

**OREGON UNIVERSITY SYSTEM
OREGON INSTITUTE OF TECHNOLOGY**

**NOTICE OF PUBLIC IMPROVEