the plans.

**MATERIALS**

**208-2.1 AGGREGATE BASE.** The aggregate base material shall consist of both fine and coarse aggregate. Material shall be clean, sound, durable particles and fragments of stone or gravel, crushed stone, or crushed gravel mixed or blended with sand, screenings, or other materials. Materials shall be handled and stored in accordance with all federal, state, and local requirements. The aggregate shall be free from clay lumps, organic matter, or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as nearly constant and uniform as practicable. The fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve produced in crushing operations, shall be incorporated in the base material to the extent permitted by the gradation requirements. Aggregate base material requirements are listed in the following table.

**Aggregate Base Material Requirements**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
<b>Coarse Aggregate</b>		
Resistance to Degradation	Loss: 50% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
percentage of Fractured Particles	Minimum 60% by weight of particles with at least two fractured faces and 75% with at least one fractured face <sup>1</sup>	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles <sup>2</sup>	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
<b>Fine Aggregate</b>		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

<sup>1</sup> The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

<sup>2</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

**208-2.2 GRADATION REQUIREMENTS.** The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

**Gradation of Aggregate Base**

<b>Sieve Size</b>	<b>Design Range percentage by Weight passing</b>	<b>Contractor's Final Gradation</b>	<b>Job Control Grading Band Tolerances for Contractor's Final Gradation<sup>1</sup> percent</b>
2 inch (50 mm)	*		±0
1-1/2 inch (37.5 mm)	*100		±5
1 inch (25.0 mm)	*70-100		±8
3/4 inch (19.0 mm)	*55-80		±8
No. 4 (4.75 mm)	*30-60		±8
No. 40 (425 µm) <sup>2</sup>	*10-30		±5
No. 200 (75 µm) <sup>2</sup>	*0-5		±3

<sup>1</sup> The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

<sup>2</sup> The fraction of material passing the No. 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No. 40 (425 µm) sieve.

**208-2.3 SAMPLING AND TESTING.**

**a. Aggregate base materials.** The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraphs 208-2.1 and 208-2.2. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

All tests for aggregate submittals necessary to determine compliance with the specification requirements will be made by the Contractor's independent testing laboratory specific to this project.

**b. Gradation requirements.** The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 208-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

**208-2.4 SEPARATION GEOTEXTILE.** See Specification E-180.

**CONSTRUCTION METHODS**

**208-3.1 CONTROL STRIP.** The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

**208-3.2 PREPARING UNDERLYING SUBGRADE AND/OR SUBBASE.** The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the

subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

**208-3.3 PRODUCTION.** The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 208-3.5, the approved material may be transported directly to the placement.

**208-3.4 PLACEMENT.** The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course layer shall be constructed in lifts as established in the control strip, but not less than 4 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

**208-3.5 COMPACTION.** Immediately upon completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D698. The moisture content of the material during placing operations shall be within  $\pm 2$  percentage points of the optimum moisture content as determined by ASTM D698. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**208-3.6 WEATHER LIMITATIONS.** Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

**208-3.7 MAINTENANCE.** The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at their expense.

**208-3.8 SURFACE TOLERANCES.** After the course has been compacted, the surface shall be tested by the Contractor in the presence of the RPR for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and recompact to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

**a. Smoothness.** The finished surface shall not vary more than 3/8-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

**b. Grade.** The grade and crown shall be measured on a 50-foot grid and shall be within +0 and -1/2 inch of the specified grade.

**208-3.9 ACCEPTANCE SAMPLING AND TESTING.** Aggregate base course shall be accepted for density and thickness on an area basis. Two tests will be made for density and thickness for each 500 square yards (. Sampling locations will be determined on a random basis per ASTM D3665.

**a. Density.** The Contractor's independent testing laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance .

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D698. The in-place field density shall be determined per ASTM D1556. or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938.. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**b. Thickness.** Depth tests shall be made by test holes at least 3 inches in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch , the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches , adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

Thickness acceptance may be determined by survey before and after placement with prior written approval from the RPR. The survey intervals should be the same as those specified in 208-3.8

#### METHOD OF MEASUREMENT

**208-4.1** The quantity of aggregate base course shall be measured by the number of cubic yards of material actually constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

#### BASIS OF PAYMENT

**208-5.1** Payment shall be made at the contract unit price per cubic yard for aggregate base course. This price shall be full compensation for furnishing all materials and for all operations, hauling, placing, and compacting of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Bid Item No. B-9

P-208 Aggregate Base Course - per Cubic Yard

#### REFERENCES

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

#### ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate



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ASTM C117	Standard Test Method for Materials Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft <sup>3</sup> (2700 kN-m/m <sup>3</sup> ))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water permeability of Geotextiles by permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

**American Association of State Highway and Transportation Officials (AASHTO)**

M288	Standard Specification for Geosynthetic Specification for Highway Applications
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END OF ITEM P-208

## SECTION 00730 - EMULSIFIED ASPHALT TACK COAT

### DESCRIPTION

**00730.00 Scope** - This Work consists of furnishing and placing Emulsified Asphalt on a prepared asphalt concrete, portland cement concrete, or other paved surface to ensure bond between Lifts as specified.

### MATERIALS

**00730.11 Emulsified Asphalt** - Furnish CSS-1, CSS-1h, CMS-2, CMS-2S, CMS-2h, CRS-1, CRS-2, HFRS-2, or HFMS-2 as selected by the Contractor.

Furnish 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. 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.

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.

Dilution of the tack coat material may be allowed to a maximum 1:1 ratio. Determine the proportion of water to be added to the Emulsified Asphalt. Do not dilute the Emulsified Asphalt until the Engineer approves the dilution ratio. Add the water to the Emulsified Asphalt and mix according to the asphalt Supplier.

Obtain samples according to AASHTO R 66 prior to dilution with water, if allowed, according to Section 00165. Samples will be tested at the ODOT Materials Laboratory, or other laboratory as designated by the Agency. Emulsified Asphalt will be tested within 30 Calendar Days from the date it is sampled.

### EQUIPMENT

**00730.22 Asphalt Distributor** - 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 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.

### CONSTRUCTION

**00730.40 Temperature Limitations** - Apply tack coat only when the surface temperature in the shade is not less than the appropriate minimum surface temperature according to 00735.40, 00744.40, and 00745.40, as applicable.

**00730.41 Traffic Control** - Do not apply the tack to more than one-half the width of the travel way at one time. The remaining width shall remain open to traffic. Do not close the open lane until traffic controlled by pilot car is operating on the new surface.

**00730.42 Preparation of Underlying Surfaces** - Immediately before applying the tack coat, the surface to be tacked shall be clean and dry. Clean all loose material by brooming, flushing with water or other approved methods.

**00730.44 Applying Tack Coat** - Apply the Emulsified Asphalt with a pressure distributor conforming to 00730.22, unless otherwise allowed. Apply the Emulsified 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 °F and 185 °F as recommended by the manufacturer. Application rates for tack coat diluted according to 00730.11 will be increased as necessary to provide the same amount of residual asphalt as the application rates specified above.

Do not place hot mixed asphalt concrete Pavement or Emulsified Asphalt Concrete Pavement on the tack coat until the Emulsified Asphalt separates from the water (breaks), but before it loses its tackiness.

#### **MEASUREMENT**

**00730.80 Measurement** - The quantities of Emulsified Asphalt cement used as tack will be measured on the weight basis.

#### **PAYMENT**

**00730.90 Payment** - No separate or additional payment will be made for Emulsified Asphalt tack coat. Less than 1 ton of Emulsified Asphalt in tack coat is estimated to be required on this Project.

## SECTION 00744 - ASPHALT CONCRETE PAVEMENT DESCRIPTION

**00744.00 SCOPE** - This Work consists of constructing Asphalt Concrete Pavement (ACP) to the lines, grades, thicknesses, and Cross Sections shown on the drawings or established in the field.

### 00744.01 ABBREVIATIONS:

<b>HMAC</b>	-	Hot Mix Asphalt Concrete
<b>MAMD</b>	-	Moving Average Maximum Density
<b>RAM</b>	-	Recycled Asphalt Material
<b>TSR</b>	-	Tensile Strength Ratio
<b>VFA</b>	-	Voids Filled with Asphalt
<b>VMA</b>	-	Voids in Mineral Aggregate
<b>WMAC</b>	-	Warm Mix Asphalt Concrete

### 0744.02 DEFINITIONS:

**Asphalt Concrete Pavement** - Uniformly coated mixture of asphalt cement, graded Aggregate, and additives as required. The use of ACP in this section refers to either hot mix or Warm Mix Asphalt Concrete.

**Hot Mix Asphalt Concrete** - A hot plant mixed ACP.

**Level 1 ACP** - ACP for use in applications with very low traffic and only limited exposure to trucks.

**Level 2 ACP** - ACP for use in applications with low traffic volumes and low volume truck traffic.

**Level 3 ACP** - ACP for use in applications exposed to moderate truck traffic.

**Recycled Asphalt Material** - The combination of reclaimed asphalt Pavement (RAP) and recycled asphalt shingles (RAS).

**Warm Mix Asphalt Concrete** - Warm Mix Asphalt Concrete shall not be used.

## MATERIALS

**00744.10 AGGREGATE** - Furnish new Aggregate, RAP Aggregate, and RAS Aggregate meeting the following requirements:

**(a) New Coarse and Fine Aggregates** - Produce Coarse and Fine Aggregate from crushed Rock or other inert material of similar characteristics.

Blend Sand is allowed for Levels 1, 2, and 3 mixes. Do not use more than 6 percent natural or uncrushed blend Sand, by weight, in the total Aggregate. Provide a means of verifying and documenting the amount of blend Sand added to the Aggregate.

Testing of Aggregates for soundness, durability, and harmful substances will be at the discretion and expense of the Owner.

**(1) Soundness** - Provide Coarse and Fine Aggregate with a weighted loss not exceeding 12 percent when subjected to five cycles of the soundness test using sodium sulfate solution according to AASHTO T 104.

**(2) Durability** - Provide Aggregate not exceeding the following maximum values:

Test	Test Methods		Aggregates Coarse
	ODOT	AASHTO	
Abrasion		T 96	30.0%
Degradation			
Passing No. 20 Sieve	TM 208		30.0%
Sediment Height	TM 208		3.0"

**(3) Fractured Faces** - Provide crushed Aggregate with not less than the minimum number of fractured faces as determined by AASHTO T 335 as follows:

percent of Fracture (by Weight)		
Type of Mix	Material Retained on 1", ¾", ½" and No. 4 Sieve (two fractured faces)	Material Retained on No. 8 Sieve (one fractured face)
All ACP	75	75

**(4) Harmful Substances** - Do not exceed the following maximum values:

Test	Test Methods		Aggregates	
	ODOT	AASHTO	Coarse	Fine
Lightweight pieces		T 113	1.0%	
Wood Particles	TM 225		0.10%	
Elongated pieces (at a ratio of 5:1)	TM 229		10.0%	
Plasticity Index		T 90		0 or NP
Sand Equivalent		T 176		45 min.

**(b) Reclaimed Asphalt Pavement** - RAP material used in the production of new ACP is optional. No more than 30 percent RAP Material will be allowed in the new ACP Pavement. Use RAP Aggregates in the ACP that are no larger than the specified maximum allowable Aggregate size before entering the cold feed. Blend the RAP Material with new Aggregate to provide a mixture conforming to the JMF within the tolerances specified.

**(c) Recycled Asphalt Shingles** - RAS used in the production of new ACP is optional. Either manufacturer waste (post-manufacturer) RAS or tear-off (post-consumer) RAS may be used. Manufacturer waste RAS is processed asphalt shingle material derived from manufacturer's shingle scrap. Tear-off RAS is processed asphalt shingle material derived from shingle scrap removed from Structures. All percentages are based upon dry weights for calculations.

**(1) Processing Shingles** - Process the RAS by grinding at ambient temperature so that 100 percent of the shredded pieces are less than 1/2 inch in any dimension and that 90 percent are less than 3/8 inch in any dimension when sampled according to AASHTO R 90 and tested according to AASHTO T 27. Sample and test the processed RAS for gradation at a frequency of one test for every 50 Tons of RAS processed.

**(2) Harmful Substances** - Certify that the RAS does not contain asbestos fibers according to the policies and procedures established by the Department of Environmental Quality. Test deleterious materials according to ODOT TM 335 at a frequency of one test for every 50 Tons of RAS Material. Limit the percentage of deleterious materials to 1.0 percent. If Fine Aggregate is added as an anti-clumping agent, sample and test processed RAS for harmful substances before adding the Fine Aggregates.

**(3) Anti-Clumping Additive** - Fine Aggregate meeting the requirements of 00744.10(a) may be added to the RAS in a quantity not to exceed 4 percent by weight of RAS to keep the material workable and to prevent conglomeration of the shingle particles in the stockpile. Include these added fine Aggregates in the mix design. RAS may also be blended with RAP in controlled percentages to preclude clumping. Do not contaminate stockpiled RAS with dirt or other foreign materials.

**(4) Allowable percentages** - No more than 5.0 percent RAS by total weight of Aggregate is allowed in ACP mixtures. Restrict the maximum allowable percentage of asphalt binder replacement to 20.0 percent for Base Courses and 15.0 percent for wearing Courses in ACP containing only RAS.

When RAS is used in conjunction with RAP, restrict the maximum allowable percentage of binder replacement to 30.0 percent for Base Courses and 25.0 percent for wearing Courses.

**(5) Establishing Mix Design Inputs** - For ACP mixtures containing RAS or RAM, following any addition of Fine Aggregate as an anti-clumping agent, test the material according to ODOT TM 319 to establish the asphalt content, material specific gravities, and gradation. Develop mixture designs according to the ODOT *Contractor Mix Design Guidelines for Asphalt Concrete*.

Blend the RAS or RAM with new Aggregate to provide a mixture conforming to the JMF within the tolerances specified.

**00744.11 ASPHALT CEMENT AND ADDITIVES** - Furnish the following asphalt cement and additives:

**(a) Asphalt Cement** - Provide asphalt cement 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. Provide PG64-28 grade asphalt cement for the project.

**(b) Asphalt Cement Additives** - Use standard recognized asphalt cement additive products that are of known value for the intended purpose and approved for use on the basis of laboratory tests and capable of being thoroughly mixed. Do not use asphalt cement additives that have detrimental effects on the asphalt Material. Do not use silicones as an additive. Add the following asphalt cement additives when required by the JMF:

- Anti-stripping asphalt cement additives to prevent stripping or separation of asphalt coatings from Aggregates to satisfy the TSR specified in 00744.13.
- Asphalt cement admixtures used to aid in the mixing or use of asphalt mixes or for experimental purposes.

Comply with the manufacturer's recommendations for incorporating additives and into the mix. Comply with manufacturer's recommendations regarding receiving, storing, and delivering the additives.

**00744.12 MIX TYPE AND BROADBAND LIMITS** - Furnish the mix type specified in the Contract Documents within the broadband limits according to following:

**(a) Mix Type** - Furnish the types of ACP shown or as directed. When the Plans allow an option of two types for a Course of Pavement, use only one type throughout the Course.

**(b) Broadband Limits** - Provide a JMF for the specified mix type within the control points listed below:

Sieve	3/4" ACP Control Points (%passing by Weight)		1/2" ACP Control Points (%passing by Weight)		3/8" ACP Control Points (%passing by Weight)	
	Min.	Max.	Min.	Max.	Min.	Max.
1"	100					
3/4"	90	100	100			
1/2"	-	90	90	100	100	
3/8"	-	-	-	90	90	100
No. 4	-	-	-	-	-	90
No. 8	23	49	28	58	32	67
No. 200	2.0	8.0	2.0	10.0	2.0	10

**00744.13 JOB MIX FORMULA REQUIREMENTS** - Provide a JMF for the Project meeting the following criteria and that was either developed or verified within 3 years of the date the Contract was advertised:

	Level 1	Level 2	Level 3
Design Method	Superpave	Superpave	Superpave
Compaction Level	65 Gyrations	65 Gyrations	80 Gyrations
Air Voids%	3.5	4.0	4.0
VMW, % minimum	½ inch – 14.0 3/8 inch – 15.0	3/4 inch – 13.0 ½ inch – 14.0 3/8 inch – 15.0	3/4 inch – 13.0 ½ inch – 14.0 3/8 inch – 15.0
VMW, % maximum	Min + 2.0%	Min + 2.0%	Min + 2.0%
P No. 200 / Eff. AC ratio	0.8 to 1.6	0.8 to 1.6	0.8 to 1.6
TSR, % minimum	80	80	80
VFA, %	70-80 3/8 inch: 70-80	65-78 3/8 inch: 70-80	65-75 3/8 inch: 70-80

Develop the JMF according to the ODOT *Contractor Mix Design Guidelines for Asphalt Concrete*; or verify according to the ODOT mix design verification process. Submit the proposed JMF and supporting data to the Engineer for review at least 10 Calendar Days before anticipated use. If acceptable, written acceptance will be provided. perform a new TSR if the source of the asphalt cement changes.

For Level 3 wearing Course mixes, include the results of the performance testing as outlined in the latest ODOT *Contractor Mix Design Guidelines for Asphalt Concrete* in the mix design submittal.

Issue a separate JMF for WMAC. Do not use RAS in WMAC mixes with minimum compaction temperatures less than 260 °F.

When WMAC is used, provide the following information in addition to the requirements listed for ACP:

- WMAC technology and WMAC additives information.
- WMAC technology manufacturer's established recommendations of usage.
- WMAC technology manufacturer's established target rate for water and additives, the acceptable variation for production, and documentation showing the impact of excessive production variation.
- WMAC technology material safety data sheets if applicable.
- Temperature range for mixing.
- Temperature range for compacting.
- Except for foaming technology, asphalt binder performance grade test data of the asphalt binder and chemical additive at the manufacturer's recommended dosage rate.
- Except for foaming technology, WMAC mixture performance test results. perform testing for foaming technology on the production mix on specimens compacted at WMAC compaction temperatures.

**00744.14 TOLERANCES AND LIMITS** - Produce and place ACP within the following JMF tolerances and limits:

Gradation Constituent	ACP Type		
	3/4"	1/2"	3/8"
1"	JMF ± 5%*		
3/4"	90-100%	JMF ± 5%*	
1/2"	JMF ± 5%	90-100%	JMF ± 5%*
3/8"	-	-	90-100%
No. 4	JMF ± 5%	JMF ± 5%	JMF ± 5%
No. 8	JMF ± 4%	JMF ± 4%	JMF ± 4%
No. 30	JMF ± 4%	JMF ± 4%	JMF ± 4%
No. 200	JMF ± 2%	JMF ± 2%	JMF ± 2%

\*Maximum not to exceed 100%

Constituent of Mixture	ACP All Types
Asphalt Cement-AASHTO T 308 (Ignition) and ODOT TM 323	JMF ± 0.50%
RAP Content-ODOT TM321	JMF ± 2.0%
RAS Content-ODOT TM321	JMF ± 1.0%
RAM Content-ODOT TM321	JMF ± 2.0%
Moisture content at time of discharge from the mixing plant-AASHTO T 329	0.80% max.

When a JMF tolerance applies to a constituent, full tolerance will be given even if it exceeds the control points established in 00744.12(b). Full tolerance will be given for RAP, RAS, or RAM content even if it exceeds the limits established in 00744.10.

**00744.16 Sampling and Testing** – Contractor shall provide sampling, testing, and quality control according to Section 00165. Provide test results to the Engineer by the middle of the following work shift.

If less than three samples are obtained on a Project, the Contractor may supplement test results with the Engineer's approval by:

- Accelerating testing.
- Providing test results from other projects with the same JMF within the past 120 Days of first date of JMF production.
- Testing back up samples.

Provide a minimum of three test results. Provide samples or split samples to the Engineer when requested.

**00744.17 ACCEPTANCE** - If the average for each mix gradation constituent and asphalt content is within the Specification limits, the Material will be accepted. If the average asphalt content or one or more gradation constituents is not within the Specification limits, the material that is not within the Specification limits will be accepted according to 00150.25.

Pavement grades shall be evaluated prior to and after the placement of the surface lift.

Measurements will be taken by the Contractor at appropriate gradelines (as a minimum at centerlines, edges of paving lane and longitudinal spacing not to exceed 25 feet). The final surface of the pavement will not vary from the



gradeline elevations and cross-sections shown on the plans by more than 3/8 inch vertically and 0.1 feet laterally. The documentation will be provided by the Contractor to the RPR within 24 hours. Areas that vary by more than ½ inch or that retain water on the surface shall be corrected per Section 00744.75.

## EQUIPMENT

**00744.23 PAVERS** - Provide pavers that are:

- Self-contained, self-propelled, supported on tracks or wheels, none of which contact the mixture being placed.
- Equipped with augers and a screed or strike-off assembly, heated if necessary, which:
  - Can spread and finish the ACP to a uniform texture, in the specified widths, thicknesses, lines, grades and Cross Sections.
  - Will not segregate, tear, shove or gouge the ACP.
- Equipped with a paver control system which:
  - Controls the ACP placement to specified Slope and grade.
  - Maintains the paver screed in proper position.
  - Provides the specified results through mechanical sensors and sensor-directed devices actuated from independent line and grade control references.

**00744.24 COMPACTORS** - Provide self-propelled steel-wheeled or vibratory rollers specifically designed to compact ACP 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 ACP being compacted.

## LABOR

**00744.30 QUALITY CONTROL PERSONNEL** – Contractor shall provide technicians having CAgT, CAT-I, CDT, and CMDT technical certifications.

## CONSTRUCTION

**00744.40 Season and Temperature Limitations** - Place ACP when the temperature of the surface that is to be paved is not less than the temperature specified:

	All Levels	Level 1 and Level 2	Level 3	
Nominal Compacted Thickness of Individual Lifts and Courses as shown on the typical section of the plans	Surface Temperature*	All Courses From To Inclusive	All Courses From To Inclusive	All Courses From To Inclusive
Less than 2 inches	60 °F	All Year**	3/15 9/30	All Year**
2 inches-2 ½ inches	50 °F	All Year**	3/15 9/30	All Year**
Greater than 2 ½ inches	40 °F	All Year**	3/15 9/30	All Year**
Temporary	40 °F	All Year**	3/15 9/30	All Year**

\*Do not use field burners or other devices to heat the pavement surface to the specified minimum temperature.

\*\*If placing ACP between March 15 and September 30, temperature requirement may be lowered 5 °F.

**00744.41 MIXING TEMPERATURES** - Produce ACP 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 as follows:

Type	Temperature, °F	
	Maximum at Mixer	Minimum Behind Paver
HMAC	350	240

Within the above limits, the Contractor with approval of the Engineer, or the Engineer may adjust this temperature in 10 °F increments from the JMF as follows:

- **Up** - If the Aggregate coating, moisture content, workability or compaction requirements are not attained.
- **Down** - If the Aggregate coating, moisture content, workability and compaction requirements are attained.

**00744.42 TACK COAT** - Construct a tack coat before placing each Lift of ACP according to Section 00730. A tack coat is not required before placing ACP on Aggregate Base.

Remove all loose material that will reduce adhesion of the tack by brooming, flushing with water, or other approved methods.

Treat all paved surfaces on and against which ACP is to be placed with an asphalt tack coat according to Section 00730. Before applying the tack coat, clean and dry the surface to be tacked.

Treat all waterproofing membranes on and against which ACP is to be placed with an asphalt tack coat meeting the requirements of 00744.11(a) or as recommended by the membrane manufacturer.

**00744.43 HAULING, DEPOSITING, AND PLACING** - Haul, deposit, and place ACP according to the following:

**(a) Hauling** - Cover ACP if rain is encountered any time between loading and placement.

ACP will be rejected before placing if one or more of the following occurs:

- Below temperature limit specified in 00744.41.
- Slumping or separating.
- Solidifying.

Dispose of rejected loads at no additional cost to the Owner.

Deliver the mixture to the paving machine at a rate that provides continuous operation of the paving machine, except for unavoidable delay or breakdown. If excessive stopping of the paving machine occurs during paving operations, the Engineer may suspend paving operations until the mixture delivery rate matches the paving machine operation.

**(b) Depositing** - Deposit ACP from the hauling vehicles so segregation is prevented.

**(c) Placing** - Alternative Equipment and means may be allowed by the Engineer if the use of a paver is impractical.

Do not place ACP during rain or other adverse weather conditions, unless allowed by the Engineer. ACP in transit at the time adverse conditions occur may be placed if:

- It has been covered during transit.
- The ACP temperature is satisfactory.
- It is placed on a foundation free from pools or flow of water.

Place the mixture in the number of Lifts and Courses, and to the compacted thickness for each Lift and Course, as shown. Place each Course in one Lift unless otherwise specified. Do not exceed a compacted thickness of 4 inches for any Lift. Limit the minimum Lift thickness to twice the maximum Aggregate size in the mix.

**00744.44 LONGITUDINAL JOINTS** - At longitudinal joints, bond, compact and finish the new ACP equal to the ACP against which it is placed.

**(a) Location** - Place the ACP 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.

**(1) Base Course** - Place Base Course longitudinal joints within 12 inches of the edge of a lane, or within 12 inches of the center of a lane, except in irregular areas, unless otherwise shown.

**(2) Wearing Course** - Construct longitudinal joints at either lane lines or fog lines, or as shown or directed.

**(b) Drop-Offs:**

- Provide traffic protection from abrupt edges per the Construction Safety Phasing Plan (CSPP).
- Protect edges from being broken down.

If unable to complete the Pavement without drop-offs according to 00744.44(c) do the following:

- Construct and maintain a wedge of ACP at a Slope of 1V:50H or flatter along the exposed longitudinal joint.
- Remove and dispose of the wedge before continuing paving operations.
- Construct, maintain, remove, and dispose of the temporary wedge at no additional cost to the Owner.

**(c) Placing Under Traffic** – Not Used.

**00744.45 TRANSVERSE JOINTS:**

**(a) Travel Lanes** - Construct transverse joints on the travel lane portion of all specified Pavement Courses, except Leveling Courses, as follows:

**(1) Temporary End Panel** - Maintain Pavement depth, line and grade at least 4 feet beyond the selected transverse joint location, and from that point, wedge down on the appropriate Slope until the top of the Course being laid meets the underlying surface (assuming a Pavement Course thickness of 2 inches) as follows:

- For wedges that will be under traffic for less than 24 hours, construct an 8 foot long wedge (1V:50H taper rate).
- For wedges that will be under traffic for 24 hours or longer, construct a 25 foot long wedge (1V:160H taper rate).
- Construct, maintain, remove, and dispose of the temporary wedge at no additional cost to the Owner.

When the Pavement Course thickness is different than the above 2 inch example, use the appropriate taper rate to compute the length of the wedge. The wedge length plus the 4 feet or longer Panel form the temporary end Panel.

**(2) Vertical Face** - After the mixture has reached the required density:

- Provide a smooth, vertical face the full depth of the Course being laid at the location selected for the joint by sawing, cutting or other approved method.
- Remove the ACP material from the joint to the end of the Panel. If removed before resuming paving beyond the joint, reconstruct the temporary end Panel immediately by placing a bond-breaker of paper, dust, or other suitable Material against the vertical face and on the surface to be occupied by

the temporary end Panel. Construct a full-depth Panel at least 4 feet long, beginning at the sawed or cut joint, and taper it on a 1V:50H Slope to zero thickness.

**(3) Excess Asphalt Concrete Pavement** - After completing a temporary end Panel as specified, dispose of unused, remaining ACP.

**(4) Resume Paving** - When permanent paving resumes, remove the temporary end Panel and any bond-breakers. Clean the surface of all debris and apply a tack coat to the vertical edge and the surface to be paved.

**(5) Joint Requirements** - Compact both sides of the joint to the specified density. When tested with a straightedge placed across the joint, the joint surface shall conform to 00744.70.

**(b) Abutting Bridge Ends** – Not Used.

**(c) Bridge Deck Overlays** - Not Used.

**00744.49 COMPACTION** - After the ACP has been spread, struck off, and surface irregularities and other defects remedied, roll it uniformly until compacted to a minimum of 91 percent of MAMD. perform finish rolling and continue until all roller marks are eliminated.

Determine compliance with density Specifications by random testing of the compacted surface with calibrated nuclear gauges. Determine the density by averaging QC tests performed by a CDT with the nuclear gauge operated in the backscatter mode according to AASHTO T 335 at one random location for each 100 Tons of asphalt concrete placed, but take no less than 10 tests each shift. Do not locate the center of a density test less than 1 foot from the Panel edge. Calculate MAMD according to ODOT TM 305. The Engineer may waive compaction testing upon written notice.

Compaction to a specified density will not be required for the following:

- **Thin Pavements** - Leveling, patches, or where the nominal compacted thickness of a Course of ACP will be less than 2 inches.
- **Other Areas** - Temporary Surfacing, guardrail flares, mailbox turnouts, road approaches, and areas of restricted width of less than 8 feet wide or limited length, regardless of thickness.

Compact thin Pavements and other areas according to 00749.45.

## MAINTENANCE

**00744.60 Correction of Defects** - Correct all defects in Materials and Work, as directed, at no additional cost to the Owner, according to the following:

**(a) Fouled Surfaces** - Repair, clean, and retack fouled surfaces that would prevent full bond between successive Lifts of mixture.

**(b) Boils, Slicks, and Oversized Material** - Replace boils, slicks, and oversized materials with fresh mixture.

**(c) Segregation** - Take corrective measures when segregation or non-uniform surface texture is occurring in the finished mat. If segregation continues to occur, stop production until a plan for providing uniform surface texture is approved.

**(d) Roller Damage to Surface** - Correct surface damage from rollers with additional fresh mixture or by other approved means.

**(e) Longitudinal Joints** - Take corrective measures when open longitudinal joints are being constructed or when the elevation of the two sides of a longitudinal joint does not match. If problems with the longitudinal joint continue to occur, stop production until a plan for providing tight, equal elevation longitudinal joints is approved.

**(f) Other Defects** - Remove and replace any ACP that:

- Is loose, broken, or mixed with dirt.
- Shows visually too much or too little asphalt.

#### FINISHING AND CLEANING UP

**00744.70 Pavement Smoothness** - Furnish a 12-foot straightedge. Test with a 12-foot straightedge parallel to and perpendicular to the centerline, as directed by the RPR. The Pavement surface shall not vary by more than 1/4 inch. Mark areas not meeting the surface tolerance.

**00744.75 Correction of Pavement Roughness** - Correct Equipment or paving operation procedures when tests show the Pavement smoothness does not comply with 00744.70. In addition, do the following:

**(a) Methods** - Correct surface roughness to the required tolerances, using one of the following methods as approved by the Engineer:

- Remove and replace the wearing surface Lift.
- Profile to a maximum depth of 0.3 inch with abrasive grinders equipped with a cutting head comprised of multiple diamond blades, and apply an emulsion fog seal as directed.

**(b) Time Limit** - Complete correction of all surface roughness within 14 Calendar Days following notification, unless otherwise directed.

#### MEASUREMENT

**00744.80 MEASUREMENT** - The quantities of ACP will be measured on the weight basis.

No deductions will be made for asphalt cement, mineral filler, lime, anti-strip, or any other additive used in the mixture.

#### PAYMENT

**00744.90 PAYMENT** - The accepted quantities of ACP incorporated into the Project, whether or not recycled Materials are used, will be paid for at the Contract unit price, per ton, for the item

Bid Item No. B-10

Level 2, 1/2 Inch ACP Mixture PG 64-28 – per Ton

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

No separate or additional payment will be made for:

- asphalt cement, mineral filler, lime, and anti-stripping or other additives
- sawing, cleaning, and filling joints on bridge deck overlays

## ITEM P-217 AGGREGATE-TURF TAXILANE

### DESCRIPTION

**217-1.1** This item shall consist of an aggregate-turf composed of a base course of soil-bound crushed stone, soil-bound gravel, or soil-bound sand, and a seedbed of suitable soil or combination of soil and aggregate, constructed on a prepared subgrade or a previously constructed underlying course per these specifications, and shall conform to the dimensions and typical cross-section shown on the plans.

This item may include the furnishing and applying of fertilizer, lime, top-soil, or other plant nutrients; the furnishing and planting of seed; and the furnishing and spreading of mulch. When any turfing materials are required, the quality, quantity, and construction methods shall be per paragraph 217-3.10 Turf. When turf is to be established, the seedbed soil or topsoil shall be a natural friable soil, possessing characteristics of the best locally obtainable soils, which can produce a heavy growth of crops, grass, or other vegetation.

The prepared composite mixture of aggregates used for the base course shall be P-208.

### MATERIALS

**217-2.1 STABILIZED MIXES.** The designated stabilized base course mixtures shall conform to the following requirements of P-208.

**217-2.2 STABILIZER AGGREGATE.** Not Used.

**217-2.3 SAMPLING AND TESTING.**

**a. Aggregate base materials.** See Specification P-208.

**b. Gradation requirements.** See Specification P-208.

**217-2.4 SEPARATION GEOTEXTILE.** See Specification E-180.

### CONSTRUCTION METHODS

**217-3.1 CONTROL STRIP.** The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. Upon acceptance of the control strip by the RPR, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

**217-3.2 PREPARING UNDERLYING COURSE.** The underlying course shall be checked and accepted by the RPR before placing and spreading operations begin. Any ruts or soft, yielding places caused by improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To protect the underlying course and to ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope. Material shall not be placed on frozen subgrade or subbase.

**217-3.3 PLACEMENT.** The material shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The material shall be thoroughly pulverized and mixed to produce a homogeneous mass forming a layer. The equipment shall have positive thickness

controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The material shall meet gradation and moisture requirements prior to compaction. The layer shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

**217-3.4 COMPACTION.** Immediately upon completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade. The field density of each compacted lift of material shall be at least 90% of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The moisture content of the material during placing operations shall be within  $\pm 2$  percentage points of the optimum moisture content as determined by ASTM D698. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**217-3.5 FINISHING.** The surface of the base course shall be finished by blading or other approved equipment designed for this purpose. Adding thin layers of material to the top layer of base course to meet grade shall not be allowed. If the elevation of the top layer is 1/2 inch or more below grade, the top layer of base shall be scarified to a depth of at least 3 inches, new material added, and the layer blended and recompact to bring it to grade at the Contractor's expense. If the finished surface is above plan grade, it shall be cut to grade and rerolled.

**217-3.6 WEATHER LIMITATIONS.** Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

**217-3.7 MAINTENANCE.** The layer shall be maintained in a condition that will meet all specification requirements until the work is accepted. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meets all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at their expense.

**217-3.8 SURFACE TOLERANCE.** After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompact to grade. until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

**a. Smoothness.** The finished surface shall not vary more than 1/2-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

**b. Grade.** The grade and crown shall be measured on a 25-foot grid and shall be within +0 and -1/2 inch of the specified grade.

**217-3.9 ACCEPTANCE SAMPLING AND TESTING.** Aggregate-Turf course shall be accepted for density and thickness on an area basis. Two tests for density and thickness shall be made for each 500 square yds. Sampling locations will be determined on a random basis per ASTM D3665.

**a. Density.** The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.

Each lot shall be accepted for density when the field density is at least 90% of the maximum density of laboratory specimens compacted and tested per ASTM D698. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**b. Thickness.** The thickness of the base course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

Thickness acceptance may be determined by survey before and after placement with prior written approval from the RPR. The survey intervals shall be approved by the RPR prior to performing the surveys.

**217-3.10 TURF.** Seeding shall be in accordance with Item T-901, Seeding and T-905, Topsoiling.

### METHOD OF MEASUREMENT

**217-4.1** Soil-aggregate base course shall be measured by the number of cubic yards of base course material placed, bonded, and accepted in the completed base course. The quantity shall be measured in final position based on by means of average end areas on the completed work.

### BASIS OF PAYMENT

**217-5.1** Payment shall be made at the contract unit price per cubic yard for soil-aggregate base course. These prices shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Bid Item No. B-8

Turf Aggregate Base – per Cubic Yard

### REFERENCES

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

#### ASTM International (ASTM)

ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water permeability of Geotextiles by permittivity
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile



**American Association of State Highway and Transportation Officials (AASHTO)**

M288                      Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-217

## ITEM E-210 T-HANGAR DESIGN, SUPPLY, AND CONSTRUCTION

### PART 1 GENERAL

#### 1.1 WORK INCLUDED:

This item shall consist of providing on site at the **Ken Jernstedt Airfield (452)** all materials needed for the construction and erection of a new aircraft nested T-hangar as indicated in these specifications and as shown on the project Drawings. This work shall include all labor, tools, equipment, submittals, permit coordination, and materials for designing, fabricating, delivering, installing, and erecting this aircraft hangar at the airport. Work items include, but are not limited to, the following work, and as outlined and as shown on the Drawings: required additional design for all local permitting, coordination of all local permitting, procurement of all local permitting, fabrication, delivery, excavation, select fill, embankment, and vapor barriers as necessary for the construction of the hangar concrete approach slabs; construction of hangar concrete foundation; provision and installation of anchor bolts; erection of the pre-fabricated metal hangar building including all metal, hangar doors, hardware, insulation, and accessories; provision, installation, and connection of all electrical items; and coordination with and connection to the local electrical utility service.

Erection of a new pre-engineered nested T-hangar metal building and accessories, provided and delivered to the project site, is included in the work. The metal building shall have a gabled roof design, steel frame type construction, and shall be a completely integrated system to the dimensions as shown on the project Drawings.

Unless otherwise specified within this section, all aspects of the building system, including design, details, materials, fabrication, quality criteria, tolerances, marking and identification, methods, and procedures, shall be governed by the building Supplier's standards, in accordance with required building codes as specified by the local authorities. The pre-engineered metal building plans shall be signed and sealed by a Professional Engineer licensed in the State of Oregon and shall include a Code Summary fully setting forth how all elements of required codes are met.

Construction of a concrete foundation and concrete approach slabs shall include all required design, local permitting, excavation, subgrade processing and required compaction, select fill, fill embankment, aggregate backfill and vapor barrier provision and foundation construction and installation, as noted in the approved concrete foundation design provided by the contractor or hangar supplier, and shall comply with the project Drawings.

#### 1.2 BUILDING DESCRIPTION:

- A. Building Type – New Aircraft Nested T-hangar Building: Multi-span, single gabled, rigid frame structure.
- B. Roof Slope: 1:12 desirable (requires lapped and sealed panels per 2022 Oregon Structural Specialty Code (OSSC)). Provide 12-inch minimum overhang to shed water away from hangar doors.
- C. Minimum Vertical Clear Dimension: 12 feet, measured vertically from the floor to the lowest portion of any structural member throughout the hangar.
- D. Minimum Clear Aircraft Hangar Unit Door Opening: 41.5-foot width by 12-foot height.
- E. Nominal Overall Building Dimension: 231 feet by 51 feet. Nominal building dimensions are based on standard metal building construction; minimum clear door opening dimensions shall govern. Other dimensions shown, such as building dimensions, hangar concrete foundation dimensions, etc., may vary slightly from dimensions shown in the project Drawings, based on the hangar Supplier's specific building design.
- F. Aircraft Hangar Unit Dimensions:
  - 1. Clear stall depth, minimum 32 feet.
  - 2. Clear wing stall depth, minimum 18 feet.

3. Clear tail stall width, minimum 21 feet.
4. Clear aircraft hangar door width, minimum 41.5 feet.
5. Clear aircraft hangar door height, minimum 12 feet.

### **1.3 QUALITY ASSURANCE:**

#### **A. Codes and Standards:**

1. Use the current version, at time of bidding, of the following applicable structural design codes as specified by Hood River County, Oregon:
  - a. 2022 Oregon Structural Specialty Code (OSSC).
  - b. AWS "Code of Welding in Building Construction" and "Specification for Welding Sheet Steel in Structures".
  - c. MBMA "Recommended Design Practices Manual", latest edition, and "Low-Rise Building Systems Manual".
  - d. AISI "Specifications for the Design of Cold Formed Steel Structural Members".
  - e. AISC "Steel Construction Manual" and "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings" (aircraft hangar supplier must be certified by AISC).
  - f. AAMA "Aluminum Construction Manual".
  - g. SJI "Standard Specifications, Load Tables, and Weight Tables".
  - h. AISC "Specifications for Structural Joints using ASTM A-325 or ASTM A-490 Bolts".
  - i. AISC "Code of Standard Practice for Steel Buildings and Bridges".
  - j. SDI "Steel Roof Deck Design Manual".
  - k. IBC "International Building Code", 2024 edition
2. Use the current version, at time of bidding, of the following applicable codes as specified by Hood River County, Oregon for other design phases:
  - a. 2023 Oregon Electrical Specialty Code (OESC).
  - b. Building Code and Regulations of other governing authorities having jurisdiction at project site.
  - c. Structural Steel Painting Council (SSPC) Standards.
  - d. Roofing system rating UL Classification 90.
  - e. American Society for Testing and Materials (ASTM) Standards.
  - f. 2022 Oregon Fire Code (OFC).
  - g. NFPA 409, as applicable to authority having jurisdiction.
  - h. IPC "International Plumbing Code", 2021 edition.
  - i. IMC "International Mechanical Code", 2024 edition.
  - j. IECC "International Energy Conservation Code", 2021 edition.
  - k. NEC "National Electrical Code", 2023 edition.

#### **B. Design Loads:**

1. Basic Design Loads: To include live, wind, snow, and earthquake, in addition to dead loads and including loading imposed by mechanical units. Consider all other design loads, whether they are of static, dynamic, or kinetic nature, as auxiliary loads. Design must conform to the minimum requirements of the OSSC, and

local code as specified by Hood River County, Oregon. Vertical live loads and wind loads with doors closed shall be as prescribed by the OSSC, and local code as specified by Hood River County, Oregon.

2. Tributary Reductions: As allowed by the OSSC.
3. Crane Loads: No crane loads are required.
4. Aircraft Hangar door deflections shall be limited to  $L/180$  under full wind load, or as required by aircraft hangar door supplier's requirements for operation.

#### **1.4 SUBMITTALS:**

- A. General: The Contractor shall furnish to the Engineer and the Owner, electronic copies of all submittal information required under this item. Submittals shall be clearly marked and cut sheets shall indicate specific items proposed. Unclear or generic submittals will be rejected.
- B. General: The Contractor shall be responsible to coordinate with the Owner, and local permitting authorities, and provide all required additional design elements and permit submittal information required to obtain, in the Owner's or local permitting authorities desired format, that is required for Owner and local permitting authority, to review and process all required project permitting. The Contractor is responsible for familiarizing themselves with the local permitting authorities' requirements for obtaining all required permits, and obtain and pay for all required permits for completion of the project.
- C. General: The Contractor shall prepare A Code Summary Table that shall detail how the building design meets all applicable code criteria for the building's intended use. Note: The Code Summary shall cover all applicable OSSC Chapters (1 through 16), with special emphasis on Chapters 4, 5, 9, and 16, all applicable sections of NFPA, and all applicable NEC sections.
- D. Aircraft Hangar Erection Shop Drawings and Calculations for the specified hangar building:
  1. The Contractor shall furnish to the Engineer and the Owner, completed hangar erection shop drawings for the hangar specified, including details and calculations for review and written acceptance.
    - a. Design Calculations and Hangar Erection Shop Drawings: Prepared by, or under the direct supervision of, a Professional Engineer licensed in the State of Oregon, with all drawings and calculations bearing this seal.
    - b. Show each type of structural building frame required and their locations within structure; details of anchor bolt sizes (including diameter, embedment length, and shape); base plate details; sidewall, endwall, and roof framing; diagonal bracing and location within structure; roof insulation and types; longitudinal and transverse cross sections; details of curbs, roof jacks, and items penetrating the roof; canopy framing and details; trim, liner panels, wall and roof coverings, and all accessory items; materials; finishes; construction and installation details; and other pertinent information required for proper and complete installation.
    - c. All shop drawings shall be reviewed and accepted in writing by the Engineer and Owner before purchase of materials and start of building fabrication.
- E. Concrete Foundation Design Drawings, Specifications, and Calculations:
  1. The Contractor shall furnish to the Engineer and Owner completed: concrete hangar floor slab, foundation and approach slab designs; drawings, including all plan details; specifications; and calculations, for review and comment. The Contractor shall resolve any noted exceptions and resubmit as required by the Engineer and Owner. All concrete strength, thickness, and reinforcement requirements shall be included in the design submittals. The design submittals shall include requirements for excavation, for providing a suitable subgrade for the hangar construction. This may include reworking/conditioning the subgrade, excavating the existing subgrade materials and replacing with select fill materials, or other methods reviewed and approved by the Engineer. The design submittals

shall also include compaction requirements, aggregate material requirements and thickness, compaction and all material testing requirements for placement of all materials, including a vapor barrier. The design submittals shall include anchor locations, bolt sizes and types, as well as embedment lengths and shapes. The design submittals shall also include concrete approach slab design in conformance with the project Drawings. The concrete hangar slab, foundation and approach slab designs, drawings, specifications, and calculations shall be signed and sealed by a Professional Engineer licensed in the State of Oregon, who is qualified to design concrete building slabs and foundations.

2. The allowable potential vertical rise (PVR) for the concrete hangar slab, foundation and approach slab design is 1½ inches, the allowable design ground bearing pressure is 1500 psi, and the local frost depth is 18 inches.
  3. The hangar Supplier and Professional Engineer designing the concrete hangar slab, foundation, and concrete approach slabs shall coordinate with the metal building supplier, subcontractors, and any other affected parties to assure a complete, sound, and finished project in conformance to the Project Drawings, and shall also coordinate with any plumbing, utility, and/or electrical plans to provide all necessary mechanical, electrical, plumbing, and all other required utility penetrations to the hangar foundations.
- F. Aircraft Hangar Supplier Material Samples – for each specific material sample requested by the Owner, submit in size, form, and number as directed:
1. Three samples of sheet metal for each color specified.
  2. Three samples of trim metal for each color specified.
- G. Product Data: Electronic copy of aircraft hangar Supplier's specifications and descriptive literature.
- H. Certification: Electronic copy of certification, prepared and signed by a Professional Engineer licensed in the State of Oregon, attesting that the building design meets specified loading requirements, requirements of codes and authorities having jurisdiction, and other requirements, as required.
- I. Electrical: Supplier's specifications and descriptive literature for all electrical materials and equipment, which shall be new and listed by a nationally-recognized testing laboratory (where applicable). Electronic submittals are required for the following: electric service equipment; electric panels and breakers; indoor and outdoor light fixtures; gas space heaters; twist lock receptacles and plugs; duplex receptacles; and wire. Incidental materials such as: hardware, conduit fittings, electrical device boxes, electrical connectors, etc. do not require submittal.
- J. Contractor shall provide a hangar Supplier's certification that all products and equipment, including origin, complies with FAA "Buy American-Steel and Manufactured Products" requirements. Electronic copy of aircraft hangar Supplier's certification for source of all steel, see Buy American requirements in project specifications.
- K. Contractor shall provide record drawings to the Engineer after final acceptance of the project.
1. Accurately record actual locations of embedded utilities and components which are concealed from view.

#### **1.5 PRODUCT HANDLING:**

- A. Deliver and store pre-fabricated components, sheets, panels, and other fabricated items so they will not be damaged or deformed. Items shall be packaged to prevent damage from weather, and any damaged or deformed materials shall be replaced by the Contractor for no additional cost to the Project, and in a timely manner such that building erection is not delayed.
- B. Stack materials on platforms or pallets, covered with tarpaulins or other approved weathertight ventilated covering.

- C. Store metal sheets and panels so water accumulation will drain freely. Do not store sheets and panels in contact with other materials that might cause staining.
- D. Stored materials to be readily accessible, with factory markings visible. The Contractor shall be responsible for stored materials until building systems are erected.
- E. Contractor shall provide all installation and maintenance instructions. Contractor shall construct all items in accordance with installation and maintenance instructions.

#### 1.6 WARRANTIES:

<u>Item</u>	<u>Materials &amp; Workmanship</u>	<u>Panel Finish</u>
Roof Panels	3 years	20 years
Wall Panels	3 years	20 years
Materials, Components & Access	3 years	20 years

Provide any other manufacturer's standard or extended warranties

## PART 2 PRODUCTS AND FABRICATION

#### 2.1 STRUCTURAL STEEL:

##### A. Materials:

1. Structural steel shall conform to the following ASTM designations, as allowed by applicable Code(s):
  - Hot Rolled Milled Shapes – A992 or A572
  - Steel Plate/Flat Bar – A572 or A529
  - Structural Steel Strip – A1011 or A529
  - Structural Steel Sheet – A1011, A529, or A572
  - Cold-Formed Light Gauge Shapes – A1011
  - Cable Bracing – A475
  - Round Bar Bracing – A36
  - Roof and Wall Cladding – A792
  - Anchor Rods – A36

Primer shall equal or exceed the end performance requirements of Federal Specification TT-P-636, or as allowed by Code.
2. High Strength Bolts and Nuts: ASTM A325, or equivalent as allowed by Code; size required by metal building system supplier's design.
3. Machine Bolts and Nuts: ASTM A307, or equivalent as allowed by Code; size required by metal building system supplier's design.

##### B. Fabrication:

1. Primary Framing: Rigid frames of shop-welded steel plate columns and rafters, both tapered and uniform depth sections as required by aircraft hangar building dimensions and design, complete with all necessary stiffeners, connection plates, and holes for field bolted assembly. Design rigid frames on basis of elastic behavior.
2. Secondary Framing: (Purlin, Girts, Struts, Flange Braces, Base Angles, Base Trim Angles), per ASTM A572 and/or ASTM A36 as applicable.

## 2.2 ROOFING AND SIDING:

### A. Exterior Wall and Hangar Door Panels:

1. All exterior wall and Hangar door panels shall be minimum 26-gauge pre-painted Galvalume steel, meeting ASTM A792, ribbed "R" panels with 36-inch wide net coverage, four major corrugations at 12-inch centers, with two minor ribs located symmetrically between the major ribs.
2. Provide and install all wall panels in continuous lengths, complete with all required sealant, trim, flashings, panel closures, and other components required for complete weathertight installation.
3. R-panel corrugations shall be oriented such that drainage flows freely along corrugations from the ridge to the eave. The ridge shall be parallel to, and centered in, the building long dimension.

### B. Roofing Panels:

1. All roofing panels shall be minimum 26-gauge Galvalume steel, meeting ASTM A792, ribbed "R" panels with 36-inch wide net coverage, four major corrugations at 12-inch centers, with two minor ribs located symmetrically between the major ribs. Sheets shall have purlin bearing legs.
2. Provide all roof panels in continuous lengths from eave to ridge, complete with all required sealant, trim, flashings, panel closures, and other components required for complete weathertight installation.
3. R-panel corrugations shall be oriented such that drainage flows freely along corrugations from the ridge to the eave. The ridge shall be parallel to, and centered in the building's long dimension.

### C. Building Flashing and Trim: All building flashing and trim shall be Minimum 26-gauge pre-painted Galvalume steel, meeting ASTM A792, equal in quality to roof and wall panels. Flashing and/or trim to be furnished at rakes, corners, eaves, framed openings, and wherever necessary to provide weather-tightness and a finished appearance. Allow for 2-inch lap for gutter, eave, and rake trim. Allow 1-inch lap for all other trim.

### D. Interior Partitions: All Interior Partitions shall be Minimum 29-gauge Galvalume steel, meeting ASTM A792 pressed rib panels. Sheets will extend from floor level to roof with allowance for expansion to prevent buckling. Short sections of flashing shall be provided and added as necessary to seal hangar units from adjacent units. Interior partitions and wall girts between units shall be installed as shown on the Drawings unless otherwise approved.

### E. Fasteners:

1. Wall Panels: #14 x 7/8-inch self-tapping zinc plated screws with bonded neoprene washers color coated to match wall and door sheeting.
2. Roof Panels: #12 x 1-inch heavy-duty zinc/aluminum/cast alloy headed self-drilling screws with bonded neoprene washers to fasten panels to purlins. Stitch screws to be #14 x 7/8-inch self-tapping zinc plated screws with bonded neoprene washers.
3. Trim Fasteners: #14 x 7/8-inch self-tapping zinc plated screws with bonded neoprene washers color coated to match trim.

### F. Roof and Wall Panel Sealant:

1. Neoprene or other solid or closed cell, preformed (inside for roof panels and outside for endwall panels at the rake) closure strips, matching panel profiles, shall be installed along the eave of roof panels and the rake of endwall panels.
2. Base Flashing: Hangar Supplier's standard base trim to provide dirt proof seal between slab and floor panels.
3. Tape Sealant: Sealant for roof sidelaps, endlaps, and flashing shall be white, pressure sensitive, 100-percent solids, butyl-based continuous tape. Tape width shall be minimum 3/8-inch with a minimum thickness of 3/32-inch. Tape to incorporate a coated, waterproof release paper for installation ease. Tape

shall be non-asphaltic, non-shrinking, non-drying, and non-toxic with a minimum life expectancy of 20 years.

4. Tube Sealant: A polyurethane based color tube sealant for sealing applications including door perimeters, gutter/downspout joining, and where needed around other penetrations. Sealant to be a high performance, flexible seal with superior adhesion and elasticity.

G. Panel and Trim Color:

1. Colors closely matching those specified shall be submitted by the Contractor for the Owner's review, selection, and written approval.

H. Roof Insulation:

1. Standard 3-inch (R-10) non-combustible fiberglass blanket insulation with reinforced vinyl backing, MP-50 or better shall be supplied and installed by the Contractor. Insulation will be placed concurrently with roof panel installation, and all insulation shall have a vinyl-backed vapor barrier facing the hangar interior.

I. Color for Roof Panels, Exterior Wall Panels and all Building Flashing and Trim:

1. All Galvalume steel exterior walls and aircraft hangar door panels shall be pre-painted off-white (Ivory), or approved equal, using a siliconized polyester or Kynar finish. Colors closely matching those specified shall be submitted by the Contractor for review, selection, and written approval by the owner.
2. All Galvalume steel roofing panels shall be pre-coated, both sides, with a clear protective coating.
3. All Galvalume steel building trim and flashing shall be pre-painted Blue, or approved equal, using a siliconized polyester or Kynar finish. Colors closely matching those specified shall be submitted by the Contractor for review, selection, and written approval by the owner.

## **2.3 WIND BRACING:**

A. General:

1. Install rod bracing or portal frames as shown on Hangar Supplier's final accepted shop drawings.
2. Clean components free of oil, dirt, loose scale, and foreign matter. Apply one coat of primer.

## **2.4 AIRCRAFT HANGAR DOORS:**

A. General:

1. Aircraft Hangar doors shall be electrically-operated bi-fold lift doors. Doors shall be adequate for building design live and wind loads, with uplift protection. Doors shall be installed according to detailed installation instructions and specifications provided by the door fabricator.
2. Aircraft Hangar door design/fabrication shall be part of the metal building system for hangars, and certified to be fully compatible with aircraft hangar building structure design. Metal panels for doors shall match building wall material and color.
3. Aircraft Hangar doors shall have secure locking system to secure doors against movement for design wind loads when in the closed and locked position.
4. Walk-in access doors shall be provided at the locations shown in the project Drawings and shall be non-handed, standard Level 3, 1-<sup>3</sup>/<sub>4</sub>" extra heavy duty steel doors. All Walk-in access doors shall swing inward and away from the light and hangar door operator switches. Walk-in doors installed in Bi-fold Aircraft Hangar doors shall be 36 inches wide by 76 inches high. Walk-in doors installed in hangar walls shall be



36 inches wide by 80 inches high. All walk-in doors shall be equipped with heavy-duty stainless-steel door locks. The portion of the doors and frames receiving locks and strikes shall be solid core. Walk-in doors shall have a factory baked white enamel finish. Walk-in door jamb perimeters shall include steel overlap flashing and appropriate rubber weatherstrips for perimeter sealing.

5. Door design/manufacture for all doors provided, shall be part of the metal building system for hangar, or certified to be compatible with hangar building design. If hangar and door manufacturers are different, certification of compatibility shall accompany design shop drawings for approval. Door panels shall match building wall material and color. The manufacturer of the metal building system and the bi-fold overhead doors must coordinate to ensure compatibility of products. Contractor shall be responsible for ensuring the compatibility of the building system and doors and shall bear all costs to replace if they are not compatible at the time of erection.

**B. Electric Bi-Fold Aircraft Hangar Doors:**

1. Each hangar unit shall be furnished with an electrically-operated bi-fold hangar door. The electric door motor shall be sized and provided by the door fabricator to properly and safely operate the designated size door shown on the project Drawings. The hangar door shall be controlled by a constant pressure switch controlling a single-phase electric motor, worm gear speed reducer, with direct drive. The hangar doors shall use a cable or strap lift system with a latching system that secures the doors in the closed and locked position. The door electric motor shall be designed to be installed near the top or bottom of the bi-fold hangar door.
2. Each hangar door operator to be capable of being stopped and restarted, up or down, in any position, and have automatic stop at fully opened and fully closed positions. Provide wall mounted disconnect switch adjacent to the operating switch for each hangar door. The hangar door electric motor operator and disconnect switches shall be mounted on the side wall just inside the hangar, near the walk-in access door.
3. Hangar doors shall be plumb and true to the building and shall open and close operation in a continuous motion without binding or warping.
4. Install full length, durable weatherstrip at sill and head of each door assembly. Walk-in door jambs shall be sealed by steel overlap flashings or appropriate rubber weatherstrips.
5. Each aircraft Bi-fold hangar door shall be capable of being locked in the closed position to prevent damage to the door during periods of high winds. Contractor shall furnish and install a placard in each hangar unit, near the exit door, at the Owner's approved location, that reads *"HANGAR DOOR SHALL BE LOCKED IN THE CLOSED POSITION AND SHALL NOT BE OPERATED WHEN WINDS EXCEED 35 MPH"*

**2.5 ACCESSORIES:**

**A. Metal Access Doors, Frames, and Hardware.** Provide all doors in building exterior as follows:

1. Frames: Standard self-flashing, self-trimming, non-handed, wrap-around type fabricated from 16-gauge steel with ASTM A525 G60 commercial zinc coating, with 5¼-inch frame profile. Provide complete with 18-gauge sill channel, 22-gauge adaptor angles, galvanized reinforcements and preparations required for finish hardware, and factory applied dark brown rust inhibitive prime coat finish.
2. Finish Hardware: Provide each walk-in access door with heavy duty stainless steel door locks. The portion of the door and frame receiving lock and strike to be solid core. All locks to be keyed alike to a master key system with two (2) keys per hangar, and four (4) master keys to be provided.

**B. Fire Extinguishers:** Provide and install one (1) Class ABC, minimum 4A80BC size fire extinguisher in each hangar unit. Verify location with owner prior to installation. Installation shall meet local code and manufacturers requirements.

## **2.6 ELECTRICAL WORK:**

- A. General: The Contractor shall provide all electrical work necessary for fully operational hangars, including all accessories as listed in the project Drawings and as needed to provide a complete installation, including all required submittals for permitting. All electrical work shall be in accordance with the 2023 OESC and 2023 NEC, and shall meet all applicable local codes. All required permits and inspections for electrical work shall be applied for and obtained by the Contractor, and paid for by the Contractor.
1. Electrical service shall be brought to the building site by the Contractor as shown on the project Drawings. The Contractor shall provide all coordination and the Contractor shall pay all fees associated with the new service to the hangar building. Coordinate with Engineer and local electrical utility prior to installation to determine requirements for utility service. Install panels, meters, and electrical devices per the project Drawings, and as required for a complete and functioning system.
  2. Hangar interior LED light fixtures shall be provided and installed in the number and at the locations as shown in the project Drawings. Provide and install multiple 3- or 4-way occupancy switches adjacent to each access door, as required for zonal lighting control. Ceiling-suspended hangar interior lights shall include NEMA L5-15R twist-lock receptacles for cord-connected lights to facilitate removal and replacement. The Contractor shall provide and install cord and plug for each LED ceiling-suspended light fixture.
  3. Hangar exterior LED light fixtures shall be provided and installed in the number and at the locations as shown in the project Drawings. Exterior lighting shall be controlled by provided and installed on-fixture photocells. When installed on hangar doors, exterior fixtures shall have mercury tilt switches so fixtures turn off when the door is open.
  4. Provided and installed receptacles shall be 125 VAC 20-amp, NEMA 5-20R units, mounted at the locations as shown in the project Drawings. All receptacle circuits shall be protected by provided and installed GFCI circuit breakers in the electrical panel.
  5. Provide and install all electrical devices as shown on the project Drawings and as required for a complete and functioning system. Equipment to be provided and installed shall include, but not be limited to: meter socket(s), electric service and distribution panels, circuit breakers, rigid and flexible conduit, conductors, safety switches, conduit bodies, junction and device boxes, switches and switch plates, ground rods, equipment grounding conductors, grounding electrode conductors, and grounding to foundation rebar or structural steel. All required mounting materials and hardware shall be provided and installed. The electrical system shall be complete, safe, fully assembled, and code compliant.
  6. Contractor shall coordinate all electrical work with building manufacturer, aircraft door supplier, and erection contractor. See electrical plans for additional requirements.

## **PART 3 EXECUTION**

### **3.1 DELIVERY:**

- A. Electronic delivery of hangar design, concrete hangar slab, hangar foundation and approach slab design, shop drawings, calculations, Code Summary Table, local permit applications and issuance of local permits, and all required submittals shall be made and completed prior to Notice to Proceed for Onsite Construction work.
- B. Physical delivery of hangar building(s), aircraft hangar doors, walk-in access doors, insulation, and all specified accessories and components, delivered to and stored at the project site, shall be at a location and in a manner approved by the Owner. The Contractor shall be responsible for the unloading of all required items and shall be responsible for the safe storage of all required items at the site until building erection is complete and building occupancy has been issued by the Owner.

### 3.2 FOUNDATION:

A. General: The work includes construction of a concrete hangar floor slab, hangar foundation, including concrete approach slab extensions, constructed per the contractor or hangar supplier provided engineered design, plans and specifications, and in conformance with the Project Drawings.

1. The Contractor shall be responsible for all excavation, foundation subgrade preparation, subgrade compaction, placement of select fill and aggregate material, requirements and thickness, compaction and all material testing, and installation of a vapor barrier, and all other site work as necessary to construct the concrete hangar floor slab, hangar foundation and hangar approach slabs as designed.
2. Concrete work shall meet requirements of the Contractor-provided engineered design, plans, and specifications, including details for the concrete hangar floor slab, hangar foundation and concrete approach slabs.
3. The Contractor shall accept responsibility for accuracy of foundation levelness, dimensions and squareness, provision and installation of anchor bolts, and finish of concrete hangar floor slab, hangar foundation and approach slabs.

B. Concrete Placement:

1. Preparing Subgrade. Excavation shall be made to the required width and depth, and the subgrade upon which the item is to be built shall be compacted per the foundation design, plans, and specifications provided by the Contractor or hangar Supplier, including any and all specified material verification testing procedures. At a minimum, all soft and unsuitable material shall be removed and replaced with suitable approved material, and subgrade shall be compacted to firm and unyielding conditions meeting the requirements of the provided design. When required, a layer of approved granular material, compacted to the thickness indicated on the provided Contractor or hangar Supplier foundation design, shall be placed to form a subbase. The Contractor shall give notice to and allow the Engineer adequate time to check and accept underlying subgrade and aggregate courses before placing subsequent layers.
2. Placing. The concrete shall be tamped until it is consolidated and mortar covers the top surface. The concrete surface shall be floated smooth and edges rounded to meet industry standards. Before the concrete is given a final finish, the surface shall be tested by the Contractor with a 12-foot straightedge, and any irregularities of more than 1/4 inch in 12 feet shall be eliminated by the Contractor.

Unless otherwise specified by the hangar slab and foundation design, concrete shall be placed with dummy-grooved joints not exceeding a 12-foot spacing. Expansion joints, of the type called for in the plans, shall be constructed to replace dummy groove joints at a maximum 96-foot spacing. Expansion joints in new concrete shall be located coincident with expansion joints in existing abutting concrete. When new concrete abuts existing concrete, an expansion joint shall be placed between the new and existing concrete.

Forms shall not be removed within 24 hours after concrete has been placed. Minor defects shall be repaired with mortar containing one part cement and two parts fine aggregate.

Depositing, compacting, and finishing the item shall be conducted to build a satisfactory structure. If any concrete section is found to be porous, or otherwise defective, it shall be removed and replaced by the Contractor without additional compensation.

C. Concrete Testing – Contractor shall provide and pay for concrete testing by an approved laboratory and inspection service experienced in sampling and testing concrete. Concrete quality control testing shall be in accordance with section 00540.16 and 00540.17 of the Oregon Standard Specifications for Construction, 2024 edition, as outlined below.

00540.16 Quality Control—Provide quality control testing in accordance to Section 00165 and the following:

- For all structural concrete, provide personnel according to 00540.30 to sample and test the mix for temperature, air content, slump, water-cementitious ratio, density and yield, from every 75 cubic yards of concrete placement, or whenever there is a visible change in the slump of the concrete, and when a set of cylinders is obtained. Additional tests may be taken at the discretion of the Engineer or Owner.
- If the results of any test are outside of the Specification limits, stop placement of the load. Correct the load or, if the load cannot be corrected, do not incorporate it into the Work. Test subsequent loads before any further concrete placement. Correct subsequent loads if any of the tests are still outside the Specification limits. Return to the specified test frequency when the test results from two consecutive loads are shown to meet the Specification limits.

00540.17 - Acceptance of Concrete - Acceptance of concrete shall be in accordance with Section 00165 and 00540.17.c

### **3.3 ERECTION:**

#### **A. General:**

1. Install metal building system components following hangar supplier's instructions and complying with requirements shown on final shop drawings.
2. Erection of metal building, insulation, and accessories shall be performed by a competent building erector familiar with, and experienced in, metal building construction.

#### **B. Structural Frames:**

1. Erect true to line, level, and plumb, rigid and secure.
2. Level base plates to true even plane with full bearing to supporting structures. Use non-shrinking grout to obtain uniform bearing and to maintain level base line elevation. Moist cure grout for not less than seven days after placement.
3. Installation and location of anchor bolts shall be as designed within the hangar supplier plans, and shall be installed in the concrete foundation as intended by design. The Contractor shall fabricate and use anchor bolt templates, made of metal, wood or hard plastic, and attached to foundation formwork to properly locate anchor bolts. Drilling and doweling of anchor bolts after the concrete foundation has been placed is undesirable.

#### **C. Steel Joists:**

1. Place and secure in accordance with final shop drawings and local permitting requirements.
2. Place on supporting work, adjust, and align in accurate locations and spacing before permanently bolting in final location.
3. Install bridging simultaneously with joist erection, before any construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at wall or beams.
4. Provide and install temporary bridging, connections, and anchors, assuring lateral stability under construction.

#### **D. Bracing: Install diagonal rod or angle bracing, in lieu of sidewall rod bracing, to hangar supplier's standards.**

#### **E. Framed Openings: Provide shapes of proper design and size to reinforce opening and to carry loads and vibrations imposed, including equipment furnished under mechanical or electrical work. Securely attach to building structural frame.**

F. Roofing and Siding Panels:

1. Install roof panels so that R-panel corrugations are perpendicular to eaves. Install wall panels with long edges plumb.
2. Arrange and nest sidelap joints so prevailing winds will blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation.
3. Apply panels and associated items for neat and weathertight enclosures.
4. Avoid "panel creep" or application not true to line.
5. Protect factory finishes from damage.
6. Install approved closures to exclude weather. Provide weather seal under ridge cap. Flash and seal roof panels at eave and rake, at perimeter of all openings through roof, and elsewhere as required. Flash and seal wall and liner panels at perimeter of all openings, under eaves and gable trims, along lower panel edges, and elsewhere as required, as applicable.

G. Wall panels:

1. Install wall panels on exterior of all metal buildings, with liner panels installed on building interior in locations shown on the project Drawings.
2. Apply approved type, continuous elastomeric sealant bead between metal base sill angle and concrete, and elsewhere as necessary for waterproofing. Handle and apply sealant and back-up in accordance with sealant supplier's recommendations.
3. Align bottoms of panels and fasten with hangar supplier's recommended and supplied anchorage devices. Fasten flashings and trim around openings, etc. with approved type self-tapping screws; fasten door frames with approved type machine screws or bolts.
4. Install screw fasteners with power tool having controlled torque adjusted to compress tightly without damage to screws, screw heads, or panels.

H. Accessories: Install flashings, trim, ridge covers, roof curbs, pipe flashings, closure strips, roof jacks, and other accessories and sheet metal items in accordance with hangar supplier's recommendations for anchorage to building and weathertight mounting.

I. Swing Doors and Frames: Install doors and frames straight, plumb, and level. Securely anchor frames to building structure. Set units with 1/8-inch maximum clearance between door and frame at jambs and head, and 3/4-inch maximum between door and floor. Adjust hardware for proper operation.

J. Thermal Insulation: Install in accordance with hangar supplier's directions, performed concurrently with installation of roof panels.

1. Roof Insulation: Standard non-combustible fiberglass blanket insulation with reinforced vinyl backing, MP-50 or better. Place insulation with vinyl backing exposed-to-view from interior of building unless recommended otherwise by metal building supplier or shown on the project Drawings. Roof insulation thickness shall be 3 inches with a minimum R-10 rating.

### 3.4 PAINTING:

A. General: Touch-up abrasions, marks, skips, or other defects in shop-primed or factory finished painted surfaces with same type material as used for shop primer or factory finished painting. Primer shall equal or exceed the end performance requirements of Federal Specification TT-P-636.

1. Apply finish paint coats to factory primed items to surfaces that are not required to be galvanized surfaces.
2. Provide finish coats that are compatible with metal building manufacturer's prime coat paints.
3. Provide approved type barrier coats over incompatible primers where required.
4. Remove hardware and accessories, and similar items in place and not to be finish-painted, or provide surface-applied protection. Reinstall removed items.
5. Finish exterior swing doors on tops, bottoms, and edges same as exterior faces, unless otherwise indicated.

### **3.5 FINAL CLEANING**

- A. General: Remove any oil-spots, rubber tire marks, or any substance from the surface of the concrete floor after erection of the building and before acceptance by the Owner. Methods of washing/removal may include power washing.

## **PART 4 MEASUREMENT**

### **4.1 METHOD OF MEASUREMENT:**

- A. Aircraft Hangar building design development, design submittal and approval, procurement of materials, components, fabrication, delivery, construction of the reinforced concrete hangar floor slab and foundation; design, fabrication, delivery, and erection of the hangar; including all required components, appurtenances, designs, specifications, plans, calculations, required submittals, local permitting and all accessories and appurtenances described herein and as required, shall all be measured as a lump sum for each listed bid item completed and accepted by the Engineer and Owner.
- B. PCC Approach Slab shall be measured by the square foot in accordance with the dimensions shown on the plans or ordered by the Engineer. No deductions shall be made for the volume occupied by reinforcing steel, anchors, expansion joints, or piling. No separate measurement shall be made for steel reinforcement.
- C. The measured quantity of each utility service improvements shall be per Lump Sum, installed, connected, coordinated, excavated, backfilled, tested, and accepted as a complete system ready for operation. Each type of utility service improvements include any associated improvements needed to support, meter future service, connect to existing utility as shown on the drawings.

## **PART 5 PAYMENT**

### **5.1 BASIS OF PAYMENT:**

- A. Any components of the work required under this section, but not explicitly described under these pay items, shall be included and considered paid under the applicable Lump Sum prices. This includes, but is not limited to, the following: the Contractor's costs for insurance, permits, and other similar expenses directly related to and required by these Contract Documents; project-dedicated supervisory staff and equipment; compliance with any and all regulatory requirements; pre-fabrication and fabrication planning; scheduling; preparation and submittal of detail drawings, specifications, calculations, and required submittals; reporting; administration; meetings; procurement of subcontractors; coordination with suppliers, municipalities, and subcontractors; fabrication, production, delivery; supplier quality control; inspections and audits; foundation construction; hangar erection and all required electrical fixtures, connections, and appurtenances; and any other requirements or related miscellaneous items specified but not explicitly covered under the pay items.

- B. The accepted quantities of PCC approach slab will be paid for at the contract unit price per square foot complete in place. This price shall be full compensation for furnishing all materials and for all preparation, design, detailing, reinforcement, backfilling and placing of the materials; and for all labor equipment, tools and incidentals necessary to complete the item.
- C. Payment will be made at the contract lump sum price for each completed and accepted utility service improvements. This price shall be full compensation for furnishing all materials and for all preparation, local utility coordination, assembly, excavation, backfill, connections, furnishing and installation of appurtenances as shown on the plans; and for all labor, equipment, tools, and incidentals necessary to complete each lump sum item.

**Bid item and payment schedule:**

**Bid Item No. A-3                      Hangar Reinforced Concrete Foundation, Complete – per Lump Sum**

1. 10% of lump sum to be paid after delivery and approval of new T-Hangar concrete foundation design, shop drawings, calculations, required submittals and engineer signed/stamped foundation construction drawings, and all required local permits have been submitted, reviewed, approved and issued to the contractor by the Engineer and Owner.
2. An additional 80% of lump sum to be paid after final completion and acceptance of T-Hangar reinforced concrete slab and foundation construction; installed and approved by the Engineer and Owner.
3. Final 10% of lump sum to be paid after final acceptance of hangar reinforced concrete slab and foundation testing results are accepted by the Engineer and Owner.

**Bid Item No. A-4                      Hangar Design, Fabrication and Delivery, Complete – per Lump Sum**

1. 30% of lump sum to be paid after delivery and approval of new T-Hangar building design, shop drawings, calculations, required submittals and engineer signed/stamped foundation construction drawings, and all required local permits have been submitted, reviewed, approved and issued to the contractor by the Hood River County.
2. Final 70% of lump sum to be paid after delivery of T-Hangar building, hangar doors, insulation, and all specified and required accessories and components, delivered to and stored at the project site at a location and in a manner approved by the Owner.

**Bid Item No. A-5                      Hangar Erected and All Appurtenances, Complete – per Lump Sum**

Full payment for lump sum of Hangar Erected and All Appurtenances, Complete upon final inspection and completion of all required work for the erection and installation of the T-Hangar building and all fixtures and appurtenances and achieving final building occupancy approval per local permit requirements as defined on the construction drawings, project specifications, and by the Engineer and Owner.

**Bid Item No. A-6                      Hangar Electric Fixtures and Components, Complete – per Lump Sum**

Full payment for lump sum of Hangar All Electric Fixtures and Components, Complete upon final inspection and completion of all required electrical work needed for a fully operational T-Hangar building per local permit requirements as defined on the construction drawings, project specifications, and by the Engineer and Owner.

**Bid Item No. A-7                      PCC Approach Slab – per Square Foot**

**Bid Item No. A-8                      Electrical Utility Service Improvements – per Lump Sum**

END OF ITEM

## ITEM P-605 JOINT SEALANTS FOR PAVEMENTS

### DESCRIPTION

**605-1.1** This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

### MATERIALS

**605-2.1 JOINT SEALANTS.** Joint sealant materials shall meet the requirements of ASTM D6690, Type 2 or 3.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

**605-2.2 BACKER ROD.** The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be  $25\% \pm 5\%$  larger in diameter than the nominal width of the joint.

**605-2.3 BOND BREAKING TAPES.** Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

### CONSTRUCTION METHODS

**605-3.1 TIME OF APPLICATION.** Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint. When used with Item P-606, Item P-605 shall not be applied until the P-606 has fully cured.

**605-3.2 EQUIPMENT.** Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, days prior to use on the project.

**a. Tractor-mounted routing tool.** Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

**b. Concrete saw.** Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

**c. Sandblasting equipment.** Sandblasting is not allowed.

**d. Hand tools.** Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.



**e. Hot-poured sealing equipment.** The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.

**605-3.3 PREPARATION OF JOINTS.** Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

**a. Sawing.** All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

**b. Sealing.** Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by tractor-mounted routing equipment concrete saw as specified in paragraph 605-3.2. If allowed, the newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. If allowed, sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

**c. Backer Rod.** When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

**d. Bond-breaking tape.** Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

**605-3.4 INSTALLATION OF SEALANTS.** Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/8 inch  $\pm$  1/16 inch below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

**605-3.5 INSPECTION.** The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

**605-3.6 CLEAN-UP.** Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

#### **METHOD OF MEASUREMENT**

**605-4.1** Joint sealing material shall be measured by the linear foot of sealant in place, completed, and accepted.

#### **BASIS OF PAYMENT**

**605-5.1** Payment for joint sealing material shall be made at the contract unit price per linear foot. The price shall be full compensation for furnishing all materials, for all preparation, delivering, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Bid Item No. A-9	Longitudinal Joint Seal, per linear foot
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#### **REFERENCES**

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

##### **ASTM International (ASTM)**

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt

##### **Advisory Circulars (AC)**

AC 150/5340-30 Design and Installation Details for Airport Visual Aids

END ITEM P-605

**ITEM P-610 CONCRETE FOR MISCELLANEOUS STRUCTURES****DESCRIPTION**

**610-1.1** This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

If the project contains less than 20 cubic yards of concrete in total, concrete meeting the requirements of the 2024 Oregon Department of Transportation Standard Specifications for Commercial Grade Concrete may be used.

**MATERIALS**

**610-2.1 GENERAL.** Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Resident Project Representative (RPR) before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

**a. Reactivity.** Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

**610-2.2 COARSE AGGREGATE.** The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

**Coarse Aggregate Grading Requirements**

<b>Maximum Aggregate Size</b>	<b>ASTM C33, Table 3 Grading Requirements (Size No.)</b>
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
3/4 inch (19 mm)	67
1/2 inch (12.5 mm)	7

**610-2.2.1 COARSE AGGREGATE SUSCEPTIBILITY TO DURABILITY (D) CRACKING.** Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

Crushed granite, calcite cemented sandstone, quartzite, basalt, diabase, rhyolite or trap rock are considered to meet the D-cracking test requirements but must meet all other quality tests specified in Item P-501.

**610-2.3 FINE AGGREGATE.** The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

**610-2.4 CEMENT.** Cement shall conform to the requirements of ASTM C150 Type IIA.

**610-2.5 CEMENTITIOUS MATERIALS.** If included in the JMF, the Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below.

**a. Fly ash.** Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the RPR.

**b. Slag cement (ground granulated blast furnace (GGBF)).** Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

**610-2.6 WATER.** Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

**610-2.7 ADMIXTURES.** The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the RPR from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

**a. Air-entraining admixtures.** Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

**b. Water-reducing admixtures.** Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

**c. Other chemical admixtures.** The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

**610-2.8 PREMOLDED JOINT MATERIAL.** Premolded joint material for expansion joints shall meet the requirements of ASTM D1751.

**610-2.9 JOINT FILLER.** The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

**610-2.10 STEEL REINFORCEMENT.** Reinforcing shall conform to the requirements below.

**Steel Reinforcement**

<b>Reinforcing Steel</b>	<b>ASTM A615, ASTM A706, ASTM A775, ASTM A934</b>
<b>Welded Steel Wire Fabric</b>	<b>ASTM A1064, ASTM A884</b>

**610-2.11 MATERIALS FOR CURING CONCRETE.** Curing materials used shall conform to the following:

**Materials for Curing**

<b>Waterproof paper</b>	<b>ASTM C171</b>
<b>Clear or white Polyethylene Sheeting</b>	<b>ASTM C171</b>
<b>White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B</b>	<b>ASTM C309</b>

**CONSTRUCTION METHODS**

**610-3.1 GENERAL.** The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

**610-3.2 CONCRETE MIXTURE.** The concrete shall develop a compressive strength of 4000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

**610-3.3 MIXING.** Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the RPRs approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

**610-3.4 FORMS.** Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining

mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

**610-3.5 PLACING REINFORCEMENT.** All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

**610-3.6 EMBEDDED ITEMS.** Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed.

**610-3.7 CONCRETE CONSISTENCY.** The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

**610-3.8 PLACING CONCRETE.** All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

**610-3.9 VIBRATION.** Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

**610-3.10 JOINTS.** Joints shall be constructed as indicated on the plans.

**610-3.11 FINISHING.** All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

**610-3.12 CURING AND PROTECTION.** All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

**610-3.13 COLD WEATHER PLACING.** When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

**610-3.14 HOT WEATHER PLACING.** When concrete is placed in hot weather greater than 85°F (30 °C), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

## QUALITY ASSURANCE (QA)

**610-4.1 QUALITY ASSURANCE SAMPLING AND TESTING.** Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

**610-4.2 DEFECTIVE WORK.** Any defective work that cannot be satisfactorily repaired as determined by the RPR, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

#### METHOD OF MEASUREMENT

**610-5.1** Concrete shall be considered incidental and no separate measurement shall be made. of concrete complete in place and accepted.

#### BASIS OF PAYMENT

**610-6.1** Payment shall be made at the contract price Concrete shall be considered incidental and no separate payment shall be made. This price shall be full compensation for furnishing all materials including reinforcement and embedded items and for all preparation, delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

#### REFERENCES

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

##### ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete

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ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

**American Concrete Institute (ACI)**

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

END OF ITEM P-610



**ITEM P-620 RUNWAY AND TAXIWAY MARKING****DESCRIPTION**

**620-1.1** This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

**MATERIALS**

**620-2.1 MATERIALS ACCEPTANCE.** The Contractor shall furnish manufacturer’s certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer’s surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

**620-2.2 MARKING MATERIALS.****Table 1. Marking Materials**

Paint <sup>1</sup>				Glass Beads <sup>2</sup>	
Type	Color	Fed Std. 595 Number	Application Rate Maximum*	Type	Application Rate Minimum
Waterborne, Type I or II	Yellow	33538 or 33655	115 ft <sup>2</sup> /gal max	III	10 lb/gal

\* Application rates shown in Table 1 are to be applied for both 1<sup>st</sup> and 2<sup>nd</sup> coats.

<sup>1</sup> See paragraph 620-2.2a

<sup>2</sup> See paragraph 620-2.2b

**a. Paint.** Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

**Waterborne.** Paint shall meet the requirements of Federal Specification TT-P-1952F, Type II. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

**b. Reflective media.** Glass beads for white and yellow waterborne paint shall meet the requirements for Federal Specification TT-B-1325D Type III.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black and green paint.

Type III glass beads shall not be used in red and pink paint.

**CONSTRUCTION METHODS**

**620-3.1 WEATHER LIMITATIONS.** Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer’s recommendations in accordance with

paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

**620-3.2 EQUIPMENT.** Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

**620-3.3 PREPARATION OF SURFACES.** Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminants that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

**a. Preparation of new pavement surfaces.** The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

**b. Preparation of pavement to remove existing markings.** Existing pavement markings shall be removed by water blasting or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings. See Item P-101, Section 3.3 for additional requirements.

**c. Preparation of pavement markings prior to remarking.** Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application requirements and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

**620-3.4 LAYOUT OF MARKINGS.** The proposed markings shall be laid out in advance of the paint application.

**620-3.5 APPLICATION.** Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR. The elapsed time between placement of surface course or seal coat and applications of the paint shall be as follows:

**Waiting period for Paint and Reflective Media**

Paint Type	Application	Minimum Waiting period After Surface Treatment
Waterborne	1 <sup>st</sup> Coat	3 days
Waterborne	2 <sup>nd</sup> Coat, when required	28 days

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

**Marking Dimensions and Spacing Tolerance**

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed at the locations shown on the plans immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

**620-3.6 APPLICATION--PREFORMED THERMOPLASTIC AIRPORT PAVEMENT MARKINGS.** Preformed thermoplastic pavement markings not used.

**620-3.7 CONTROL STRIP.** Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

**620-3.8 RETRO-REFLECTANCE.** Not Used

**620-3.9 PROTECTION AND CLEANUP.** After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

**METHOD OF MEASUREMENT**

**620-4.1a** The quantity of pavement markings to be paid for shall be measured by the number of square feet of painting.

The quantity of bid item "Pavement Marking, White/Yellow, Two Coat" shall include both first and second coat applications in the same measurement.

No separate measurement shall be made for reflective media.

**BASIS OF PAYMENT**

**620-5.1** This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

**620-5.1a** Payment for pavement markings shall be made at the contract price for the number of square feet of painting.

No separate payment shall be made for reflective media.

Payment will be made under:

Bid Item No. B-11	Pavement Marking, Black, One Coat– per Square Foot
Bid Item No. B-12	Pavement Marking, White/Yellow, Two Coat – per Square Foot

### REFERENCES

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

#### ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

#### Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24 Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings

29 CFR Part 1910.1200 Hazard Communication

#### Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
FED STD 595	Colors used in Government Procurement

#### Commercial Item Description

A-A-2886B Paint, Traffic, Solvent Based

#### Advisory Circulars (AC)

AC 150/5340-1 Standards for Airport Markings

AC 150/5320-12 Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-620

**ITEM D-701 PIPE FOR STORM DRAINS AND CULVERTS****DESCRIPTION**

**701-1.1** This item shall consist of the construction of pipe culverts, storm drains, connections to existing pipes or structures in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

**MATERIALS**

**701-2.1** Materials shall meet the requirements shown on the plans and specified below. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.

**701-2.2 PIPE.** The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements:

AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
ASTM F667	Standard Specification for 3 through 24 in Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe

**701-2.3 CONCRETE.** Not Used.

**701-2.4 RUBBER GASKETS.** Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and precoat galvanized pipe shall conform to the requirements of ASTM D1056, for the "RE" closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477.

**701-2.5 JOINT MORTAR.** Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**701-2.6 JOINT FILLERS.** Poured filler for joints shall conform to the requirements of ASTM D6690.

**701-2.7 PLASTIC GASKETS.** Plastic gaskets shall conform to the requirements of ASTM C990.

**701-2.8. CONTROLLED LOW-STRENGTH MATERIAL (CLSM).** Not used.

**701-2.9 PRECAST BOX CULVERTS.** Manufactured in accordance with and conforming to ASTM C1433.

**701-2.10 PRECAST CONCRETE PIPE.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or American Concrete Pipe Association QCast Plant Certification program.

**CONSTRUCTION METHODS**

**701-3.1 EXCAVATION.** The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current Federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

**701-3.2 BEDDING.** The bedding surface for the pipe shall provide a foundation of uniform density to support the pipe throughout its entire length.

**a. Rigid pipe.** The pipe bedding shall be constructed uniformly for the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 in when the bedding thickness is less than or equal to 6 inches, and 1-1/2 in when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed uncompacted material under the middle third of the pipe prior to placement of the pipe.

**b. Flexible pipe.** For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

**Flexible Pipe Bedding**

Pipe Corrugation Depth		Minimum Bedding Depth	
inch	mm	inch	mm
1/2	12	1	25
1	25	2	50
2	50	3	75
2-1/2	60	3-1/2	90

**c. Other pipe materials.** For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

**701-3.3 LAYING PIPE.** The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

**701-3.4 JOINING PIPE.** Joints shall be made with (1) cement mortar, (2) cement grout, (3) rubber gaskets, (4) plastic gaskets, or (5) coupling bands .

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

**a. Concrete pipe.** Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joint shall be fully entered and the inner surfaces flush and even. Concrete pipe joints shall be sealed with rubber gaskets meeting ASTM C443 when leak resistant joints are required.

**b. Metal pipe.** Metal pipe shall be firmly joined by form-fitting bands conforming to the requirements of ASTM A760 for steel pipe and AASHTO M196 for aluminum pipe.

**c. PVC, polyethylene and polypropylene pipe.** Joints for PVC, Polyethylene, and Polypropylene pipe shall conform to the requirements of ASTM D3212 when leak resistant joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M252 or ASTM M294. Fittings for polypropylene pipe shall conform to ASTM F2881, ASTM F2736, or ASTM F2764.

**d. Fiberglass pipe.** Joints and fittings shall be as detailed on the plans and in accordance with the manufacturers recommendations. Joints shall meet the requirements of ASTM D4161 for flexible elastomeric seals.

**701-3.5 EMBEDMENT AND OVERFILL.** Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

#### **701-3.5-1 EMBEDMENT MATERIAL REQUIREMENTS**

**a. Concrete Pipe.** Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation Type(s) 1, per ASTM C1479 unless otherwise shown on plans. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.

**b. Plastic and fiberglass Pipe.** Embedment material shall meet the requirements of ASTM D3282, A-1 unless otherwise shown on plans, Embedment material shall be free of organic material, stones larger than 1.5 inches in the greatest dimension, or frozen lumps. Embedment material shall extend to 12 inches above the top of the pipe.

**c. Metal Pipe.** Embedment material shall be granular as specified in the contract document and specifications, and shall be free of organic material, rock fragments larger than 1.5 inches in the greatest dimension and frozen lumps. As a minimum, backfill materials shall meet the requirements of ASTM D3282, A-1, A-2, or A-3. Embedment material shall extend to 12 inches above the top of the pipe.

**701-3.5-2 PLACEMENT OF EMBEDMENT MATERIAL.** The embedment material shall be compacted in layers not exceeding 6 inches (150 mm) on each side of the pipe and shall be brought up one foot (30 cm) above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the

haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches (150 mm) and shall be brought up evenly on each side of the pipe to one foot (30 cm) above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

Concrete cradles and flowable fills, such as controlled low strength material (CLSM) or controlled density fill (CDF), may be used for embedment provided adequate flotation resistance can be achieved by restraints, weighing, or placement technique.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

**701-3.6 OVERFILL.** Pipes shall be inspected before any overfill is in place. Any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be placed and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per ASTM D698. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

#### **701-3.7 INSPECTION REQUIREMENTS**

An initial post installation inspection shall be performed by the RPR no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

Flexible pipes shall be inspected for rips, tears, joint separations, soil migration, cracks, localized buckling, settlement, alignment, and deflection. Determine whether the allowable deflection has been exceeded by use of a laser profiler for internal pipe diameters of 48 inches or less, or direct measurement for internal pipe diameters greater than 48 inches. Laser profile equipment shall utilize low barrel distortion video equipment. Deflection of installed pipe shall not exceed the limits provided in the table below, as a percentage of the average inside diameter of the pipe.

**Maximum Allowable Pipe Deflection**

<b>Type of Pipe</b>	<b>Maximum Allowable Deflection (%)</b>
Corrugated Metal Pipe	5
Concrete Lined CMP	3
Thermoplastic Pipe	5
Fiberglass	5

If deflection readings in excess of the allowable deflection are obtained, remove the pipe with excessive deflection and replace with new pipe. Isolated areas may exceed allowable by 2.5% with concurrence of RPR. Repair or replace



any pipe with cracks exhibiting displacement across the crack, bulges, creases, tears, spalls, or delaminations. The report for flexible pipe shall include as a minimum, the deflection results and final post installation inspection report. The inspection report shall include: a copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design line and grade, and inspector's notes.

#### METHOD OF MEASUREMENT

**701-4.1** The length of pipe shall be measured in linear feet of pipe in place, completed, and accepted. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. Each kind of pipe, of the type, class, and size designated, shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

**701-4.2** The quantity of connections to existing pipes or structures shall be measured by the unit.

#### BASIS OF PAYMENT

**701-5.0** These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, backfill, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

**701-5.1** Payment will be made at the contract unit price per linear foot for each kind of pipe of the type and size designated. .

**701-5.2** Payment for accepted quantities of connections to existing pipes or structures will be made for at the contract unit price per each in place when completed.

Payment will be made under:

Bid Item No. B-13	6-Inch HDPE Pipe – per Linear Foot
Bid Item No. B-14	12-Inch HDPE Pipe – per Linear Foot
Bid Item No. B-15	6-Inch Schedule 80 PVC– per Linear Foot
Bid Item No. B-16	Pipe Connection to Existing Structure – per Each

#### REFERENCES

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

#### American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M167	Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M190	Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M219	Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M243	Standard Specification for Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

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AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter

**ASTM International (ASTM)**

ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A761	Standard Specification for Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM A849	Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM B745	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
ASTM C14	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM D1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D3282	Standard Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals

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ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F667	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR PR) Based on Outside Diameter
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2435	Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications

**National Fire Protection Association (NFPA)**

NFPA 415	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways
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END OF ITEM D-701

**ITEM D-705 PIPE UNDERDRAINS FOR AIRPORTS****DESCRIPTION**

**705-1.1** This item shall consist of the construction of pipe drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

**MATERIALS**

**705-2.1 GENERAL.** Materials shall meet the requirements shown on the plans and specified below.

**705-2.2 PIPE.** The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements.

American Association of State Highway and Transportation Officials (AASHTO) M196

Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains

AASHTO M252 Standard Specification for Corrugated Polyethylene Drainage Pipe

AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

AASHTO M304 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter

ASTM F758 Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage

ASTM F794 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter

ASTM F949 Standard Specification for Poly (Vinyl Chloride)(PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

**705-2.3 JOINT MORTAR.** Pipe joint mortar shall consist of one part by volume of Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**705-2.4 ELASTOMERIC SEALS.** Elastomeric seals shall conform to the requirements of ASTM F477.

**705-2.5 POROUS BACKFILL.** Porous backfill shall be free of clay, humus, or other objectionable matter, and shall conform to the gradation in Table 1 when tested in accordance with ASTM C136.

**TABLE 1. GRADATION OF POROUS BACKFILL**

Sieve Designation (square openings)	percentage by Weight Passing Sieves
1-1/2 in (38 mm)	100
1 in (25 mm)	90 - 100
3/8 in (9.5 mm)	25 - 60
No. 4 (4.75 mm)	5 - 40
No. 8 (2.36 mm)	0 - 20

**705-2.6. GRANULAR MATERIAL.** Granular material used for backfilling shall conform to the requirements of ASTM D2321 for Class IA, IB, or II materials.

**705-2.7. FILTER FABRIC.** The filter fabric shall conform to the requirements of AASHTO M288 Class 2 or equivalent.

**TABLE 2. FABRIC PROPERTIES**

FABRIC PROPERTY	TEST METHOD	TEST REQUIREMENT
Grab Tensile Strength, lbs	ASTM D4632	125 min
Grab Tensile Elongation %	ASTM D4632	50 min
Burst Strength, psi	ASTM D3785	125 min
Trapezoid Tear Strength, lbs	ASTM D4533	55 min
Puncture Strength, lbs	ASTM D4833	40 min
Abrasion, lbs	ASTM D4886	15 max loss
Equivalent Opening Size	ASTM D4751	70-100
permittivity sec <sup>-1</sup>	ASTM D4491	0.80
Accelerated Weathering (UV Stability) (Strength Retained - %)	ASTM D4355 *(500 hrs exposure)	70

**705-2.8. CONTROLLED LOW-STRENGTH MATERIAL (CLSM).** CLSM is not used.

### CONSTRUCTION METHODS

**705-3.1 EQUIPMENT.** All equipment required for the construction of pipe underdrains shall be on the project, in good working condition, and approved by the RPR before construction is permitted to start.

**705-3.2 EXCAVATION.** The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but shall not be less than the external diameter of the pipe plus 6 inches (150 mm) on each side of the pipe. The trench walls shall be approximately vertical.

Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 4 inches (100 mm). The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 inches (150 mm) in uncompacted depth to form a uniform but yielding foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

Excavated material not required or acceptable for backfill shall be disposed of by the Contractor as directed by the RPR. The excavation shall not be carried below the required depth; if this occurs, the trench shall be backfilled at the Contractor's expense with material approved by the RPR and compacted to the density of the surrounding material.

The pipe bedding shall be constructed uniformly over the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 inch when the bedding thickness is less than or equal to 6 inches, and 1-1/2 inch when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed, uncompacted material under the middle third of the pipe prior to placement of the pipe.

The Contractor shall do trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to Federal, state and local laws. Unless otherwise provided, the bracing, sheathing, or shoring shall be removed by the Contractor after the backfill has reached at least 12 inches (300 mm) over the top of the pipe. The sheathing or shoring shall be pulled as the granular backfill is placed and compacted to avoid any unfilled spaces between the trench wall and the backfill material. The cost of bracing, sheathing, or shoring, and the removal of same, shall be included in the unit price bid per foot (meter) for the pipe.

### **705-3.3 LAYING AND INSTALLING PIPE.**

**a. Concrete pipe.** The laying of the pipe in the finished trench shall be started at the lowest point and proceed upgrade. When bell and spigot pipe is used, the bells shall be laid upgrade. If tongue and groove pipe is used, the groove end shall be laid upgrade. Holes in perforated pipe shall be placed down, unless otherwise shown on the plans. The pipe shall be firmly and accurately set to line and grade so that the invert will be smooth and uniform. Pipe shall not be laid on frozen ground.

Pipe which is not true in alignment, or which shows any settlement after laying, shall be taken up and re-laid by the Contractor at no additional expense. Making adjustments in grade by exerting force on the barrel of the pipe with excavating equipment, by lifting and dropping the pipe, or by lifting the pipe and packing bedding material under it shall be prohibited. If the installed pipe section is not to grade, the pipe section shall be completely removed, the grade corrected, and the pipe rejoined."

**b. Metal pipe.** The metal pipe shall be laid with the separate sections joined firmly together with bands, with outside laps of circumferential joints pointing upgrade, and with longitudinal laps on the sides. Any metal in the pipe or bands that is not protected thoroughly by galvanizing shall be coated with a suitable asphaltum paint.

During installation, the asphalt-protected pipe shall be handled without damaging the asphalt coating. Any breaks in the bitumen or treatment of the pipe shall be refilled with the type and kind of bitumen used in coating the pipe originally.

**c. PVC, fiberglass or polyethylene pipe.** PVC or polyethylene pipe shall be installed in accordance with the requirements of ASTM D2321. perforations shall meet the requirements of AASHTO M252 or AASHTO M294 Class 2, unless otherwise indicated on the plans. The pipe shall be laid accurately to line and grade. Fiberglass per ASTM D3839 Standard Guide for Underground Installation of "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pipe.

**d. All types of pipe.** The upgrade end of pipelines, not terminating in a structure, shall be plugged or capped as approved by the RPR.

Unless otherwise shown on the plans, a 4-inch (100 mm) bed of granular backfill material shall be spread in the bottom of the trench throughout the entire length under all perforated pipe underdrains.

Pipe outlets for the underdrains shall be constructed when required or shown on the plans. The pipe shall be laid with soil tight-fitting joints. Porous backfill is not required around or over pipe outlets for underdrains. All connections to other drainage pipes or structures shall be made as required and in a satisfactory manner. If connections are not made to other pipes or structures, the outlets shall be protected and constructed as shown on the plans.

**e. Filter fabric.** The filter fabric shall be installed in accordance with the manufacturer's recommendations, or in accordance with the AASHTO M288 Appendix, unless otherwise shown on the plans.

**705-3.4 MORTAR.** The mortar shall be of the desired consistency for caulking and filling the joints of the pipe and for making connections to other pipes or to structures. Mortar that is not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted.

**705-3.5 JOINTS IN CONCRETE PIPE.** When open or partly open joints are required or specified, they shall be constructed as indicated on the plans. The pipe shall be laid with the ends fitted together as designed. If bell and spigot pipe is used, mortar shall be placed along the inside bottom quarter of the bell to center the following section of pipe.

The open or partly open joints shall be surrounded with granular material meeting requirements of porous backfill in Table 1 or as indicated on the plans. This backfill shall be placed so its thickness will be not less than 3 inches (75 mm) nor more than 6 inches (150 mm), unless otherwise shown on the plans.

### **705-3.6 EMBEDMENT AND BACKFILL.**

**a. Earth.** All trenches and excavations shall be backfilled soon after the pipes are installed, unless additional protection of the pipe is directed. The embedment material shall be select material from excavation or borrow and shall be approved by the RPR. The select material shall be placed on each side of the pipe out to a distance of the nominal pipe diameter and one foot (30 cm) over the top of the pipe and shall be readily compacted. It shall not contain stones 3 inches (75 mm) or larger in size, frozen lumps, chunks of highly plastic clay, or any other material that is objectionable to the RPR. The material shall be moistened or dried, as required to aid compaction. Placement of the embedment material shall not cause displacement of the pipe. Thorough compaction under the haunches and along the sides to the top of the pipe shall be obtained.

The embedment material shall be placed in loose layers not exceeding 6 inches (150 mm) in depth under and around the pipe. Backfill material over the pipe shall be placed in lifts not exceeding 8 inches (200 mm). Successive layers shall be added and thoroughly compacted by hand and pneumatic tampers, approved by the RPR, until the trench is completely filled and brought to the planned elevation. Embedment and backfilling shall be done to avoid damaging top or side of the pipe.

In embankments and other unpaved areas, the backfill shall be compacted per Item P-152 to the density required for embankments in unpaved areas. Under paved areas, the subgrade and any backfill shall be compacted per Item P-152 to the density required for embankments for paved areas.

**b. Granular backfill.** When granular backfill is required, placement in the trench and about the pipe shall be as shown on the plans. The granular backfill shall not contain an excessive amount of foreign matter, nor shall soil from the sides of the trench or from the soil excavated from the trench be allowed to filter into the granular backfill. When required by the RPR, a template shall be used to properly place and separate the two sizes of backfill. The backfill shall be placed in loose layers not exceeding 6 inches (150 mm) in depth. The granular backfill shall be compacted by hand and pneumatic tampers to the requirements as given for embankment. Backfilling shall be done to avoid damaging top or side pressure on the pipe. The granular backfill shall extend to the elevation of the trench or as shown on the plans.

When perforated pipe is specified, granular backfill material shall be placed along the full length of the pipe. The position of the granular material shall be as shown on the plans.

If porous backfill is placed in paved or adjacent to paved areas before grading or subgrade operations is completed, the backfill material shall be placed immediately after laying the pipe. The depth of the granular backfill shall be not less than 12 inches (300 mm), measured from the top of the underdrain. During subsequent construction operations, a minimum depth of 12 inches (300 mm) of backfill shall be maintained over the underdrains. When the underdrains are to be completed, any unsuitable material shall be removed exposing the porous backfill. Porous backfill containing objectionable material shall be removed and replaced with suitable material. The cost of removing and replacing any unsuitable material shall be at the Contractor's expense.

If a granular subbase blanket course is used which extends several feet beyond the edge of paving to the outside edge of the underdrain trench, the granular backfill material over the underdrains shall be placed in the trench up to an elevation of 2 inches (50 mm) above the bottom surface of the granular subbase blanket course. Immediately prior to the placing of the granular subbase blanket course, the Contractor shall blade this excess trench backfill from the top of the trench onto the adjacent subgrade where it can be incorporated into the granular subbase blanket course. Any unsuitable material that remains over the underdrain trench shall be removed and replaced. The subbase material shall be placed to provide clean contact between the subbase material and the underdrain granular backfill material for the full width of the underdrain trench.

**c. Controlled low-strength material (CLSM).** CLSM is not used.

**705-3.7 FLEXIBLE PIPE RING DEFLECTION.** The flexible pipe shall be inspected by the Contractor during and after installation to ensure that the internal diameter of the pipe barrel has not been reduced by more than 5 percent. For guidance on properly sizing mandrels, refer to ASTM D3034 and ASTM F679 appendices.

**705-3.8 CONNECTIONS.** When the plans call for connections to existing or proposed pipe or structures, these connections shall be watertight and made to obtain a smooth uniform flow line throughout the drainage system.

**705-3.9 CLEANING AND RESTORATION OF SITE.** After the backfill is completed, the Contractor shall dispose of all surplus material, soil, and rubbish from the site. Surplus soil may be deposited in embankments, shoulders, or as directed by the RPR. Except for paved areas of the airport, the Contractor shall restore all disturbed areas to their original condition.

#### METHOD OF MEASUREMENT

**705-4.1** The length of pipe shall be the number of linear feet of pipe underdrains in place, completed, and approved; measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The several classes, types, and sizes shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipeline being measured.

**705-4.2.** The quantity of pipe underdrains shall be made at the contract unit price per linear foot complete, including porous backfill and filter fabric.

#### BASIS OF PAYMENT

**705-5.1** Payment will be made at the contract unit price per linear foot for pipe underdrains of the type, class, and size designated. This price shall be full compensation for furnishing all materials and for all preparation, excavation, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Bid Item No. B-17	6-Inch perforated HDPE Underdrain Pipe - per Linear Foot
Bid Item No. B-18	6-Inch perforated Trench Drain - per Linear Foot

#### REFERENCES

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

##### ASTM International (ASTM)

ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C444	Standard Specification for perforated Concrete Pipe
ASTM C654	Standard Specification for Porous Concrete Pipe
ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications



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ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F758	Standard Specification for Smooth Wall Poly(Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage

**American Association of State Highway and Transportation Officials (AASHTO)**

AASHTO M190	Standard Specification for Bituminous - Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M288	Standard Specification for Geotextile Specification for Highway Applications
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500- mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel-Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900- mm (12- to 36-in.) diameter
AASHTO	Standard Specifications for Highway Bridges

END OF ITEM D-705

**ITEM D-751 MANHOLES, CATCH BASINS, INLETS AND INSPECTION HOLES****DESCRIPTION**

**751-1.1** This item shall consist of construction of catch basins, cleanouts, drainage access structures, drainage outfall structures, and adjustment of existing drainage structures in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

**MATERIALS**

**751-2.1 BRICK.** The brick shall conform to the requirements of ASTM C32, Grade MS.

**751-2.2 MORTAR.** Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**751-2.3 CONCRETE.** Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

**751-2.4 PRECAST CONCRETE PIPE MANHOLE RINGS.** Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

**751-2.5 CORRUGATED METAL.** Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

**751-2.6 FRAMES, COVERS, AND GRATES.** The castings shall conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: Malleable iron castings
- c. ASTM A27: Steel castings
- d. ASTM A283, Grade D: Structural steel for grates and frames
- e. ASTM A536, Grade 65-45-12: Ductile iron castings
- f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

**751-2.7 STEPS.** The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

**751-2.8 PRECAST STRUCTURES.** Manufactured in accordance with and conforming to ASTM C913.

## CONSTRUCTION METHODS

### 751-3.1 UNCLASSIFIED EXCAVATION.

a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.

e. After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

### 751-3.2 BRICK STRUCTURES. Not Used.

**751-3.3 CONCRETE STRUCTURES.** Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped downward to the outlet.

**751-3.4 PRECAST CONCRETE STRUCTURES.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

Precast concrete structure shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

**751-3.5 CORRUGATED METAL STRUCTURES.** Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures.

The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

**751-3.6 INLET AND OUTLET PIPES.** Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

**751-3.7 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES, AND FITTINGS.** All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

**751-3.8 INSTALLATION OF STEPS.** The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures, they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches (300 mm).

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

#### **751-3.9 BACKFILLING.**

a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

b. Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

c. Backfill shall not be measured for direct payment. performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

**751-3.10 CLEANING AND RESTORATION OF SITE.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as

approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

#### **METHOD OF MEASUREMENT**

**751-4.1** The quantity of catch basins, cleanouts, drainage access structures, drainage outfall structures, and adjustment of existing drainage structures shall be measured by the unit.

#### **BASIS OF PAYMENT**

**751-5.1** The accepted quantities of catch basins, cleanouts, drainage access structures, drainage outfall structures, and adjustment of existing drainage structures will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Bid Item No. B-19	Catch Basin - per Each
Bid Item No. B-20	Cleanout - per Each

#### **REFERENCES**

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

##### **ASTM International (ASTM)**

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.

##### **American Association of State Highway and Transportation Officials (AASHTO)**

AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
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END OF ITEM D-751

**ITEM E-906 IRRIGATION SYSTEM****PART 1 - DESCRIPTION****1.01 General**

Work in this section consists of all labor, materials, and equipment necessary to install the irrigation system as indicated on the plans and includes, but not necessarily limited to: lawn sprinkler system automatic controller and remote-control valves, the proper execution of the work, including trenching, installation of pipe sleeves, and backfilling.

**PART 2 - MATERIALS****2.01 Submittals**

- A. Before any irrigation system materials are delivered to the job site, submit to the Owner a complete list of all irrigation system materials proposed to be furnished and installed. Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, and furnish the manufacturer's recommendations as to method of installation.
- B. Provide at least one person who shall be present at all times during execution of this portion of the work, and who shall be thoroughly familiar with the type of materials being installed, and material manufacturer's recommended methods of installation, and who shall direct all work performed under this section. The Contractor shall have a minimum of 5 years experience in commercial or residential lawn irrigation installation

**2.02 Materials**

- A. Polyvinyl Chloride (PVC) Pipe
  - 1 All mainlines and transmission lines shall be Schedule 40 PVC; laterals shall be Class 200 PVC. Pipe shall be rigid unplasticized conforming to ASTM D-1784 and D-2241 standard specifications for PVC pipe. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, deleterious wrinkles, and dents.
- B. Risers
  - 1 All stationary spray heads shall have risers of high density polyethylene plastic pipe ("funny pipe") with spiral barbed ell fittings. Minimum length of "funny pipe" shall be eighteen inches (18") (450mm).
  - 2 All rotor pop-up sprinklers shall have an adjustable pre-assembled double swing joint riser.
- C. Manual Valves
  - 1 All manual ball valves, sizes three-inch (3") (75mm) and smaller, shall be full ported ball valves with maximum working pressure of 175 psi (1200kPa) and 350 psi (2400kPa) hydrostatic test pressure.
- D. Valve Boxes
  - 1 All remote control valves, manual control valves, zone shut-off valves, ball valves, or globe valves unless otherwise indicated, shall be installed in valve access box of proper size as required for easy access to the valve.
  - 2 Valve boxes shall not be located within aircraft wheel path. Valve boxes shall be placed with a minimum of five feet (5') (1.5m) separation between each valve box.
- E. Sprinkler Heads
  - 1 All heads of a particular type and for a particular function in the system shall be of the same manufacture and shall be marked with the manufacturer's name and identification, in such a position that they can be identified without being removed from the system. Sprinkler heads shall be installed in locations shown on the plans.

**F. Automatic Irrigation Controllers**

- 1 Field controllers shall be installed with manufacturer's lightning and surge protection.
- 2 Central controller shall be located as shown on the drawings.
- 3 On site lockable disconnects or lockable fuse block and a 110 volt outlet shall be installed at each controller in a separate lockable water-tight enclosure.

**G. Automatic Remote Control Valves**

- 1 Automatic remote control valves must be electric solenoid-type, with globe screwed patterns. The valve solenoids must be completely epoxy-encapsulated for positive waterproofing and must include a stainless steel shunt band. The valves must open and close slowly (in not less than 5 seconds) by means of a potential fluid resistor to avoid damage or surge pressures. All wiring in PVC conduits.

**H. Fittings**

- 1 All plastic pipe fittings shall be permanently marked with the following information: Manufacturer's name or trademark, size, schedule and type of pipe, working pressure at 73°F (23°C), and National Sanitation Foundation (N.S.F.) approval.
- 2 All plastic pipe fittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for solvent weld or screwed connections.
- 3 Slip fitting socket taper shall be so sized that a dry unsoftened pipe end, conforming to these special provisions, can be inserted no more than halfway into the socket. Plastic saddle and flange fittings will not be permitted. Only schedule 80 fittings may be threaded.
- 4 When connection is plastic to metal, plastic male adapters shall be used. The male adapter shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be Teflon Tape and Teflon paste. No oil based products permitted.
- 5 All lateral line fittings and mainline fittings two inches (2") (50mm) and smaller shall be schedule 40 solvent weld fittings.

**I. Pipe Sleeves**

- 1 Pipe sleeves shall be Schedule 40 PVC pipe, or equal.

**J. Concrete**

- 1 All concrete shall be 3,000 psi (20,700kPa) at 28 days, transit mixed. Provide certifications with each delivery.

**K. Other Materials**

- 1 All other materials, not specifically described, but required for a complete and proper irrigation system installation, shall be new, first quality of their respective kinds, and subject to the approval of the RPR.

**PART 3 - EXECUTION****3.01 Product Handling**

- A. Use all means necessary to protect irrigation system materials before, during, and after installation and to protect the installed work and materials of all other trades.
- B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the RPR and at no additional cost to the Owner.

### 3.02 Surface Conditions

#### A. Inspection

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that trenching may be completed in accordance with the original design and the referenced standards.
3. In the event of discrepancy, immediately notify the RPR. Do not proceed with installation in areas of discrepancy until all discrepancies have been fully resolved.

### 3.03 Trenching

- A. perform all trenching required for the installation of items where the trenching is not specifically described in other sections of these Specifications.
- B. Make all trenches in accordance with OSHA Requirements with sufficient width to provide free working space at both sides of the trench and around the installed item as required for gluing, joining, backfilling, and compacting while minimizing width of trenches.
- C. All mainline shall have a minimum cover of fourteen inches (14") (350mm) and a maximum cover of twenty inches (20") (500mm) above the pipe. All laterals shall be the same depth as the mainline. All lateral and main lines shall be installed in a straight line with no arching or bending of pipe. Change in direction of pipe shall occur only with the use of proper fittings only.
- D. Where trench excavation is inadvertently carried below proper elevations, backfill with material approved by the RPR and then compact to provide a firm and unyielding subgrade to the approval of the RPR and at no additional cost to the Owner.
- E. Trench Bracing
  1. Properly support all trenches in strict accordance with all pertinent rules and regulations.
  2. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind will be fully protected from damage.
  3. In the event of damage to such improvements, immediately make all repairs and replacements necessary to the approval of the RPR and at no additional cost to the Owner.
  4. Arrange all bracing, sheeting and shoring so as to not place stress on any portion of the completed work until the general construction thereof has proceeded far enough to provide sufficient strength.
  5. Exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse or caving of the excavation faces being supported.
- F. Grading and Stockpiling Trenched Material
  1. Control the stockpiling of trenched material in a manner to prevent water running into the excavations.
  2. Do not obstruct surface drainage but provide means whereby storm and waste waters are diverted into existing gutters, other surface drains, or temporary drains.
- G. All trench excavation shall be made by open cut. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading, and to prevent slides or cave-ins. The Contractor shall remove all material not required for backfill or not suitable for backfill, from the site. Banks of trenches shall be kept as nearly vertical as possible, and shall be properly sheeted and braced as may be necessary to prevent caving.
- H. Trench widths in paved streets or in areas where proximity to other structures require vertical cuts, shall not be wider than is required for proper handling, jointing and bedding of the pipe.



- I. The bottom of the trenches shall be accurately graded to line and grade, and provide uniform bearing and support for each section of the pipe on undisturbed soil, at every point along its entire length. Depressions for joints shall be dug after the trench bottom has been graded, and shall be only of such length, depth and width as required for properly making the particular type joint. Care shall be taken not to excavate below the depths indicated.
- J. Where rock occurs in trench excavation, the rock shall be removed to a depth of six inches (6") (150mm) below the established grade line, and to a width of twelve inches (12") (300mm) greater than the outside diameter of the pipe to be installed in the trench.
- K. Where excavation of trenches requires the removal of asphalt pavement, the pavement shall be cut in a straight line along the edge of the excavation by use of a spade-bitted air hammer, concrete saw, or similar approved equipment to obtain straight, square and clean break; and, after backfilling and subgrade preparations are completed, hot plant mix asphalt concrete shall be replaced and compacted in accordance with the appropriate standard specification. Replaced base course and asphalt shall match removed sections, with minimum of two inches (2") (51mm) asphalt concrete over eight inches of suitable (8") (203mm) base course.
- L. Excess material, including rock, broken concrete, bituminous materials, debris, or other materials not suitable for backfill, shall be removed from the site and disposed of by the Contractor.

#### **3.04 Boring**

- A. Boring shall be used to route pipe, wiring, or both under concrete structures such as walks or curbs where trenching is impractical. Sleeves shall be installed in all bored holes.
- B. Boring shall be accomplished with a drill, auger, water jet, or any other instrument approved by the RPR capable of producing a precise hole. Boring shall not disturb overlaying structures or cause settlement and damage to those structures.

#### **3.05 Sleeves**

- A. Sleeves shall be installed wherever routing of a pipe, wiring, or both crosses a paved area or passes through a bored hole.
- B. Sleeves laid in open trenches shall be uniformly and evenly supported by undisturbed soil on the trench bottom. Backfill shall conform to standards hereinafter specified.
- C. Sleeves installed in borings shall be forced through and shall have a snug fit throughout the length of the bored hole. Sleeves cracked or broken shall not be accepted.

#### **3.06 Backfill**

- A. The trenching shall not be backfilled until inspection by the RPR has been completed and the pipe installation, including the grade, alignment, and jointing has been found to be in compliance with the requirements of the plans and specifications.
- B. Select backfill material consisting of sand, fine gravel or select earth, free of large lumps or rocks larger than one inch (1") (25mm) shall be used in backfilling around and over the installed pipe.
- C. The select material shall be obtained from the excavation material removed from the trench and shall be processed by screening, sifting, or selective sorting, so as to produce the type of backfill herein specified. The Contractor may at his option and own expense provide an acceptable imported material.
- D. This backfill material shall be carefully deposited around and over the pipe in layers not more than six inches (6") (150mm) thick, loose measurement, unless otherwise permitted by the RPR, wetted to optimum moisture content and uniformly compacted to at least 95 percent of the maximum density obtainable at optimum moisture content as determined by AASHTO T99 Method A or D (latest revision), until the pipe has a cover depth of at least 14 inches (14") (350mm).
- E. The remaining depth of the trench shall be backfilled with excavation material removed from the trench, which shall be wetted or dried to near optimum moisture content.

**3.07 Field Measurements**

A. Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design.

**3.08 Installation of Piping**

- A. perform all trenching and backfilling as specified by the specifications in this Section.
- B. Lay out the piping system in strict accordance with the plans. Where piping is shown on the plans to be under paved areas, but running parallel and adjacent to planted areas, the intention is to install the piping in the planted areas.
- C. All mainlines and laterals shall be installed with twelve inches (12") (304 mm) minimum cover, and a maximum of eighteen inches (18") (457 mm) cover, over the pipe.
- D. All lines shall have a minimum clearance (horizontal and vertical) of four inches (4") (100mm) of adjacent pipe from each other, and six inches (6") (150mm) from lines of other trades, except through pipe sleeves. Parallel lines shall not be installed directly over one another.
- E. Carefully inspect all pipe and fittings before installation, removing all dirt, scale, and burrs and reaming as required; install all pipe with all markings up for visual inspection and verification.
- F. PVC Pipe
  - 1. Plastic pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.
  - 2. All plastic joints shall be solvent-weld joints. Only the solvent cement recommended by the pipe manufacturer shall be used. All plastic pipe and fittings shall be installed as outlined and instructed by the pipe manufacturer and it shall be the Contractor's responsibility to make arrangements with the pipe manufacturer for any field assistance that may be necessary. The Contractor shall assume full responsibility for the correct installation.
  - 3. All plastic to metal joints shall be made with plastic adapters.
  - 4. The solvent-weld joints shall be made dry.
  - 5. The solvent-weld joints shall be allowed to set at least 24 hours before pressure is applied to the system on PVC pipe.
  - 6. Swing joints shall be installed on the same side of the pipe as the head. Swing joints may not cross pipe laterally.
- G. Thrust Blocks
  - 1. Provide concrete thrust for all pipe as required by the following schedule:

Sizes		Pipe Tees and Dead Ends				Elbows											
						22 ½ degrees				45 degrees				90 degrees			
		Length		Height		Length		Height		Length		Height		Length		Height	
In	Mm	In	Mm	In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	In	mm
3-4	75-100	24	600	12	300	9	225	12	300	17	425	12	300	21	525	18	450
6	150	33	825	18	450	12	300	18	450	24	600	18	450	32	800	24	600
8	200	40	1000	24	600	16	400	24	600	30	750	24	600	45	1125	30	750
10	250	50	1250	30	750	20	500	30	750	40	1000	30	750	61	1525	36	900
12	300	61	1525	36	900	28	700	30	750	56	1400	30	750	87	2175	36	900

2. All thrust blocks shall bear directly on undisturbed earth. Pipe shall be centered in the middle of thrust block. Contractor shall install a plastic barrier between the thrust block and the pipe and/or wires, so as not to encase them in the concrete thrust block.

### 3.09 Installation of Equipment

A. All fittings, valves, etc. shall be carefully placed in the trenches as shown on the plans.

1. All control wires shall be clearly labeled, by station, using weatherproof material, both at the controller and at the valve. The outside cover of all automatic valve boxes shall also have the station number clearly stamped on the cover.
2. All sprinklers, having adjustable nozzles, shall be adjusted for proper and adequate distribution of the water over the coverage pattern of the sprinkler.
3. All nozzles on stationary pop-up sprinklers or stationary spray heads shall be tightened after installation. All sprinklers having an adjusting screw, adjusting stem or adjusting friction collars shall be adjusted as required for the proper arc of coverage, radius, diameter and/or gallonage discharge.

B. Lawn Sprinkler Heads

1. Install lawn sprinkler heads where indicated on the plans and in strict accordance with the manufacturer's recommendations.
2. Along walks and driveways where finished grade is established, set all heads one-quarter inch (¼") (5mm) below surface of pavement at time of installation and one and one-half inches (1-1/2") (40mm) from pavement. Stake all temporary risers.
3. Set all heads to final grade where sod lawn will be installed.
4. Upon completion of maintenance period, reset all lawn sprinkler heads flush with grade and firmly anchor with soil.

### 3.10 Testing and Inspection

A. Closing-in Work

1. Do not allow or cause any of the work in this section to be covered up or enclosed until it has been inspected, tested, and approved by the RPR.

2. Where trenches are not closed at the end of the day Contractor shall accept all liability for any damage or injury that may result from open trenches. Provide barricades and warning tape as necessary around all open trenches.
- B. Before backfilling the mainline, and with all control valves in place, completely flush and test the mainline and repair all leaks; flush out each section of lateral pipe before sprinkler heads are attached.
- C. Testing
  1. Make all necessary provisions for thoroughly bleeding the line of air and debris.
  2. Before testing, fill the line with water for a period of at least 24 hours.
  3. After valves have been installed, test all installed irrigation lines for leaks at a pressure of 150 psi (1035 kPa) for a period of two hours, with all couplings exposed and with all pipe sections center loaded.
  4. Furnish all necessary testing equipment and personnel.
  5. Correct all leaks and retest until acceptance by the RPR.
- D. Final Inspection
  1. Thoroughly clean, adjust, and balance all systems.
- E. Demonstrate the entire system to the RPR, proving that all remote control valves are properly balanced, that all heads are properly adjusted for radius and arc of coverage, and that the installed system is workable, clean, and efficient.

### 3.11 Record Drawings

- A. Dimension from two permanent points of reference (buildings, monuments, sidewalks, curbs, pavement, etc.). Locations shown on as-built drawings shall be kept day to day as the project is being installed. All dimensions noted on drawings shall be neat and legible.

Show locations and depths of the following items: Point of connection

Routing of sprinkler lines Ball valves

Sprinkler control valves  
Quick coupling valves

Routing of control and power wires  
Sprinkler heads

Other related equipment

- B. Record drawings must be delivered to the Owner upon completion.

### 3.12 Operations and Maintenance Manuals

- A. Prepare and deliver to the Owner within ten calendar days prior to completion of construction, all required and necessary descriptive material in complete detail and sufficient quantity, properly prepared in four individually bound copies of the operations and maintenance manual. The manual shall describe the material installed and shall be in sufficient detail to permit operating personnel to understand, operate and maintain all equipment. Spare parts lists and related manufacturer information shall be included for each equipment item installed. Each complete, bound manual shall include the following information:
  1. Index sheet stating Contractor's address and telephone number, duration of guarantee period, list of equipment with names and addresses of local manufacturer representatives.
  2. Complete operating and maintenance instructions on all major equipment.
- B. In addition to the above maintenance manuals, provide the maintenance personnel with instructions for system

operation and show written evidence to the Owner at the conclusion of the project that this service has been rendered.

- C. Final payment will not be made until record drawings and operation and maintenance manuals have been submitted and approved.

### **3.13 Warranty**

- A. Warranty requirements will be submitted to Owner upon substantial completion of work.
- B. The Contractor shall winterize the system and perform spring start-up of the system during the guarantee period. These functions shall be coordinated in advance with the Owner, and the Owner's personnel shall be encouraged to participate.
  - 1. Upon re-energizing the system, the Contractor shall repair any leaks or breaks and shall check each head and valve, making any adjustment necessary.

### **3.14 Crossing and Repairing Existing Irrigation Systems**

- A. The Contractor shall coordinate all work with the RPR for locating the existing irrigation pipelines. The ends of the pipe shall be cleaned and plugged with a solvent weld cap. The pipeline shall be kept clean and free of debris.
- B. After installation and backfilling the Contractor shall expose the irrigation crossings and repair the pipeline in accordance with this specification. The Contractor shall coordinate his activities with the RPR to ensure that the lines are adequately flushed and leak tested at static pressure following the repairs.

## **PART 4 - MEASUREMENT**

- A. The measured quantity of the irrigation system shall be per Lump Sum, installed, connected, coordinated, excavated, backfilled, tested, and accepted as a complete system ready for operation.

## **PART 5 - PAYMENT**

- A. Payment will be made at the contract lump sum price for the completed and accepted irrigation system . This price shall be full compensation for furnishing all materials and for all preparation, local utility coordination, water service installation, assembly, excavation, backfill, connections, furnishing and installation of appurtenances as shown on the plans; and for all labor, equipment, tools, and incidentals necessary to complete the lump sum item.

Payment will be made under:

Bid Item No. B-23

Irrigation System - per Lump Sum

## **END OF SECTION**

**ITEM E-907 WATER DISTRIBUTION**

**DESCRIPTION**

**110-1.1** This section covers work necessary to construct and test the water service lines, and vaults.

**CONSTRUCTION METHODS**

**110-2.1 UTILITIES.** The Contractor shall be responsible for determining specific locations for all existing utilities in the area of demolition prior to beginning demolition. All utilities not identified on the drawings for removal are to be protected. The Contractor shall be responsible for coordinating and meeting the requirements of the utility companies. New service connections shall be made from the meter set to the existing water main using saddles as specified and type suitable for use with the pipe being installed. All materials, fittings and connections shall be made in accordance with the Ice Foundation Water District standards.

**MEASUREMENT**

**110-3.1** No separate measurement for payment shall be made for the water utility service from the main line to the irrigation backflow prevention assembly. The water utility service shall be considered necessary and incidental to the irrigation system bid item.

**110-3.2** The measured quantity of the hangar water connection shall be per Lump Sum, installed, tested, and accepted as a complete system ready for operation.

**BASIS OF PAYMENT**

**110-4.1** No separate payment shall be made for the water utility service including but not limited to all piping, trench excavation, backfill and bedding; stops, valve box, meter box, meter piping, tapping saddles, connections and fittings from the main line to the irrigation backflow prevention assembly.

**110-4.2** Payment for completion of the hangar water connection including but not limited to all piping, trench excavation, backfill and bedding, connections and fittings from the irrigation backflow prevention assembly to the new hangar building shall be included in the unit price cost for the hangar water connection.

Payment will be made under:

Bid Item No. C-1

Hangar Water Connection - per Lump Sum

END OF ITEM E-907

**ITEM T-901 SEEDING****DESCRIPTION**

**901-1.1** This item shall consist of soil preparation, hydraulic growth medium application, seeding, fertilizing, and placement of topsoil on the areas shown on the plans or as directed by the RPR in accordance with these specifications.

**MATERIALS**

**901-2.1 Seed.** The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Contractor shall consult with local, Oregon grass seed manufacturer/supplier for determination of seed mix design and appropriate application (seeding) rate for hydraulically applied seed mulch. Seed shall be a quick growing species that will not be attractive to hazardous wildlife. Seed mix and application rate shall be submitted to the RPR prior to placement for approval.

Seeds shall be applied as follows:

<b>Seed Species</b>	<b>% by Weight</b>	<b>Rate of Application PLS lbs./Acre</b>
Principal II perennial Ryegrass	25%	65
Chorus Creeping Red Fescue	25%	65
Conductor Chewings Fescue	25%	65
Clarinet Hard Fescue	25%	65
<b>TOTALS</b>	<b>100.0%</b>	<b>260</b>

**901-2.2 Lime.** Not required.

**901-2.3 Fertilizer.** Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

- c. A granular or pellet form suitable for application by blower equipment.

Contractor shall consult with local, Oregon grass seed manufacturer/supplier for determination of fertilizer type and appropriate application rate.

**901-2.4 Soil for repairs.** The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

## CONSTRUCTION METHODS

**901-3.1 Advance preparation and cleanup.** After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by disking, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

**901-3.2 Dry application method.** Not required.

**901-3.3 Wet application method.**

**a. General.** The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

**b. Spraying equipment.** The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range



ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

**c. Mixtures.** Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

**d. Spraying.** Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

**901-3.4 Maintenance of seeded areas.** The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

It will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the RPR. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

## METHOD OF MEASUREMENT

**901-4.1** The quantity of seeding to be paid for shall be the number of units acre measured on the ground surface, completed and accepted.

**BASIS OF PAYMENT**

**901-5.1** Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Bid Item No. B-21	Hydroseeding – per Acre
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**REFERENCES**

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

**ASTM International (ASTM)**

ASTM C602	Standard Specification for Agricultural Liming Materials
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**Federal Specifications (FED SPEC)**

FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural
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**Advisory Circulars (AC)**

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports
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**FAA/United States Department of Agriculture**

Wildlife Hazard Management at Airports, A Manual for Airport personnel

END OF ITEM T-901

**ITEM T-905 TOPSOIL****DESCRIPTION**

**905-1.1** This item shall consist of all work and materials necessary to prepare the ground surface for topsoil application, removing topsoil from approved sources off the site, and placing, and spreading the topsoil on prepared areas in accordance with this specification at the locations, lines, and grades as shown on the plans or as directed by the RPR.

**MATERIALS**

**905-2.1 TOPSOIL.** Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches (50 mm) or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75  $\mu$ m) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

**CONSTRUCTION METHODS**

**905-3.1 GENERAL.** Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the RPR before the various operations are started.

**905-3.2 PREPARING THE GROUND SURFACE.** Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the RPR, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

**905-3.3 OBTAINING TOPSOIL.** Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the RPR. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall supply all required documentation that imported topsoil meets material specifications. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

**905-3.4 PLACING TOPSOIL.** The topsoil shall be evenly spread on the prepared areas to a uniform depth of 6 inches (50 mm) after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. After spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

#### **METHOD OF MEASUREMENT**

**905-4.1** Topsoil placed will be measured by the cubic yard of material measured in its final position. No measurement will be made for topsoil placement outside the limits authorized by the RPR.

#### **BASIS OF PAYMENT**

**905-5.1** Payment will be made at the contract unit price per cubic yard for topsoil. This price shall be full compensation for importing all materials from offsite and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Bid Item No. B-22

Imported Topsoil - per Cubic Yard

#### **REFERENCES**

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

##### **ASTM International (ASTM)**

ASTM C117

Materials Finer than 75  $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing

##### **Advisory Circulars (AC)**

AC 150/5200-33

Hazardous Wildlife Attractants on or Near Airports

##### **FAA/United States Department of Agriculture**

Wildlife Hazard Management at Airports, A Manual for Airport personnel

END OF ITEM T-905

**ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS****DESCRIPTION**

**125-1.1 GENERAL.** This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, concrete foundations, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

**125-1.2 REFERENCED MATERIALS.** Additional details pertaining to specific systems covered in this item are contained in the Advisory Circulars (latest edition) listed below:

150/5340-30	Design and Installation Details for Airport Visual Aids
150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
150/5345-44	Specification for Runway and Taxiway Signs

The Contractor is responsible for using the latest edition of the referenced FAA Advisory Circulars.

**EQUIPMENT AND MATERIALS****125-2.1 GENERAL.**

**a.** Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

**b.** Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

**c.** All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

**d.** The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

**e.** All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

**EQUIPMENT AND MATERIALS**

**125-2.2 CONDUIT/DUCT.** Not Used.

**125-2.3 CABLE AND COUNTERPOISE.** Not Used.

**125-2.4 TAPE.** Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

**125-2.5 CABLE CONNECTIONS.** Not Used.

**125-2.6 RETROREFLECTIVE MARKERS.** Retroreflective markers shall be type L-853 and shall conform to the requirements of AC 150/5345-39.

**125-2.7 RUNWAY AND TAXIWAY LIGHTS.** Not Used.

**125-2.8 RUNWAY AND TAXIWAY SIGNS.** Runway and Taxiway Guidance Signs shall conform to the requirements of AC 150/5345-44 and the following table and as indicated on the drawings. Sign legend, background, and lettering, and location shall be as shown on the Drawings. The number of modules for the legend shall be as required by manufacturer. Signs shall include base can, Portland Cement Concrete (PCC) pad, and other incidentals required for complete installation as shown on the drawings.

**Signs**

Type	Size	Style	Class	Mode	Notes
L858-C	Size 1	Style 4	Class 2	Mode 1	Retroreflective, 48" Length

**125-2.9 RUNWAY END IDENTIFIER LIGHT (REIL).** Not required.

**125-2.10 PRECISION APPROACH PATH INDICATOR (PAPI).** Not required.

**125-2.11 CIRCUIT SELECTOR CABINET.** ~~Rating.~~ Not required.

**125-2.12 LIGHT BASE, JUNCTION CANS, AND TRANSFORMER HOUSINGS.** Not Used.

**125-2.13 ISOLATION TRANSFORMERS.** Not Used.

**125-2.14 CONCRETE.** Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Where reinforced concrete is specified, reinforcing steel shall conform to ASTM A615 Grade 60. Concrete and reinforcing steel are incidental to the respective pay item of which they are a component part.

**INSTALLATION**

**125-3.1 INSTALLATION.** The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans or accepted shop drawings.

**125-3.2 TAXIWAY GUIDANCE SIGN INSTALLATION.** The taxiway guidance signs shall be assembled in accordance with the manufacturer's instructions. The transformer secondary leads shall be connected to the lamp leads by means of a disconnecting plug and receptacle, and the joint shall not be taped. The proper lamp(s) shall be installed in the sign.

The sign shall be installed level and true. Horizontal level shall not exceed ¼-inch per foot. Vertical face level shall not exceed 1/8-inch per foot. Sign alignment shall be as shown on the drawings and shall be within 5-degrees of parallel or perpendicular to the runway or taxiway. Where the intersection angle is not right, the sign shall be aligned to within 5-degrees as indicated by the RPR.

**125-3.3 TESTING.** Not Used.

**125-3.4 SHIPPING AND STORAGE.** Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

**125-3.5 ELEVATED AND IN-PAVEMENT LIGHTS.** Not Used.

### METHOD OF MEASUREMENT

**125-4.1** Retroreflective markers will be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR.

**125-4.2** Retroreflective Signs will be measured by the number of each type and size installed as completed units in place, ready for operation, and accepted by the RPR.

### BASIS OF PAYMENT

**125-5.1** Payment will be made at the Contract unit price for each complete retroreflective marker installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

**125-5.2** Payment will be made at the Contract unit price for each retroreflective sign installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

Bid Item No. B-24	Retroreflective Marker - per Each
Bid Item No. B-25	Retroreflective End Sign - per Each

### REFERENCES

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

#### Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors

AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program
<b>Engineering Brief (EB)</b>	
EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures
END OF ITEM L-125	



## **SECTION VI**

### **PREVAILING WAGE RATES**

#### **FEDERAL DAVIS-BACON WAGE RATES ARE ATTACHED**

##### **PREVAILING WAGE RATES - OREGON**

THIS PROJECT IS A PUBLIC WORKS CONTRACT SUBJECT TO ORS  
279C.800 TO 279C.870 AND THE  
DAVIS-BACON ACT (40 U.S.C. 276A).

ORS 279c.838 requires state prevailing wage rates to be paid on projects subject to both the state prevailing wage rate law and the Federal Davis-Bacon act, if the state prevailing rate of wage is higher than the federal prevailing rate of wage.

State prevailing wage rates, as set forth in the January 5, 2025 and any amendment(s) Bureau of Labor and Industry (BOLI) publication "*Prevailing Wage Rates for Public Contracts in Oregon Subject to both State PWR Law and The Federal Davis-Bacon Act*" are attached and applicable rates (including current amendments and corrections to that publication) are available at:

<http://www.oregon.gov/boli/whd/pwr/pages/index.aspx>

**General Decision Number: OR20250001 04/11/2025**

**Superseded General Decision Number: OR20240001**

**State: Oregon**

**Construction Type: Highway**

**Counties: Oregon Statewide**

**HIGHWAY CONSTRUCTION PROJECTS**

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022;	Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022.	Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>

Modification Number    Publication Date

0	01/03/2025
1	01/10/2025
2	01/31/2025
3	02/28/2025
4	04/11/2025

BROR0001-031 06/01/2024

	Rates	Fringes
BRICKLAYER.....	\$ 47.63	24.80

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CARP0503-016 02/10/2025

	Rates	Fringes
Carpenters:		
CARPENTERS.....	\$ 49.79	15.81
DIVER STANDBY.....	\$ 67.58	19.40
DIVERS TENDERS.....	\$ 60.34	19.40
DIVERS.....	\$ 103.21	19.40
MANIFOLD AND/OR DECOMPRESSION CHAMBER OPERATORS.....	\$ 65.34	19.40
MILLWRIGHTS.....	\$ 50.84	20.98
PILEDRIVERS.....	\$ 55.79	15.81

DEPTH PAY:

50 to 100 feet 2.00 per foot over 50 feet

101 to 150 feet 3.00 per foot over 50 feet

151 to 200 feet 4.00 per foot over 50 feet

over 220 feet 5.00 per foot over 50 feet

Zone Differential (Add to Zone A rates):

Zone B - \$1.25

Zone C - 1.70

Zone D - 2.00

Zone E - 3.00

Zone F - 5.00

Zone G - 10.00

ZONE A - All jobs or projects located within 30 miles of the respective City Hall

ZONE B - More than 30 miles and less than 40 miles from the respective City Hall

ZONE C - More than 40 miles and less than 50 miles from the respective City Hall

ZONE D - More than 50 miles and less than 60 miles from the respective City Hall

ZONE E - More than 60 miles and less than 70 miles from the respective City Hall

ZONE F - More than 70 miles from the respective City Hall.

ZONE G - More than 100 miles from the respective City Hall.

BASEPOINTS CITIES FOR CARPENTERS (EXCLUDING MILLWRIGHTS AND PILEDRIVERS)

ALBANY	ASTORIA	BAKER	BEND	BROOKINGS	BURNS
COOS BAY	EUGENE	GOLDENDALE	GRANTS PASS	HERMISTON	HOOD RIVER
KLAMATH FALLS		LAGRANDE	LAKEVIEW	LONGVIEW	MADRAS
MEDFORD	NEWPORT	ONTARIO	PENDLETON	PORTLAND	PORT ORFORD
REEDSPORT	ROSEBURG	SALEM	THE DALLES	TILLAMOOK	VANCOUVER

BASEPOINTS FOR MILLWRIGHTS

EUGENE	NORTH BEND	LONGVIEW	PORTLAND	MEDFORD	THE DALLES
VANCOUVER					

BASEPOINTS FOR PILEDRIVERS

BEND	EUGENE	LONGVIEW	MEDFORD	North Bend	PORTLAND
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\* ELEC0048-006 01/01/2025

CLACKAMAS, CLATSOP, COLUMBIA, HOOD RIVER, MULTNOMAH, TILLAMOOK, WASCO, WASHINGTON, SHERMAN AND YAMHILL (NORTH) COUNTIES

	Rates	Fringes
CABLE SPLICER.....	\$ 69.85	30.44
ELECTRICIAN.....	\$ 63.50	29.73

HOURLY ZONE PAY:

Hourly Zone Pay shall be paid on jobs located outside of the free zone computed from the city center of the following listed cities:

Portland, The Dalles, Hood River, Tillamook, Seaside and Astoria

Zone Pay:

Zone 1: 31-50 miles \$1.50/hour

Zone 2: 51-70 miles \$3.50/hour

Zone 3: 71-90 miles \$5.50/hour

Zone 4: Beyond 90 miles \$9.00/hour

\*These are not miles driven. Zones are based on Delorme Street Atlas USA 2006 plus.

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ELEC0112-001 06/01/2024

BAKER, GILLIAM, GRANT, MORROW, UMATILLA, UNION, WALLOWA, AND WHEELER COUNTIES

	Rates	Fringes
CABLE SPLICER.....	\$ 60.90	26.01
ELECTRICIAN.....	\$ 58.00	25.92

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ELEC0280-003 01/01/2025

BENTON, CROOK, DESCHUTES, JEFFERSON, LANE (EAST OF A LINE RUNNING NORTH AND SOUTH FROM THE NORTHEAST CORNER OF COOS COUNTY TO THE SOUTHEAST CORNER OF LINCOLN COUNTY), LINN, MARION, POLK AND YAMHILL (SOUTHERN HALF) COUNTIES

	Rates	Fringes
CABLE SPLICER.....	\$ 60.80	22.24
ELECTRICIAN.....	\$ 56.46	23.05

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ELEC0291-006 06/01/2023

MALHEUR COUNTY

	Rates	Fringes
CABLE SPLICER.....	\$ 41.69	6%+14.80
ELECTRICIAN.....	\$ 37.90	6%+14.80

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\* ELEC0659-004 01/01/2025

DOUGLAS (EAST OF A LINE RUNNING NORTH AND SOUTH FROM THE NE CORNER OF COOS COUNTY TO THE SE CORNER OF LINCOLN COUNTY), HARNEY, JACKSON, JOSEPHINE, KLAMATH AND LAKE COUNTIES

	Rates	Fringes
CABLE SPLICER.....	\$ 64.58	1.5%+22.34
ELECTRICIAN.....	\$ 45.58	20.70

ZONE PAY: BASE POINTS ARE FROM THE DOWNTOWN POST OFFICE IN GRANTS PASS, KLAMATH FALLS, ROSEBURG AND MEDFORD.

ZONE 1:	0-20 MILES	\$0.00 PER HOUR
ZONE 2:	> 20-30 MILES	\$1.50 PER HOUR
ZONE 3:	>30-40 MILES	\$3.30 PER HOUR
ZONE 4:	>40-50 MILES	\$5.00 PER HOUR
ZONE 5:	>50-60 MILES	\$6.80 PER HOUR
ZONE 6:	>60 MILES	\$9.50 PER HOUR

\*THESE ARE NOT MILES DRIVEN. ZONES ARE BASED ON DELORNE STREET ATLAS USA 5.0.

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ELEC0932-004 01/01/2024

COOS, CURRY, LINCOLN, DOUGLAS AND LANE COUNTIES (AREA LYING WEST OF A LINE NORTH AND SOUTH FROM THE N.E. CORNER OF COOS COUNTY TO THE S.E. CORNER OF LINCOLN COUNTY)

	Rates	Fringes
ELECTRICIAN.....	\$ 50.03	24.00

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ENGI0701-005 01/01/2024

ZONE 1:

POWER EQUIPMENT OPERATORS (See Footnote C)

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 56.66	16.90
GROUP 1A.....	\$ 58.82	16.90
GROUP 1B.....	\$ 60.98	16.90
GROUP 2.....	\$ 54.75	16.90
GROUP 3.....	\$ 53.60	16.90
GROUP 4.....	\$ 50.27	16.90
GROUP 5.....	\$ 49.03	16.90
GROUP 6.....	\$ 45.81	16.90

Zone Differential (add to Zone 1 rates):

Zone 2 - \$3.00

Zone 3 - \$6.00

For the following metropolitan counties: MULTNOMAH; CLACKAMAS; MARION; WASHINGTON; YAMHILL; AND COLUMBIA; CLARK; AND COWLITZ COUNTY, WASHINGTON WITH MODIFICATIONS AS INDICATED:

All jobs or projects located in Multnomah, Clackamas and Marion Counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Highway 26 and West of Mile Post 30 on Highway 22 and all jobs or projects located in Yamhill County, Washington County and Columbia County and all jobs or projects located in Clark & Cowlitz County, Washington except that portion of Cowlitz County in the Mt. St. Helens ""Blast Zone"" shall receive Zone I pay for all classifications.

All jobs or projects located in the area outside the identified boundary above, but less than 50 miles from the Portland City Hall shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone III pay for all classifications.

For the following cities: ALBANY; BEND; COOS BAY; EUGENE; GRANTS PASS; KLAMATH FALLS; MEDFORD; ROSEBURG

All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone I pay for all classifications.

All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone III pay for all classifications.

#### POWER EQUIPMENT OPERATORS CLASSIFICATIONS

##### Group 1

Concrete Batch Plant and or Wet mix three (3) units or more Crane, Floating one hundred and fifty (150) ton but less than two hundred and fifty (250) ton. Crane, two hundred (200) ton through two hundred ninety-nine (299) ton with two-hundred-foot (200?) boom or less (including jib, inserts and/or attachments) Crane, ninety (90) ton through one hundred ninety-nine (199) ton with over two hundred (200?) boom Including jib, inserts and/or attachments) Crane, Tower Crane with one hundred seventy-five-foot (175?) tower or less and with less than two-hundred-foot (200?) jib Crane, Whirley ninety (90) ton and over Helicopter when used in erecting work Tunnel Boring Machine Tunnel, Micro Boring Tunnel Machine

##### Group 1A

Crane, floating two hundred fifty (250) ton and over Crane, two hundred (200) ton through two hundred ninety-nine (299) ton, with over two-hundred-foot (200?) boom (including jib, inserts and/or attachments) Crane, three hundred (300) ton through three hundred ninety-nine (399) ton Crane, Tower Crane with over one hundred seventy-five-foot (175?) tower or over two hundred foot (200?) jib Crane, tower Crane on rail system or 2nd tower or more in work radius

##### Group 1B

Crane, three hundred (300) ton through three hundred ninety-nine (399) ton, with over two hundred-foot (200?) boom (including jib, inserts and/or attachments) Floating crane, three hundred fifty (350) ton and over Crane, four hundred (400) ton and over

##### Group 2

Asphalt Plant (any type) Asphalt Roto-Mill, pavement profiler eight foot (8?) lateral cut and over Auto Grader or ?Trimmer? Blade, Robotic Bulldozer, Robotic Equipment (any type) Bulldozer, over one hundred twenty thousand (120,000) lbs. and above Canal Trimmer Concrete Batch Plant and/or Wet Mix one (1) and two (2) drum Concrete Canal Liner Operator Concrete Diamond Head Profiler Concrete, Automatic Slip Form Paver Crane, Boom Truck fifty (50) ton and with over one hundred fifty-foot (150?) boom and over Crane, Floating (derrick barge) thirty (30) ton but less than one hundred fifty (150) ton Crane, Cableway twenty-five (25) ton and over Crane, Floating Clamshell three (3) cu. Yds. And over Crane, ninety (90) ton through one hundred ninety-nine (199) ton up to and including two hundred-foot (200?) boom (including jib inserts and/or attachments) Crane, fifty (50) ton through eighty-nine (89) ton with over one hundred fifty-foot (150?) boom (including jib inserts and/or attachments) Crane, Whirley under ninety (90) ton Crusher Plant Drone Excavator over one hundred thirty thousand (130,000) lbs. Heavy Equipment Robotics Operator or Mechanic Loader one hundred twenty thousand (120,000) lbs. and above Master environmental Maintenance Mechanic Remote Controlled Earth Moving Equipment Shovel, Dragline, Clamshell, five (5) cu. Yds. And over Underwater Equipment remote or otherwise, when used in construction work Wheel Excavator any size

### Group 3

Bulldozer, over seventy thousand (70,000) lbs. up to and including one hundred twenty thousand (120,000) lbs. Crane, Boom Truck fifty (50) ton and over with less than one hundred fifty-foot (150?) boom Crane, fifty (50) ton through eighty-nine (89) ton with one hundred fifty-foot (150?) boom or less (including jib inserts and/or attachments) Crane, Shovel, Dragline or Clamshell three (3) cu. yds. but less than five (5) cu. Yds. Excavator over eighty-five thousand (85,000) lbs. through one hundred thirty thousand (130,000) lbs. Loader sixty thousand (60,000) lbs. and less than one hundred twenty thousand (120,000) lbs.

### Group 4

Asphalt, Screed Asphalt Paver Asphalt Roto-Mill, pavement profiler, under eight foot (8?) lateral cut Asphalt, Recycle Machine Asphalt, Material Transfer Vehicle Operator Back Filling Machine Backhoe, Robotic, track and wheel type up to and including twenty thousand (20,000) lbs. with any attachments Blade (any type) Boatman, Licensed Boring Machine Bulldozer over twenty thousand (20,000) lbs. and more than one hundred (100) horse up to seventy thousand (70,000) lbs. Cable-Plow (any type) Cableway up to twenty-five (25) ton Cat Drill (John Henry) Challenger Chippers Combination Heavy Duty Mechanic-Welder, when required to do both Compactor, multi-engine Compactor, Robotic Compactor with blade self-propelled Concrete, Breaker Concrete, Grout Plant Concrete, Mixer Mobile Concrete, Paving Road Mixer Concrete, Reinforced Tank Banding Machine Crane, Boom Truck twenty (20) ton and under fifty (50) ton Crane, Bridge Locomotive, Gantry and Overhead Crane, Carry Deck, Spider Crane, and similar types Crane, Chicago Boom and similar types Crane, Derrick Operator, under one hundred (100) ton Crane, Floating Clamshell, Dragline, etc. under three (3) cu. yds. Or less than thirty (30) ton Crane, under fifty (50) ton Crane, Quick Tower under one-hundred-foot (100?) in height and less than one hundred fifty foot (150?) jib (on rail included) Diesel-Electric Engineer (Plant or Floating) Directional Drill over twenty thousand (20,000) lbs. pullback Drill Cat Operator Drill Doctor and/or Bit Grinder Drill, Oscillator Driller, Percussion, Diamond, Core, Cable, Rotary and similar type Excavator Operator over twenty thousand (20,000) lbs. through eighty-five thousand (85,000) lbs. Generator Operator Grade Setter/layout from plans Grade-all Guardrail Machines, i.e., punch, auger, etc. Hammer Operator (Piledriver) Hoist, stiff leg, guy derrick or similar type, fifty (50) ton and over Hoist, two (2) drums or more Hydro Axe (loader mounted or similar type) Jack Operator, Elevating Barges, Barge Operator, self-unloading Loader Operator, front end and overhead, twenty-five thousand (25,000) lbs. and less than sixty thousand (60,000) lbs. Log Skidders Mechanic, Heavy Duty Piledriver Operator (not crane type) Pipe, Bending, Cleaning, Doping and Wrapping Machines Rail, Ballast Tamper Multi-Purpose Rubber-tired Dozers and Pushers Scraper, all types Side-Boom Skip Loader, Drag Box Stump Grinder (loader mounted or similar type) Surface Heater and Planer Tractor, rubber-tired, over fifty (50) HP Flywheel Trenching Machine three-foot (3?) depth and deeper (Assistant to the Operator required) Truck, Crane Oiler-Driver 250 tons and over Tub Grinder (used for wood debris) Tunnel Boring Machine Mechanic ? hyperbaric pay: additional ten dollars (\$10.00) per hour, includes prep and decompress Tunnel, Mucking Machine Tunnel, Segment Plant Tunnel, Separation Plant Tunnel, Shaef Loader Tunnel, Shield Operator Ultra-High-Pressure Water Jet Cutting Tool System Operator Vacuum Blasting Machine Operator Water pulls, Water Wagons Welder; Heavy Duty

### Group 5

Asphalt, Extrusion Machine Asphalt, Roller (any asphalt mix) Asphalt, Roto-Mill pavement profiler ground man Bulldozer, twenty thousand (20,000) lbs. or less, or one hundred (100) horse or less Cement Pump Chip Spreading Machine Churn Drill and Earth Boring Machine Compactor, self-propelled without blade Compressor, (any power) one thousand two hundred fifty (1,250) cu. ft. and over, total capacity Concrete, Batch Plant Quality control Concrete, Combination Mixer and compressor operator, gunite



work Concrete, Curb Machine, Mechanical Berm, Curb and/or Curb and Gutter Concrete, Finishing Machine Concrete, Grouting Machine Concrete, Internal Full Slab Vibrator Operator Concrete, Joint Machine Concrete, Mixer single drum, any capacity Concrete, Paving Machine eight foot (8?) or less (Assistance to the Operator required) Concrete, Placing Boom Concrete, Planer Concrete, Pump Concrete, Pump Truck Concrete, Pumpcrete Operator (any type) Concrete, Slip Form Pumps, power driven hydraulic lifting device for concrete forms Concrete, Spreader Concrete, Tele belt Concrete, Treated Base Roller Operator, Oiling Conveyored Material Hauler Crane, Boom Truck under twenty (20) tons Crane, Boom Type lifting device, five (5) ton capacity or less Drill, Directional type less than twenty thousand (20,000) lbs. pullback Drill, Mud Mixer Elevating Grader Operator, Tractor towed requiring Operator or Grader Elevating Loader Operator (any type) Elevator to move personnel or materials Forklift, over ten (10) ton or Robotic Helicopter Hoist Hoist Operator, single drum Hydraulic Backhoe track type up to and including twenty thousand (20,000) lbs. Hydraulic Backhoe wheel type (any make) Laser Screed Lime Spreader, construction job site Loaders, rubber-tired type, less than twenty-five thousand (25,000) lbs. Pavement Grinder and/or Grooving Machine (riding type) Pipe, cast in place Pipe Laying Machine Pulva-Mixer or similar types Pump Operator, more than five (5) pumps (any size) Rail, Ballast Compactor, Regulator, or Tamper machines Rail, Car Mover Rail, Clip Applicator Rail, High Rail Self Loader Truck Rail, Locomotive, forty (40) ton and over Rail, Lo-Railer Rail, Shuttle Car Operator Rail, Speedswing Rail, Track Liner Service Oiler (Greaser) Sweeper Self-Propelled, Construction Job Site Tractor, Rubber-Tired, fifty (50) HP flywheel and under Trenching Machine Operator, maximum digging capacity three-foot (3?) depth Truck, All Terrain or Track type Truck, Barrel type Truck, Crane Oiler-Driver 100-249 tons Truck, Heavy Haul, specialized transporter, hydraulic, electric, or similar Truck, Off Road Trucks, Articulated and Non-articulated Trucks over forty (40) ton Truck, Vacuum Truck, Water Tunnel, Locomotive, Dinkey Tunnel, Power Jumbo setting slip forms, etc.

#### Group 6

Air Filtration Equipment Asphalt, Pugmill (any type) Asphalt, Raker Asphalt, Truck Mounted Asphalt Spreader, with Screed Assistant to the Operator Auger Oiler Bell Man (any type of communication) Boatman Bobcat, skid steer (less than one (1) yard) Broom, self-propelled, construction job site Compressor Operator (any power) under 1,250 cu. ft. total capacity Concrete Curing Machine (riding type) Concrete Saw Conveyor Operator or Assistant Crane, Tugger Crusher Feederman Crusher Oiler Deckhand Drill Assistant Drill, Directional Locator Forklift Grade Checker Guardrail Punch Oiler Heavy Duty Repairman Assistant Helicopter Radioman (ground) Hydraulic Pipe Press Hydrographic Seeder Machine, straw, pulp or seed Hydrostatic Pump Operator Material Handler Mixer Box (CTB, dry batch, etc.) Oiler Parts Man (Tool Room) Plant Oiler Pump (any power) Rail, Brakeman, Switchman, Motorman Rail, Tamping Machine, mechanical, self-propelled Rigger Roller grading (not asphalt) Truck, Crane Oiler-Driver under 100 tons Truck, Off-Road Trucks, Articulated and Non-Articulated Trucks forty (40) ton and under Truck, over highway, examples: material and equipment Welder's Assistant Welding Machine Wire Mat or Brooming Machine

IRON0029-004 01/01/2024

	Rates	Fringes
IRONWORKER.....	\$ 43.82	34.02

LABO0737-001 06/01/2024

Rates      Fringes

Mason Tender/Hod Carrier

Tenders to Bricklayers, Tile Setters, Marble Setters and Terrazzo Workers, Topping for Cement Finishers and Mortar Mixers.....\$ 43.79      17.05

LABO0737-008 06/01/2024

ZONE 1:

LABORERS (SEE FOOTNOTE C)

Rates      Fringes

Laborers:

GROUP 1.....\$ 39.00      17.30

GROUP 2.....\$ 40.41      17.30

GROUP 3.....\$ 34.39      17.30

Zone Differential (Add to Zone 1 rates):

Zone 2 - \$0.85

Zone 3 - 2.00

Zone 4 - 3.00

Zone 5 - 5.00

ZONE 1 - All jobs or projects located within 30 miles of the respective City Hall

ZONE 2 - More than 30 miles and less than 40 miles from the respective City Hall

ZONE 3 - More than 40 miles and less than 50 miles from the respective City Hall

ZONE 4 - More than 50 miles and less than 80 miles from the respective City Hall

ZONE 5 - More than 80 miles from the respective City Hall.

BASEPOINTS:

ALBANY      ASTORIA      BAKER CITY      BEND      BURNS      COOS BAY      EUGENE  
GRANTS PASS      HERMISTON      KLAMATH FALLS      MEDFORD      PENDLETON      PORTLAND  
ROSEBURG      SALEM      THE DALLES

LABORER CLASSIFICATIONS

GROUP 1: Applicator (including Pot Tender for same) applying protective material by hand or nozzle on utility lines or storage tanks on project, Asphalt Plant; Asphalt Spreader; Batch Weighman; Broomers; Brush Burners and Cutters; Choker Setter; Choker Splicer; Clary Power Spreader; Clean-up Laborer; Clean up Nozzleman (concrete, rock, etc); Concrete Laborer; Crusher Feeder; Curing, Concrete; Demolition, wrecking, and moving; Dopping and Wrapping Pipe; Dumpman (for Grading Crew); Erosion Control Specialist; Fine Graders; Fence Builders; Form Strippers; Guard Rail, Median Rail, Barriers,

Reference Post, Guide Post, Right of Way Marker; Remote Control (Dry Pack Machine, Jackhammer, Chipping Guns, Compaction, Paving Breakers, Hand Held Concrete Saw, Demo Saw, Core Drill); Precast Concrete Setter; Pressure Washer; Railroad Track Laborer; Ribbon Setter; Rip Rap Map; Sand Blasting (Wet); Scaffold Tender; Self Propelled Concrete Buggy; Sewer Laborer; Sign Erector; Signalman; Scissor and Manlift; Skipman; Slopers; Sprayman; Stake Chaser; Stake Setter; Tamper; Timber Faller and Bucker; Tool Operators (Hand Held, Walk Behind)

GROUP 2: Asbestos Removal; Asphalt Rakers, Bit Grinder, Concrete Core Drill, Concrete Pump Nozzleman, Concrete Saw Operator (Walk Behind, Walk Saw, Rail Mounted, Wire); Drill Operator; Grade Checker; Gunit Nozzleman; Hazardous Waste Laborer; High Scalers; Laser Bean (Pipe Laying); Loop Installation; Manhole Builder; Mold Remediation Laborer; Nippers and Timberman; Pipelayer; Powderman; Power Saw Operators (Bucking and Falling); Pumpcrete Nozzleman; Sand Blasting (Dry); Sewer Timberman; Tugger Operator; Vibrators; Water Blaster

GROUP 3: Final Clean-up(detailed clean-up, limited to cleaning up floors, ceilings, walls, windows-prior to acceptance by the owner); Fire Watch; Landscaper; Traffic Flagger

FOOTNOTE C:

HANDLING OF HAZARDOUS WAST MATERIALS - Personnel in all craft classifications subject to working inside a federally designated Hazardous Waste perimeter shall be eligible for compensation in accordance with the following group schedule relative to the level of Hazardous Waste as outline in the specific Hazardous Waste Project Site Safety Plan:

H-1 Base Wage Rate when on a hazardous waste site when not outfitted with protective clothing.

H-2 Class ""C"" Suit - Basic hourly wage rate plus \$1.00 per hour, fringes plus \$0.15.

H-3 Class ""B"" Suit - Basic hourly wage rate plus \$1.50 per hour, fringes plus \$0.15.

H-4 Class ""A"" Suit -Basic hourly wage rate plus \$2.00 per hour, fringes plus \$0.15.

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\* PAIN0010-005 01/01/2025

	Rates	Fringes
PAINTER		
HIGHWAY & PARKING LOT STRIPER.....	\$ 40.25	16.67

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PAIN0010-008 07/01/2022

	Rates	Fringes
PAINTER.....	\$ 38.18	15.08

PLAS0555-001 06/01/2024

ZONE 1:

	Rates	Fringes
Cement Masons: (ZONE 1)		
CEMENT MASONS DOING BOTH COMPOSITION/POWER MACHINERY AND SUSPENDED/HANGING SCAFFOLD..	\$ 46.93	20.05
CEMENT MASONS ON SUSPENDED, SWINGING AND/OR HANGING SCAFFOLD.....	\$ 46.03	20.05
CEMENT MASONS.....	\$ 45.13	20.05
COMPOSITION WORKERS AND POWER MACHINERY OPERATORS...	\$ 46.03	20.05

Zone Differential for Cement Mason - Add to Basic Hourly Rate FOR THE FOLLOWING CITIES: (Reference City) Bend, Portland, Pendleton, Medford, Corvallis, Salem, Eugene, The Dalles, Vancouver

When a contractor takes current employees to a project that is located more than 59 miles from the City Hall of the Reference City that is closest to the contractor's place of business, Zone Pay is to be paid for the distance between the City Hall of the identified Reference City and the project site, per the following:

Zone A - 60-79 miles - additional \$3.00 hourly premium above the base rate of all classification as listed in Schedule ""A"".

Zone B - 80-99 miles - additional \$5.00 hourly premium above the base rate of all classifications as listed in Schedule ""A""

Zone C -100 or more miles - additional \$10.00 hourly premium above the base rate of all classifications as listed in Schedule ""A""

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TEAM0037-004 06/01/2024

ZONE 1:

TRUCK DRIVERS (See Footnote C):

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 33.09	17.58
GROUP 2.....	\$ 33.24	17.58
GROUP 3.....	\$ 33.40	17.58
GROUP 4.....	\$ 33.72	17.58
GROUP 5.....	\$ 33.97	17.58
GROUP 6.....	\$ 34.18	17.58
GROUP 7.....	\$ 34.43	17.58

Zone Differential (add to Zone 1 rates):

Zone 2 - \$0.65

Zone 3 - 1.15

Zone 4 - 1.70

Zone 5 - 2.75

Zone 1 - All jobs or projects located within 30 miles of the respective City Hall

Zone 2 - More than 30 miles and less than 40 miles from the respective City Hall

Zone 3 - More than 40 miles and less than 50 miles from the respective City Hall

Zone 4 - More than 50 miles and less than 80 miles from the respective City Hall

Zone 5 - More than 80 miles from the respective City Hall

BASEPOINTS:

ALBANY	ASTORIA	BAKER	BEND	BINGEN	BROOKINGS
BURNS	COOS BAY	CORVALLIS	EUGENE	GOLDENDALE	GRANTS PASS
HERMISTON	HOOD RIVER	KLAMATH FALLS		LAGRANDE	LAKEVIEW
LONGVIEW	MADRAS	MEDFORD	MCMINNVILLE	OREGON CITY	NEWPORT
ONTARIO	PENDLETON	PORTLAND	PORT ORFORD	REEDSPORT	ROSEBURG
SALEM	THE DALLES	TILLAMOOK	VANCOUVER		

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: A-frame or hydra-lift truck w/load bearing surface; Articulated dump truck; Battery rebuilders; Bus or manhaul driver; Concrete buggies (power operated); Concrete pump truck; Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: up to and including 10 cu. yds.; Lift jitneys, fork lifts (all sizes in loading, unloading and transporting material on job site); Loader and/or leverman on concrete dry batch plant (manually operated); Lubrication man, fuel truck driver, tireman, wash rack, steam cleaner or combination; Pilot car; Pickup truck; Slurry truck driver or leverman; Solo flat bed and misc. body truck, 0-10 tons; Team drivers; Tireman; Transit mix and wet or dry mix trucks: 5 cu yds. and under; Water wagons (rated capacity) up to 3,000 gallons

GROUP 2: Boom truck/hydra-lift or retracting crane; Challenger; Dumpsters or similar equipment-all sizes; Dump trucks/articulated dumps 6 cu to 10 cu.; Flaherty spreader driver or leverman; Low bed equipment, flat bed semi-truck and trailer or doubles transporting equipment or wet or dry materials; Lumber carrier, driver-straddle carrier (used in loading, unloading and transporting of materials on job site); Oil distributor driver or leverman; Transit mix and wet or dry mix trucks: over 5 cy yds and including 7 cu. yds; Vacuum trucks; Water Wagons (rated capacity) over 3,000 to 5,000 gallons

GROUP 3: Ammonia nitrate distributor driver; Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: over 10 cu. yds. and including 30 cu. yds., includes articulated dump trucks; Self-Propelled street sweeper; Transit mix and wet or dry mix trucks, over 7 cu. yds. and including 11 cu. yds.; truck mechanic-Welder-Body repairman; Utility and clean-up truck; Water wagons (rated capacity) 5,000 to 10,000 gallons.

GROUP 4: Asphalt Bruner; Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: over 30 cu. yds. and including 50 cu. yds. includes articulated dump trucks; Fire guard; Transit Mix and Wet or Dry Mix Trucks, over 11 cu. yds. and including 15 cu. yds.; Water Wagon (rated capacity) over 10,000 gallons to 15,000 gallons

GROUP 5: Composite Crewman; Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: over 50 cu. yds. and including 60 cu. yds., includes articulated dump trucks

GROUP 6: Bulk cement spreader w/o auger; Dry Pre-Batch concrete mix trucks; Dump trucks, side, end and bottom dumps, including semi-trucks and trains of combinations thereof: over 60 cu. yds. and including 80 cu. yds. and includes articulated dump trucks; Skid truck

GROUP 7: Dump trucks, side, end and bottom dumps, including semi-trucks and trains or combinations thereof: over 80 cu. yds. and including 100 cu. yds. includes articulated dump trucks; Industrial lift truck (mechanical tailgate)

FOOTNOTE C:

HANDLING OF HAZARDOUS WAST MATERIALS -(LABORERS, POWER EQUIPMENT OPERATORS, AND TRUCK DRIVERS): Personnel in all craft classifications subject to working inside a federally designated Hazardous Waste perimeter shall be eligible for compensation in accordance with the following group schedule relative to the level of Hazardous Waste as outline in the specific Hazardous Waste Project Site Safety Plan:

H-1 Base Wage Rate when on a hazardous waste site when not outfitted with protective clothing.

H-2 Class ""C"" Suit - Basic hourly wage rate plus \$1.00 per hour, fringes plus \$0.15.

H-3 Class ""B"" Suit - Basic hourly wage rate plus \$1.50 per hour, fringes plus \$0.15.

H-4 Class ""A"" Suit -Basic hourly wage rate plus \$2.00 per hour, fringes plus \$0.15.

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\* SUOR1991-003 04/01/1991

	Rates	Fringes
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Timber Sales Roads:

LABORERS.....	\$ 8.35 **	4.30
OPERATING ENGINEERS.....	\$ 10.37 **	4.15
POWER SAW, DRILLER, POWDERMAN.....	\$ 9.12 **	4.30
TEAMSTERS.....	\$ 9.74 **	3.74

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at: <https://www.dol.gov/agencies/whd/government-contracts>

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

#### Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 7/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

#### Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

#### Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey

data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier. ?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

#### State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:



Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

**AMENDMENTS TO OREGON DETERMINATION 2025-01  
EFFECTIVE APRIL 5, 2025**

**Occupation and Premium/Differential Pay**

**Base Rate / Fringe Rate**

**ASBESTOS WORKER/INSULATOR**

**62.02                      25.42**

Firestop Containment

**46.64                      17.98**

**DIVER & DIVER TENDER**

Zone 1 (Base Rate)

**DIVER**

**105.33                      19.60**

**DIVER TENDER**

**61.32                      19.60**

Any Diver or Diver's Tender working on a project more than 50 miles from Portland, OR city hall shall receive forty dollars (\$40.00) per day in addition to their regular pay. Miles are calculated via the "shortest route" filter using Google Maps from Portland, OR city hall or the employee's primary residence; whichever one is closer

Diver Depth Pay:

**Depth Below Water Surface (FSW)**

**Daily Depth Pay**

50-100 ft.

**2.00** per foot over 50 feet

101-150 ft.

**3.00** per foot over 100 feet

151-220 ft.

**4.00** per foot over 150 feet

Over 220 ft.

**5.00** per foot over 220 feet

The actual depth in FSW shall be used in determining depth premium.

Diver Enclosure Pay (working without vertical escape):

**Distance Traveled in the Enclosure**

**Daily Enclosure Pay**

0 – 25ft.

**N/C**

25 – 300 ft.

**1.00** per foot from the entrance

300 – 600 ft.

**1.50** per foot beginning at 300 ft.

Over 600 ft.

**2.00** per foot beginning at 600 ft.

**HAZARDOUS MATERIALS HANDLER**

**31.03                      18.18**

**IRONWORKER**

Zone 1 (Base Rate):

**46.82                      33.98**

Zone Differential for Ironworker – Add to Basic Hourly Rate

Zone 2: **6.88/hr.** or \$55.00 maximum per day

Zone 3: **10.00/hr.** or \$80.00 maximum per day

Zone 4: **12.50/hr.** or \$100.00 maximum per day

Zone 1: Projects located within 45 miles of city hall in the reference cities listed below.

Zone 2: More than 46 miles, but less than 60 miles.

Zone 3: More than 61 miles, but less than 100 miles.

Zone 4: More than 100 miles.

See more information on Zone Differential on page 2.

Occupation and Premium/Differential Pay

Base Rate / Fringe Rate

**IRONWORKER (continued)**

**Note:** Zone pay for Ironworkers shall be determined using the quickest route per Google Maps and computed from the city hall or dispatch center of the reference cities listed below **or** the residence of the employee, whichever is nearer to the project.

Reference Cities and Dispatch Center

Portland

**PAINTER & DRYWALL TAPER**

COMMERCIAL PAINTING	37.74	15.94
INDUSTRIAL PAINTING	39.94	15.94
BRIDGE PAINTING	46.83	15.94

Shift Differential for Painter

Add \$2.00/hour to base rate for entire shift if any hours are worked outside of 5:00 a.m. to 5:00 p.m.

DRYWALL TAPER <u>Zone A (Base Rate)</u>	45.52	21.03
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Zone Differential for Drywall Taper – Add to Zone A Base Rate

Zone B: **6.00** per hour  
Zone C: **9.00** per hour  
Zone D: **12.00** per hour

Zone A: Projects located less than 61 miles from the respective city hall of the dispatch cities listed.  
Zone B: Projects located 61 miles to 80 miles.  
Zone C: Projects located 81 miles to 100 miles.  
Zone D: Projects located 101 miles or more.

Dispatch Cities for Drywall Taper

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

**Note:** Zone pay is based on AAA Road Mileage.

**PLUMBER/PIPEFITTER/STEAMFITTER**

**Area 1**

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Reference Counties

Harney – **See Area 3 rates**      Malheur – **See Area 3 rates**  
Baker – **See Area 2 rates**

AMENDMENTS TO OREGON DETERMINATION 2025-01  
EFFECTIVE APRIL 5, 2025

Occupation and Premium/Differential Pay

Base Rate / Fringe Rate

**PLUMBER/PIPEFITTER/STEAMFITTER** (continued)

**Area 2**

**62.95**

**33.76**

Reference Counties

Baker  
Union  
Wallowa

Grant – **See Area 3 rate**  
Morrow – **See Area 3 rate**  
Wheeler – **See Area 3 rate**

Gilliam – **See Area 3 rate**  
Umatilla – **See Area 3 rate**

Zone Differential for Area 2 – Add to Base Rate

Zone 2: **10.62/hr.** not to exceed \$80.00 day.

**Zone mileage based on road miles:**

Zone 2: Eighty (80) miles or more from City Hall in Pasco, Washington.

Add \$1.00 to base rate in one-hour minimum increments if it is possible for worker to fall 35 ft. or more.

Add \$1.00 to base rate in one-hour minimum increments if worker is required to wear a mask in hazardous areas.

**Area 3**

**60.77**

**37.10**

Reference Counties

Benton	Deschutes	Jefferson	Malheur	Umatilla
Clackamas	Douglas	Josephine	Marion	Wasco
Clatsop	Grant	Klamath	Morrow	Washington
Columbia	Gilliam	Lake	Multnomah	Wheeler
Coos	Harney	Lane	Polk	Yamhill
Crook	Hood River	Lincoln	Sherman	
Curry	Jackson	Linn	Tillamook	

Oregon Bureau of Labor and Industries

# **Prevailing Wage Rates for Public Works Contracts**



Christina E. Stephenson  
Labor Commissioner  
Rates Effective January 5, 2025



CHRISTINA E. STEPHENSON  
Labor Commissioner

In this rate book are the new prevailing wage rates for Oregon non-residential public works projects, effective January 5, 2025.

Prevailing wage rates are the minimum hourly wages that must be paid to all workers employed on all public works projects. Thank you for your engagement in the process and commitment to Oregon law.

Our team is ready to help support you with any questions you have. We also offer regular, free, informational seminars and webinars for contractors and public agencies. Contact us at [PWR.Email@boli.oregon.gov](mailto:PWR.Email@boli.oregon.gov) or (971) 245-3844.

A handwritten signature in blue ink, appearing to read "C. Stephenson".

Christina E. Stephenson  
Labor Commissioner

### More information about prevailing wage rates:

The Oregon Bureau of Labor & Industries publishes the prevailing wage rates (PWR) that are required to be paid to workers on non-residential public works projects in Oregon.

Separate documents, [Definitions of Covered Occupations for Public Works Contracts in Oregon](#), provide occupational definitions used to classify the duties performed on public works projects. These definitions are used to find the correct prevailing wage rate.

The rate book and definition publications are available online at <https://www.oregon.gov/boli>, as well as additional information, supporting documents, and forms.

Please contact us at [PWR.Email@boli.oregon.gov](mailto:PWR.Email@boli.oregon.gov) or (971) 245-3844, for additional information such as:

- Applicable prevailing wage rates for projects (Generally, the rates in effect at the time the bid specifications are first advertised are those that apply for the duration of the project.)
- Federal Davis-Bacon rates (In cases where projects are subject to both state PWR and federal Davis-Bacon rates, the higher wage must be paid.)
- Required PWR provisions for specifications and contracts
- Apprentice rates



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Forms necessary to comply with ORS 279C.800 through ORS 279C.870 can be found on our website at <https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx>. Contractors are encouraged to use and keep on file the forms provided as master copies for use on future prevailing wage rate projects.

**All of the information in this booklet can be accessed and printed from the Internet at: [www.oregon.gov/BOLI](http://www.oregon.gov/BOLI)**

Pursuant to ORS 279C.800 to ORS 279C.870, the prevailing wage rates contained in this booklet have been adopted for use on public works contracts in Oregon.

## **Required Postings for Prevailing Wage Contractors and Subcontractors**

### **PREVAILING WAGE RATES**

Every contractor and subcontractor engaged in work on a public works must post the applicable prevailing wage rates for that project in an obvious place on the worksite, so workers have ready access to the information.

### **DETAILS OF FRINGE BENEFIT PROGRAMS**

When a contractor or subcontractor provides or contributes to a health and welfare plan or a pension plan, or both, for employees who are working on a public works project, the details of all fringe benefit plans or programs must be posted on the worksite.

The posting must include a description of the plan or plans, information about how and where claims can be made and where to obtain more information. The notice must be posted in an obvious place on the work site in the same location as the prevailing wage rates.

### **WORK SCHEDULE**

Contractors and subcontractors must give workers their regular work schedule (days of the week and number of hours per day) in writing before beginning work on the project.

Contractors and subcontractors may provide the schedule at the time of hire, prior to starting work on the contract, or by posting the schedule in a location frequented by employees, along with the prevailing wage rate information and any fringe benefit information.

If an employer fails to give written notice of the worker's schedule, the work schedule will be presumed to be a five-day schedule. The schedule may only be changed if the change is intended to be permanent and is not designed to evade the PWR overtime requirements.

*ORS 279C.840(4); OAR 839-025-0033(1). ORS 279C.840(5); OAR 839-025-0033(2). ORS 279C.540(2); OAR 839-025-0034.*



# PUBLIC WORKS BONDS

**Every** contractor and subcontractor who works on public works projects subject to the prevailing wage rate (PWR) law is required to file a \$30,000 **"PUBLIC WORKS BOND"** with the Construction Contractors' Board (CCB). This includes flagging and landscaping companies, temporary employment agencies, and sometimes sole proprietors.

The key elements of ORS 279C.830(2) and ORS 279C.836 specify that:

- Specifications for every contract for public works must contain language stating that the contractor and every subcontractor must have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt.
- Every contract awarded by a contracting agency must contain language requiring the contractor:
  - To have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt; and
  - To include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the CCB before starting work on the project unless otherwise exempt
- Every subcontract that a contractor or subcontractor awards in connection with a public works contract between a contractor and a public agency must require any subcontractor to have a public works bond filed with the CCB before starting work on the public works project, unless otherwise exempt.
- Before permitting a subcontractor to start work on a public works project, contractors must first verify their subcontractors either have filed the bond or have elected not to file a public works bond due to a bona fide exemption.
- The PWR bond is to be used exclusively for unpaid wages determined to be due by the Bureau of Labor & Industries.
- The bond is in effect continuously (you do not have to have one per project).
- A public works bond is in addition to any other required bond the contractor or subcontractor is required to obtain.

## **Exemptions:**

- Allowed for a disadvantaged business enterprise, a minority-owned business, woman-owned business, a business that a service-disabled veteran owns, or an emerging small business certified under ORS 200.055, for the first FOUR years of certification;
  - Exempt contractor must still file written verification of certification with the CCB and give the CCB written notice that they elect not to file a bond.
  - The prime contractor must give written notice to the public agency that they elect not to file a public works bond.
  - Subcontractors must give written notice to the prime contractor that they elect not to file a public works bond.
- For projects with a total project cost of \$100,000 or less, a public works bond is not required. (Note this is the total project cost, not an individual contract amount.)
- Emergency projects, as defined in ORS 279A.010(f).

# PREVAILING WAGE RATES

## FINDING THE CORRECT PREVAILING WAGE RATE

To find the correct rate(s) required on your public works project, you will need:

- the date the project was first advertised for bid
- the county your project is in
- the duties of workers on the job

Generally, the rate you should look for is based on the date the project was first advertised for bid. (See OAR 839-025-0020(8) for information about projects that contract through a CM/GC, or contract manager/general contractor.)

The Labor Commissioner must establish the prevailing rate of wage for each region as defined in law. (See ORS 279C.800.) A map of these regions can be found on [BOLI's website](#).

### To find the correct rate in this rate book:

1. *Determine the duties that are being performed by each worker.* Use the booklet *Definitions of Covered Occupations* to find the definition that most closely matches the actual work performed by the worker. You can find this publication online at <https://www.oregon.gov/boli/employers/Pages/occupational-definitions.aspx>.
2. *Find the correct occupation in the “Prevailing Wage Rate for Public Works Contracts” below.* The prevailing wage rate is made up of an hourly base rate and an hourly fringe rate. The combination of these two amounts must be paid to each worker. Watch for possible zone differential, shift differential, and/or hazard pay. If the occupation lists different rates for different Areas of the state, locate the Area that includes the county where the project is located.

Apprentices must be paid consistent with their registered apprenticeship program standard. You can find apprenticeship rates on our website at <https://www.oregon.gov/boli/employers/Pages/prevailing-wage-rates.aspx>. You may also contact the agency to confirm the correct apprenticeship rate.

The “Prevailing Wage Rate Laws” handbook provides specific information and answers questions regarding prevailing wage laws and is available on our website at <https://www.oregon.gov/boli/employers/Documents/2024%20PWR%20Law%20book%20-%20FINAL.pdf>.

If you have any questions about any of this information, please contact the Bureau of Labor & Industries at [PWR.Email@boli.oregon.gov](mailto:PWR.Email@boli.oregon.gov) or (971) 245-3844.

## Prevailing Wage Rates by Occupations—Table of Contents

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**ASBESTOS WORKER/INSULATOR**

60.62 24.42

Firestop Containment

46.64 17.98

**BOILERMAKER**

43.83 32.22

**BRICKLAYER/STONEMASON**

47.63 25.55

This trade is tended by "Tenders to Mason Trades."

Add \$1.00 per hour to base rate for refractory repair work.

**CARPENTER****Zone A (Base Rate)**

Group 1	51.69	15.81
Group 2	51.86	15.81
Group 3 (Millwrights)	58.85	20.98
Group 4	Eliminated	
Group 5 (Bridge & Highway)	52.98	15.81
Group 6 (Piledrivers)	52.98	15.81

**Zone Differential for Carpenters - Add to Zone A Base Rate**

Zone B	1.25 per hour
Zone C	1.70 per hour
Zone D	2.00 per hour
Zone E	3.00 per hour
Zone F	5.00 per hour
Zone G	10.00 per hour

Zone A: Projects located within 30 miles of the respective city hall of the cities listed.

Zone B: More than 30 miles but less than 40 miles.

Zone C: More than 40 miles but less than 50 miles.

Zone D: More than 50 miles but less than 60 miles.

Zone E: More than 60 miles but less than 70 miles.

Zone F: More than 70 miles but less than 100 miles.

Zone G: More than 100 miles.

**Reference Cities for Group 1 and 2 Carpenters**

Albany	Coos Bay	Klamath Falls	Newport	Roseburg
Astoria	Eugene	La Grande	Ontario	Salem
Baker City	Goldendale	Lakeview	Pendleton	The Dalles
Bend	Grants Pass	Longview	Portland	Tillamook
Brookings	Hermiston	Madras	Port Orford	Vancouver
Burns	Hood River	Medford	Reedsport	

See more information on Reference Cities for Zone Differential and Premium Pays on page 6.

**CARPENTER** (continued)Reference Cities for Group 3 Carpenters

Eugene	Medford	Portland	Vancouver
Longview	North Bend	The Dalles	

Reference Cities for Group 5 and 6 Carpenters

Bend	Longview	North Bend
Eugene	Medford	Portland

**Note:** All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time--best road via Google Maps) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Group 1, 2, 5, and 6:

Welders shall receive a 5% premium per hour based on their Group's journeyman wage rate, with an 8-hour minimum.

Group 1, 2, and 3:

When working with toxic treated wood, workers shall receive \$.25/hour premium pay for minimum of eight (8) hours.

Group 5 and 6:

When working with creosote and other toxic treated wood, workers shall receive \$.25/hour premium pay for minimum of eight (8) hours.

Group 6:

When working in sheet pile coffer dams or cells up to the external water level, workers shall receive \$.15/hour premium pay for minimum of eight (8) hours.

**CEMENT MASON**

This trade is tended by "Concrete Laborer."

Group 1	<b>43.13</b>	<b>22.05</b>
Group 2	<b>44.03</b>	<b>22.05</b>
Group 3	<b>44.03</b>	<b>22.05</b>
Group 4	<b>44.93</b>	<b>22.05</b>

Zone Differential for Cement Mason - Add to Basic Hourly Rate

Zone A: **3.00** per hour

Zone B: **5.00** per hour

Zone C: **10.00** per hour

Zone A: Projects located 60-79 miles of the respective city hall of the Reference Cities listed below (Page 7).

Zone B: Projects located 80-99 miles of the respective city hall of the Reference Cities listed below (Page 7).

Zone C: Projects located 100 or more miles of the respective city hall of the Reference Cities listed below (Page 7).

See more information on Reference Cities for Zone Differential on page 7.

**CEMENT MASON** (continued)Reference Cities for Cement Mason

Bend	Eugene	Pendleton	Salem	Vancouver
Corvallis	Medford	Portland	The Dalles	

When a contractor takes employees to a project that is located more than 59 miles from the city hall of the Reference City that is closest to the contractor's place of business, Zone Pay is to be paid for the distance between the city hall of the identified Reference City and the project site.

**Note:** All miles are to be determined on the basis of road miles using the normal route (shortest time – best road), from the city hall of the Reference City closest to the contractor's place of business and the project.

**DIVER & DIVER TENDER**Zone 1 (Base Rate)

<b>DIVER</b>	<b>124.80</b>	<b>19.40</b>
<b>DIVER TENDER</b>	<b>62.40</b>	<b>19.40</b>

Any Diver or Diver's Tender working on a project more than 50 miles from Portland, OR city hall shall receive forty dollars (\$40.00) per day in addition to their regular pay. Miles are calculated via the "shortest route" filter using Google Maps from Portland, OR city hall or the employee's primary residence; whichever one is closer

Diver Depth Pay:

<b>Depth Below Water Surface (FSW)</b>	<b>Daily Depth Pay</b>
50-100 ft.	<b>2.00</b> per foot over 50 feet
101-150 ft.	<b>3.00</b> per foot over 100 feet
151-220 ft.	<b>4.00</b> per foot over 150 feet
Over 220 ft.	<b>5.00</b> per foot over 220 feet

The actual depth in FSW shall be used in determining depth premium.

Diver Enclosure Pay (working without vertical escape):

<b>Distance Traveled in the Enclosure</b>	<b>Daily Enclosure Pay</b>
0 – 25ft.	<b>N/C</b>
25 – 300 ft.	<b>1.00</b> per foot from the entrance
300 – 600 ft.	<b>1.50</b> per foot beginning at 300 ft.
Over 600 ft.	<b>2.00</b> per foot beginning at 600 ft.

**DREDGER**Zone A (Base Rate)

Leverman (Hydraulic & Clamshell)	<b>58.75</b>	<b>16.95</b>
Assistant Engineer (Watch Engineer, Mechanic Machinist)	<b>55.59</b>	<b>16.95</b>
Tenderman (Boatman Attending Dredge Plant), Fireman	<b>54.10</b>	<b>16.95</b>
Fill Equipment Operator	<b>52.93</b>	<b>16.95</b>
Assistant Mate	<b>50.23</b>	<b>16.95</b>

See more information on Zone Differential on page 8.

**DREDGER** (continued)Zone Differential for Dredgers – Add to Zone A Base RateZone B: **3.00** per hourZone C: **6.00** per hour**Zone mileage based on road miles:**Zone A: Center of jobsite to no more than 30 miles from the **City Hall of Portland**.

Zone B: More than 30 miles but not more than 60 miles.

Zone C: Over 60 miles.

**DRYWALL, LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER**1. DRYWALL INSTALLER **51.49** **15.81**2. LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER **51.49** **15.81**Zone Differential for Lather, Acoustical Carpenter & Ceiling Installer**Zone mileage based on road miles:**Zone B 61-80 miles **6.00** per hourZone C 81-100 miles **9.00** per hourZone D 101 or more **12.00** per hour

The correct transportation allowance shall be based on AAA road mileage from the City Hall of the transportation reference cities listed herein.

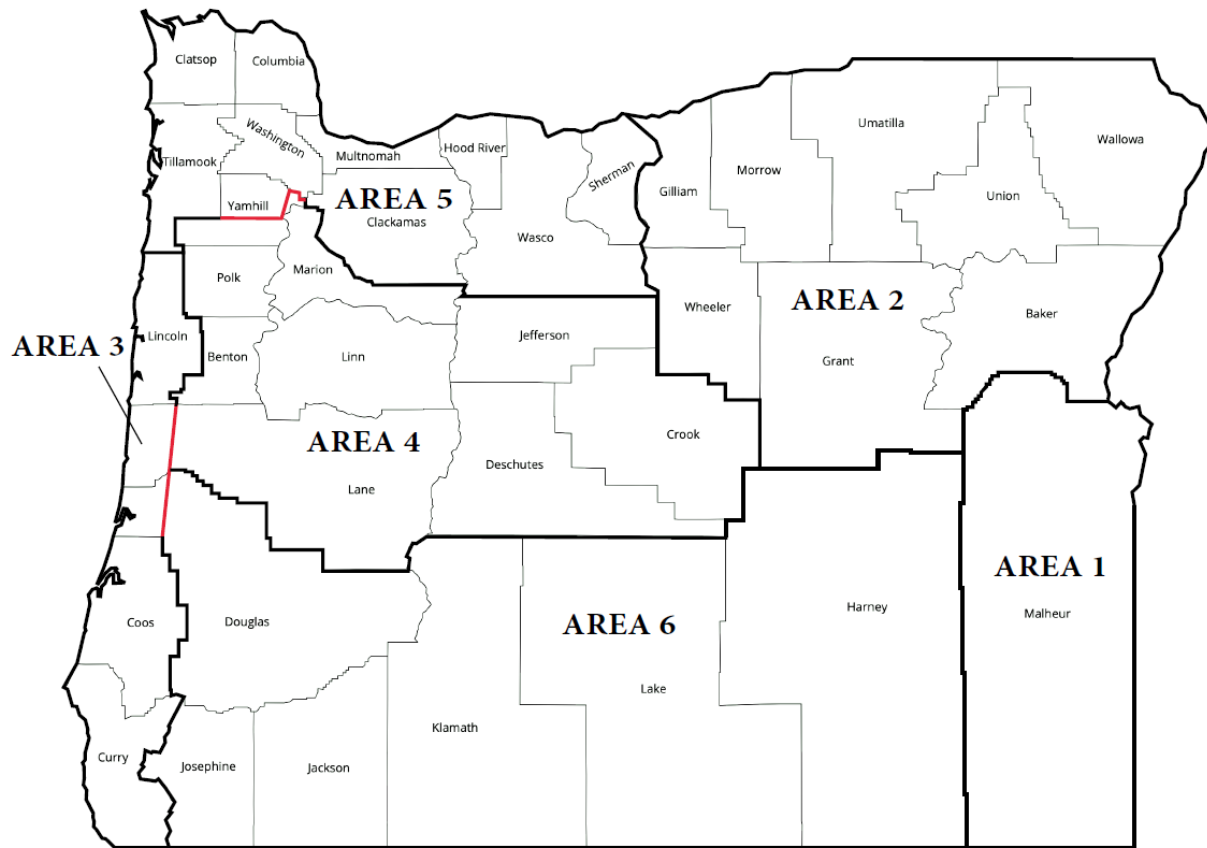
Reference Cities for Drywall, Lather, Acoustical Carpenter & Ceiling Installer

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Certified welders shall receive 5% over the base wage rate, with an eight (8) hour minimum.

**ELECTRICIAN**

Electrician/Limited Energy Electrician Area Map



**Note:** If you are unable to determine the area of a project located on or near the cross-county boundaries marked in red on the map, call or email the BOLI Prevailing Wage Rate Coordinator at (971) 245-3844 or [PWR.email@boli.oregon.gov](mailto:PWR.email@boli.oregon.gov).

**Area 1**

Electrician	<b>42.55</b>	<b>19.85</b>
Wireman Welder/Cable Splicer	<b>46.81</b>	<b>20.11</b>

**Reference County**

Malheur

**Shift Differential\***

1 <sup>st</sup> Shift "day":	Between the hours of 8:00am and 4:30pm	— 8 hours pay for 8 hours work
2 <sup>nd</sup> Shift "swing":	Between the hours of 4:30pm and 1:00am	— 8 hours pay for 8 hours work plus 10% for all hours worked
3 <sup>rd</sup> Shift "graveyard":	Between the hours of 12:30am and 9:00am	— 8 hours pay for 8 hours work plus 15% for all hours worked.

\* The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

Work will be paid at time and one half the regular rate: (1) When workmen are under compressed air or where gas masks are required; (2) When working tunnels or shafts where danger of falling rocks or other debris exists; and (3) When working from suspended or swinging scaffolds or boson's chairs.



**ELECTRICIAN** (continued)**Area 2**

Electrician	58.00	25.92
Cable Splicer	60.90	26.01
Certified Welder	72.50	26.36
Material Handler	34.80	19.32

**Reference Counties**

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Add 50% of the base rate when workers are required to work under the following conditions:

- 1) Under compressed air with atmospheric pressure exceeding normal pressure by at least 10%.
- 2) From trusses, swing scaffolds, bosun's chairs, open platforms, unguarded scaffolds, open ladders, frames, tanks, stacks, silos and towers where the workman is subject to a direct fall of (a) more than 60 feet or (b) into turbulent water under bridges, powerhouses or spillway faces of dams.

**Area 3**

Electrician	51.76	26.90
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**Reference Counties**

Coos	Douglas (a)	Lincoln
Curry	Lane (a)	

(a) Those portions of Lane and Douglas counties lying **west** of the red line on the Electrician Area Map posted above.

**Shift Differential\***

1 <sup>st</sup> Shift "day":	Between the hours of 8:00am and 4:30pm	– 8 hours pay for 8 hours work
2 <sup>nd</sup> Shift "swing":	Between the hours of 4:30pm and 1:00am	– 8 hours pay for 8 hours work plus 17% for all hours worked
3 <sup>rd</sup> Shift "graveyard":	Between the hours of 12:30am and 9:00am	– 8 hours pay for 8 hours work plus 31% for all hours worked.

\* The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

When workers are required to work under compressed air or where gas masks are required, or to work from trusses, all scaffolds including mobile elevated platforms, any temporary structure, bosun's chair or on frames, stacks, towers, tanks, within 15' of the leading edges of any building at a distance of:

50 – 75 feet to the ground	Add 1 ½ x the base rate
75+ feet to the ground	Add 2 x the base rate

High Time is not required to be paid on any permanent structure with permanent adequate safeguards (handrails, mid-rails, and toe guards). Any vehicle equipped with outriggers are exempted from this section.

**ELECTRICIAN** (continued)**Area 4**

Electrician	<b>56.46</b>	<b>24.05</b>
Cable Splicer	<b>62.11</b>	<b>24.22</b>
Lighting Maintenance/Material Handler	<b>27.76</b>	<b>10.73</b>

**Reference Counties for Area 4**

Benton	Jefferson	Marion
Crook	Lane (b)	Polk
Deschutes	Linn	Yamhill (c)

(b) Those portions of Lane and Douglas counties lying **east** of the red line on the Electrician Area Map posted above.

(c) The portion of Yamhill county lying **south** of the red line on the Electrician Area Map posted above.

**Shift Differential\***

1 <sup>st</sup> Shift "day"	Between the hours of 8:00am and 4:30pm	– 8 hours pay for 8 hours work
2 <sup>nd</sup> Shift "swing"	Between the hours of 4:30pm and 1:00am	– 8 hours pay for 8 hours work plus 17% for all hours worked
3 <sup>rd</sup> Shift "graveyard"	Between the hours of 12:30am and 9:00am	– 8 hours pay for 8 hours work plus 31.4% for all hours worked.

\* The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

**Area 5**

Electrician	<b>63.50</b>	<b>31.98</b>
Electrical Welder	<b>69.85</b>	<b>32.17</b>
Material Handler/Lighting Maintenance	<b>36.20</b>	<b>21.97</b>

**Reference Counties**

Clackamas	Hood River	Tillamook	Yamhill (d)
Clatsop	Multnomah	Wasco	
Columbia	Sherman	Washington	

(d) The portion of Yamhill county lying **north** of the red line on the Electrician Area Map posted above.

**Shift Differential\***

1 <sup>st</sup> Shift "day"	Between the hours of 7:00am and 5:30pm	– 8 hours pay for 8 hours work
2 <sup>nd</sup> Shift "swing"	Between the hours of 4:30pm and 3:00am	– 8 hours pay for 8 hours work plus 17.3% for all hours worked
3 <sup>rd</sup> Shift "graveyard"	Between the hours of 12:30am and 11:00am	– 8 hours pay for 8 hours work plus 31.4% for all hours worked.

\* The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

See more information about Zone Pay on page 12.

**ELECTRICIAN** (continued)

Zone Pay for Area 5 – Electrician and Electrical Welder – Add to Basic Hourly Rate

**Zone mileage based on air miles:**

Zone 1: 31-50 miles – **1.50** per hour  
 Zone 2: 51-70 miles – **3.50** per hour  
 Zone 3: 71-90 miles – **5.50** per hour  
 Zone 4: Beyond 90 – **9.00** per hour

There shall be a 30-mile free zone from downtown Portland City Hall and a similar 15-mile free zone around the following cities:

Astoria	Seaside	Tillamook
Hood River	The Dalles	

Further, the free zone at the Oregon coast shall extend along Hwy 101 west to the ocean Hwy 101 east 10 miles if not already covered by the above 15-mile free zone.

When workers are performing electrical work on a structure at or above the 90 ft. level directly above the ground, floor, roadway, roof or water where scaffolding or special safety devices which have not been approved by the Occupational Safety and Health Administration are used, the wage rate for such work shall be double the straight time hourly rate.

**Area 6**

Electrician	<b>45.58</b>	<b>20.70</b>
Lighting Maintenance and Material Handler	<b>22.84</b>	<b>10.59</b>

**Reference Counties**

Douglas (e)	Jackson	Klamath
Harney	Josephine	Lake

(e) The portion of Douglas county lying **east** of the red line on the Electrician Area Map posted above.

**Shift Differential\***

1 <sup>st</sup> Shift "day"	Between the hours of 8:00am and 4:30pm	– 8 hours pay for 8 hours work
2 <sup>nd</sup> Shift "swing"	Between the hours of 4:30pm and 1:00am	– 8 hours pay for 8 hours work plus 7.5% for all hours worked
3 <sup>rd</sup> Shift "graveyard"	Between the hours of 12:30am and 9:00am	– 8 hours pay for 8 hours work plus 15% for all hours worked.

\* The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

When workers are required to work under compressed air or to work from trusses, scaffolds, swinging scaffolds, bosun's chair or on building frames, stacks or towers at a distance, the following should be added to base rate.

50 – 90 feet to the ground:	Add 1 ½ x the base rate
90+ feet to the ground:	Add 2 x the base rate

When such work is performed outside of the regularly scheduled working hours, workmen shall be paid three (3) times the regular rate of pay. An assignment of work referred to in this Section shall entitle the workman to the premium rate for a period of at least two (2) hours.

**ELEVATOR CONSTRUCTOR, INSTALLER AND MECHANIC****Area 1**

Mechanic	67.61	43.84
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**Reference Counties**

Baker	Union	Wallowa
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Umatilla – See Area 2 rate

**Area 2**

Mechanic	67.89	43.87
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**Reference Counties**

Benton	Deschutes	Jefferson	Malheur	Umatilla
Clackamas	Douglas	Josephine	Marion	Wasco
Clatsop	Gilliam	Klamath	Morrow	Washington
Columbia	Grant	Lake	Multnomah	Wheeler
Coos	Harney	Lane	Polk	Yamhill
Crook	Hood River	Lincoln	Sherman	
Curry	Jackson	Linn	Tillamook	

39.11	17.30
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**FENCE CONSTRUCTOR (NON-METAL)****FENCE ERECTOR (METAL)**

39.11	17.30
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**GLAZIER**

53.15	23.07
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Add \$1.00 to base rate when employee works from a swing stage, scaffold, suspended contrivance or mechanical apparatus from the third floor up or thirty feet of free fall (whichever is less), and employee is required to wear a safety belt.

Add twenty percent (20%) to base rate when employee works from a bosun chair (non-motorized single-man apparatus), regardless of height.

Certified welders shall receive twenty percent (20%) above the base rate for actual time spent performing welding duties.

**HAZARDOUS MATERIALS HANDLER**

30.03	16.18
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**HIGHWAY/PARKING STRIPER**

71.75	16.67
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**IRONWORKER**

Zone 1 (Base Rate): **46.82** **33.98**

Zone Differential for Ironworker – Add to Basic Hourly Rate

Zone 2: **6.88/hr.** or \$55.00 maximum per day

Zone 3: **10.00/hr.** or \$80.00 maximum per day

Zone 4: **12.50/hr.** or \$100.00 maximum per day

Zone 1: Projects located within 45 miles of city hall in the reference cities listed below.

Zone 2: More than 46 miles, but less than 60 miles.

Zone 3: More than 61 miles, but less than 100 miles.

Zone 4: More than 100 miles.

**Note:** Zone pay for Ironworkers shall be determined using the quickest route per Google Maps and computed from the city hall or dispatch center of the reference cities listed below **or** the residence of the employee, whichever is nearer to the project.

**Reference Cities and Dispatch Center**

Portland          Richland

**LABORER**

Zone A (Base Rate):

**Group 1 (Includes Flagger)** **39.11** **17.30**

**Group 2** **40.41** **17.30**

**Group 3** **40.91** **17.30**

**Group 4** **34.39** **17.30**

**Group 5 (Landscape Laborer)** **28.01** **17.30**

Zone Differential for Laborers Add to Zone A Base Rate

Zone B: **.85** per hour

Zone C: **1.25** per hour

Zone D: **2.00** per hour

Zone E: **4.00** per hour

Zone F: **5.00** per hour

Zone A: Projects located within 30 miles of city hall in the reference cities listed.

Zone B: More than 30 miles but less than 40 miles.

Zone C: More than 40 miles but less than 50 miles.

Zone D: More than 50 miles but less than 80 miles.

Zone E: More than 80 miles but less than 100 miles.

Zone F: More than 100 miles.

**Reference Cities for Laborer**

Albany	Burns	Hermiston	Roseburg
Astoria	Coos Bay	Klamath Falls	Salem
Baker City	Eugene	Medford	The Dalles
Bend	Grants Pass	Portland	

See more information on Zone Differential and Live Sewer Pay on page 15.

**LABORER** (Continued)

**Note:** All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time, best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

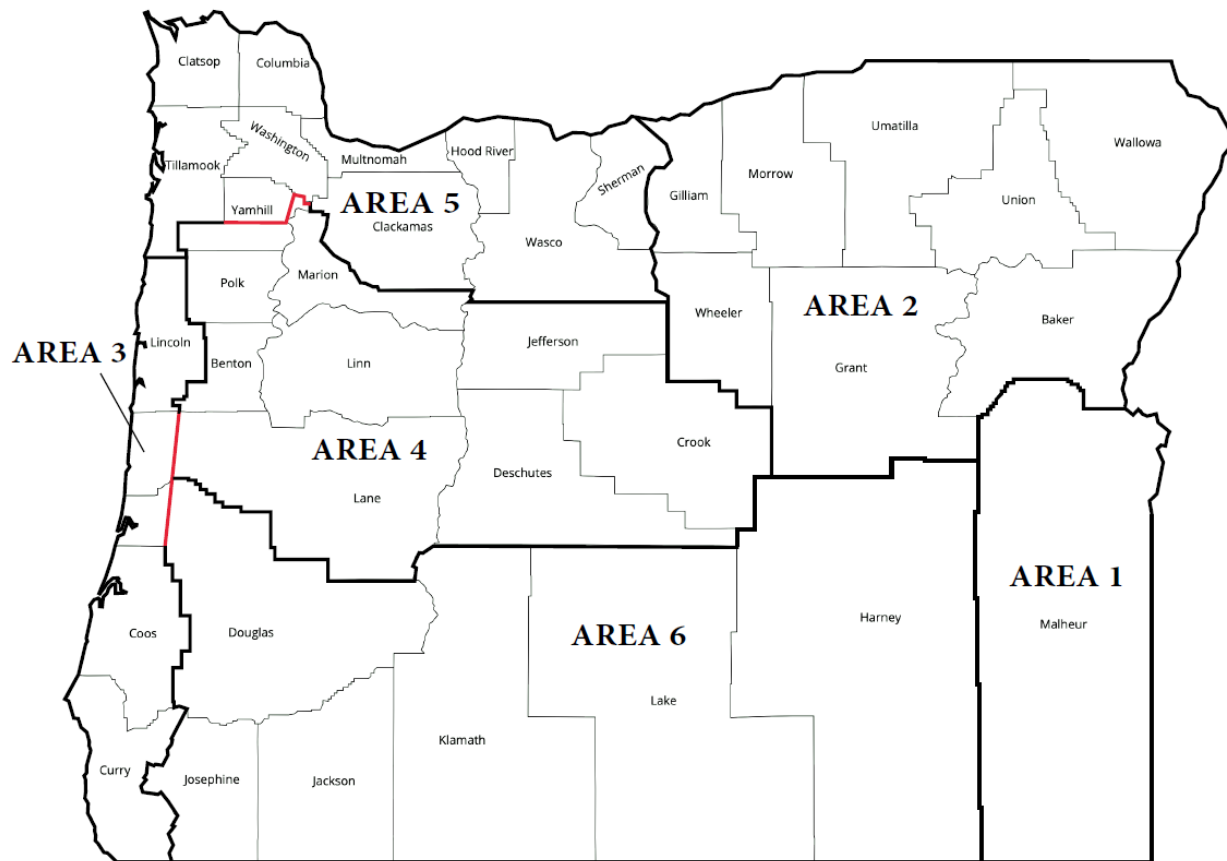
Any Laborer working in Live Sewers shall receive forty dollars (\$40) per day in addition to their regular pay.

**LANDSCAPE LABORER/TECHNICIAN** (Laborer Group 5)

See Laborer Group 5 Rate

**LIMITED ENERGY ELECTRICIAN**

Electrician/Limited Energy Electrician Area Map



**Note:** If you are unable to determine the area of a project located on or near the cross-county boundaries marked in red on the map, call or email the BOLI Prevailing Wage Rate Coordinator at (971) 245-3844 or [PWR.email@boli.oregon.gov](mailto:PWR.email@boli.oregon.gov).

**Area 1**

37.90

15.65

**Reference County**

Malheur

**LIMITED ENERGY ELECTRICIAN** (continued)**Area 2****37.97****18.44**Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

**Area 3****41.93****24.17**Reference Counties

Coos	Douglas (a)	Lincoln
Curry	Lane (a)	

(a) Those portions of Lane and Douglas counties lying **west** of the red line on the Electrician Area Map posted above

**Area 4****42.98****19.40**Reference Counties

Benton	Jefferson	Marion
Crook	Lane (b)	Polk
Deschutes	Linn	Yamhill (c)

(b) Those portions of Lane and Douglas counties lying **east** of the red line on the Electrician Area Map posted above.

(c) The portion of Yamhill county lying **south** of the red line on the Electrician Area Map posted above.

**Area 5****52.12****26.76**Reference Counties

Clackamas	Hood River	Tillamook	Yamhill (d)
Clatsop	Multnomah	Wasco	
Columbia	Sherman	Washington	

(d) The portion of Yamhill county lying **north** of the red line on the Electrician Area Map posted above.

**Area 6****35.49****17.99**Reference Counties

Douglas (e)	Jackson	Klamath
Harney	Josephine	Lake

(e) The portion of Douglas county lying **east** of the red line on the Electrician Area Map posted above.

**LINE CONSTRUCTOR****Area 1 (All Regions)**

Group 1	71.87	26.13
Group 2	64.17	25.79
Group 3	41.12	17.94
Group 4	55.19	22.18
Group 5	48.13	18.97
Group 6	38.50	18.53
Group 7	22.84	14.16

**Reference Counties**

All counties

*Pursuant to ORS 279C.815(2)(b), the Line Constructor Area 1 rate is the highest rate of wage among the collective bargaining agreements for Line Constructor Area 1 and Area 2.*

**MARBLE SETTER**

**48.63                      25.55**

This trade is tendered by "Tile, Terrazzo, & Marble Finishers." Add \$1.00 per hour to base rate for refractory repair work.

**PAINTER & DRYWALL TAPER**

COMMERCIAL PAINTING	35.62	15.94
INDUSTRIAL PAINTING	37.69	15.94
BRIDGE PAINTING	44.20	15.94

**Shift Differential for Painter**

Add \$2.00/hour to base rate for entire shift if any hours are worked outside of 5:00 a.m. to 5:00 p.m.

**DRYWALL TAPER**

<b><u>Zone A (Base Rate)</u></b>	<b>45.52</b>	<b>21.03</b>
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**Zone Differential for Drywall Taper – Add to Zone A Base Rate**

Zone B: **6.00** per hour  
 Zone C: **9.00** per hour  
 Zone D: **12.00** per hour

Zone A: Projects located less than 61 miles from the respective city hall of the dispatch cities listed.  
 Zone B: Projects located 61 miles to 80 miles.  
 Zone C: Projects located 81 miles to 100 miles.  
 Zone D: Projects located 101 miles or more.

See more information on Dispatch Cities for Zone Differential on page 18.



**PAINTER & DRYWALL TAPER** (continued)Dispatch Cities for Drywall Taper

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

**Note:** Zone pay is based on AAA Road Mileage.

**PLASTERER AND STUCCO MASON**

This trade is tended by "Tenders to Plasterers."

Zone A (Base Rate) **44.61** **19.63**

Zone Differential for Plasterer and Stucco Mason – Add to Zone A Base Rate

Zone B: **6.00** per hour  
 Zone C: **9.00** per hour  
 Zone D: **12.00** per hour

Zone A: Projects located less than 61 miles from the respective city hall of the reference cities listed below.  
 Zone B: Projects located 61 miles to 80 miles.  
 Zone C: Projects located 81 miles to 100 miles.  
 Zone D: Projects located 101 miles or more.

Reference Cities for Plasterer & Stucco Mason

Bend	Eugene	Medford	Portland	Seaside
Coos Bay	La Grande	Newport	Salem	The Dalles

Add \$1.00 to base rate for swinging scaffold work.

Add \$2.00 to base rate for nozzle technicians on plastering machines.

**PLUMBER/PIPEFITTER/STEAMFITTER**

Area 1 **39.90** **18.67**

Reference Counties

Harney Malheur

Baker – **See Area 2 rates**

Zone Differential for Area 1 – Add to Base Rate

Zone 1: **2.50** per hour  
 Zone 2: **3.50** per hour  
 Zone 3: **5.00** per hour

**Zone mileage based on road miles:**

Zone 1: Forty (40) to fifty-five (55) miles from City Hall in Boise, Idaho.  
 Zone 2: Fifty-five (55) to one hundred (100) miles from City Hall in Boise, Idaho.  
 Zone 3: Over one hundred (100) miles from City Hall in Boise, Idaho.

Add \$2.21 to base rate if it is possible for worker to fall 30 ft. or more, or if required to wear a fresh-air mask or similar equipment for 2 hours or more.



**POWER EQUIPMENT OPERATOR** (continued)Zone 1 (Base Rate)

Group 1	58.94	17.15
Group 1A	61.10	17.15
Group 1B	63.26	17.15
Group 2	57.03	17.15
Group 3	55.88	17.15
Group 4	52.55	17.15
Group 5	51.31	17.15
Group 6	48.09	17.15

Zone Pay Differential for Power Equipment Operator – Add to Zone 1 Base Rate

Zone 2: 3.00 per hour

Zone 3: 6.00 per hour

**For projects in the following metropolitan counties:**

Clackamas Marion Washington  
Columbia Multnomah Yamhill

- (A) All jobs or projects located in Multnomah, Clackamas and Marion counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Hwy 26 and West of Mile Post 30 on Hwy 22 and all jobs located in Yamhill County, Washington County and Columbia County shall receive Zone 1 pay for all classifications.
- (B) All jobs or projects located in the area outside the *identified boundary* above, but less than 50 miles from Portland City Hall shall receive Zone 2 pay for all classifications.
- (C) All jobs or projects located more than 50 miles from Portland City Hall, but outside the identified border above, shall receive Zone 3 pay for all classifications.

**Reference cities for projects in all remaining counties:**

Albany Coos Bay Grants Pass Medford  
Bend Eugene Klamath Falls Roseburg

- (A) All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone 1 pay for all classifications.
- (B) All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 2 for all classifications.
- (C) All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 3 pay for all classifications.

**Note:** All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

See more information on Hazard Pay and Shift Differential calculation on Page 21.

**POWER EQUIPMENT OPERATOR** (continued)

Add \$10.00/hour hyperbaric pay for Group 4 Tunnel Boring Machine Mechanic.

Add \$0.40 to the base rate for any and all work performed underground, including operating, servicing and repairing of equipment.

Add \$0.50 to the base rate per hour for any employee who works suspended by a rope or cable.

Add \$0.50 to the base rate for employees who do "pioneer" work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation.

**Note:** A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Waste Site. For information on this differential, call the Prevailing Wage Rate Coordinator at (971) 245-3844.

**Shift Differential****Two-Shift Operations:**

On a two-shift operation, when the second shift starts after 4:30 p.m., second-shift workers shall be paid the base hourly wage rate plus 5% for all hours worked.

When the second shift starts at 8:00 p.m. or later, the second-shift workers shall be paid at the base hourly wage rate plus 10% for all hours worked.

**Three-Shift Operations:**

On a three-shift operation, the base hourly wage rate plus five percent (5%) shall be paid to all second-shift workers for all hours worked, and the base hourly wage rate plus ten percent (10%) shall be paid to all third shift workers for all hours worked.

**ROOFER****Area 1****42.27****21.94****Reference Counties**

Baker	Deschutes	Morrow	Union
Clackamas	Gilliam	Multnomah	Wasco
Clatsop	Grant	Sherman	Wallowa
Columbia	Hood River	Tillamook	Washington
Crook	Jefferson	Umatilla	Wheeler

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

**ROOFER** (Continued)**Area 2****39.36****18.76**Reference Counties

Benton	Harney	Lake	Malheur
Coos	Jackson	Lane	Marion
Curry	Josephine	Lincoln	Polk
Douglas	Klamath	Linn	Yamhill

Crook – **See Area 1 rates**Deschutes – **See Area 1 rates**

Application, spudding and cutting or removal of coal tar products 10% over basic wage scale.

Application, spudding and cutting fiberglass insulation add a 10% over the basic wage scale.

**Area 4****42.27****21.94**Reference County

Umatilla	Union	Wallowa
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Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

*Pursuant to ORS 279C.815(2)(b), the Roofer Area 1 rate is the highest rate of wage among the collective bargaining agreements for Roofer Areas 1, 4 and 5.***Area 5****42.27****21.94**Reference County

Morrow

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials. Add 10% to the base rate for handling fiberglass insulation.

*Pursuant to ORS 279C.815(2)(b), the Roofer Area 1 rate is the highest rate of wage among the collective bargaining agreements for Roofer Areas 1, 4 and 5.***SHEET METAL WORKER****Area 1****53.60****29.66**Reference Counties

Benton	Deschutes	Lincoln	Polk	Washington
Clackamas	Gilliam	Linn	Sherman	Wheeler
Clatsop	Grant	Marion	Tillamook	Yamhill
Columbia	Hood River	Morrow	Umatilla	
Crook	Jefferson	Multnomah	Wasco	

See more information on Shift Differential calculation on Page 23.

**SHEET METAL WORKER** (Continued)**Swing Shift Operations:**

When a second (or "swing") shift starts between 2:00pm -7:00pm, second-shift workers shall be paid the base hourly wage rate plus \$7.85 for all hours worked.

**Graveyard Shift Operations:**

When the second (or "graveyard") shift starts between 7:00pm – 1:00am, second-shift workers shall be paid the base hourly wage rate plus \$12.04 for all hours worked.

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

**Area 2**Reference Counties

Baker – **See Area 3 rate**      Malheur – **See Area 4 rate**

**Area 3****47.76****27.70**Reference Counties

Baker                  Union                  Wallowa

Morrow – **See Area 1 rate**      Umatilla – **See Area 1 rate**

Add \$.45 to base rate for work performed on any swinging stage, swinging scaffold or boson chair in excess of thirty (30) feet above the ground.

Add \$1.00 to base rate for work where it is necessary to wear a chemically activated type face mask.

**Area 4****43.08****27.62**Reference Counties

Douglas          Jackson          Klamath          Lane  
Harney          Josephine      Lake          Malheur

Coos – **See Area 5 rate**      Curry – **See Area 5 rate**

**Swing Shift Operations:**

When a second (or "swing") shift starts between 2:00pm -7:00pm, second-shift workers shall be paid the base hourly wage rate plus \$6.45 for all hours worked.

**Graveyard Shift Operations:**

When the second (or "graveyard") shift starts between 7:00pm – 1:00am, second-shift workers shall be paid the base hourly wage rate plus \$9.90 for all hours worked.

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

**SHEET METAL WORKER** (Continued)**Area 5****43.44****28.66**Reference Counties

Coos                  Curry

**Swing Shift Operations:**

When a second (or “swing”) shift starts between 2:00pm -7:00pm, second-shift workers shall be paid the base hourly wage rate plus \$6.51 for all hours worked.

**Graveyard Shift Operations:**

When the second (or “graveyard”) shift starts between 7:00pm – 1:00am, second-shift workers shall be paid the base hourly wage rate plus \$9.98 for all hours worked.

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder. Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

**SOFT FLOOR LAYER****42.03****18.83****SPRINKLER FITTER****Area 1****48.32****26.98**Reference Counties

Benton	Deschutes	Jefferson	Malheur	Umatilla
Clackamas	Douglas	Josephine	Marion	Wasco
Clatsop	Gilliam	Klamath	Morrow	Washington
Columbia	Grant	Lake	Multnomah	Wheeler
Coos	Harney	Lane	Polk	Yamhill
Crook	Hood River	Lincoln	Sherman	
Curry	Jackson	Linn	Tillamook	

**Area 2****41.48****26.97**Reference Counties

Baker                  Union                  Wallowa

Gilliam – <b>See Area 1 rate</b>	Malheur – <b>See Area 1 rate</b>	Umatilla – <b>See Area 1 rate</b>
Grant – <b>See Area 1 rate</b>	Morrow – <b>See Area 1 rate</b>	

**TENDER TO MASON TRADES** (Brick and Stonemason, Mortar Mixer, Hod Carrier)**43.79****17.05**

Add \$0.50 to base rate for refractory repair work.

**TENDER TO PLASTERER AND STUCCO MASON**Zone A (Base Rate)**42.62****17.30**Zone Differential for Tender to Plasterer and Stucco Mason – Add to Zone A Base RateZone B: **6.00** per hourZone C: **9.00** per hourZone D: **12.00** per hour

Zone A: Projects located within 60 miles of city hall in the reference cities listed.

Zone B: More than 61 miles but less than 80 miles.

Zone C: More than 81 miles but less than 100 miles.

Zone D: More than 101 miles

Reference Cities

Bend	Eugene	Medford	Portland	Seaside
Coos Bay	La Grande	Newport	Salem	The Dalles

Add \$0.50 to base rate for refractory repair work.

**TESTING AND BALANCING (TAB) TECHNICIAN**For work performed under the [Sheet Metal](#) classification, including Air-Handling Equipment, DuctworkSee [SHEET METAL WORKER RATE](#)For work performed under the [Plumber/Pipefitter/Steamfitter](#) classification, including Water Distribution SystemsSee [PLUMBER/PIPEFITTER/STEAMFITTER RATE](#)**TILE SETTER/TERRAZZO WORKER: Hard Tile Setter****41.31****22.14**

This trade is tended by "Tile, Terrazzo, &amp; Marble Finisher." Add \$2.00 when performing terrazzo work.

Add \$1.00 when working with epoxy, furnane, or alkor acetylene.

**TILE, TERRAZZO, AND MARBLE FINISHER**

1. TILE, TERRAZZO FINISHER

**30.75****16.57**

Add \$2.00 when performing terrazzo work.

Add \$1.00 when working with epoxy, furnane, or alkor acetylene.

2. BRICK &amp; MARBLE FINISHER

**30.75****16.70**

Add \$1.00 per hour to base rate for refractory repair work.



**TRUCK DRIVER****Zone A (Base Rate)**

Group 1	33.09	17.58
Group 2	33.24	17.58
Group 3	33.40	17.58
Group 4	33.72	17.58
Group 5	33.97	17.58
Group 6	34.18	17.58
Group 7	34.42	17.58

**Zone Differential for Truck Drivers – Add to Zone A Base Rate**

Zone B: **.65** per hour  
 Zone C: **1.15** per hour  
 Zone D: **1.70** per hour  
 Zone E: **2.75** per hour

Zone A: Projects within 30 miles of the cities listed.  
 Zone B: More than 30 miles but less than 40 miles.  
 Zone C: More than 40 miles but less than 50 miles.  
 Zone D: More than 50 miles but less than 80 miles.  
 Zone E: More than 80 miles.

**Reference Cities**

Albany	Burns	Hermiston	Madras	Pendleton	The Dalles
Astoria	Coos Bay	Hood River	Medford	Portland	Tillamook
Baker	Corvallis	Klamath Falls	McMinnville	Port Orford	Vancouver
Bend	Eugene	La Grande	Newport	Reedsport	
Bingen	Goldendale	Lakeview	Ontario	Roseburg	
Brookings	Grants Pass	Longview	Oregon City	Salem	

**Note:** All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

## **Prevailing Wage Rate Laws Handbook**

The 2024 edition of the ***Prevailing Wage Rate Laws Handbook*** is now available on our website at <https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx>.

In addition to providing this and other PWR publications, Oregon BOLI Labor & Industries' PWR Unit regularly offers free, informational seminars for both public agencies and contractors. The current schedule is available online at <https://www.oregon.gov/boli/employers/Pages/prevailing-wage-seminars.aspx>.

If you are interested in being included on our mailing lists for future seminar notifications, please contact us at [PWR.Email@boli.oregon.gov](mailto:PWR.Email@boli.oregon.gov) or (971) 245-3844.

## **SECTION VII**

### **DRAWINGS**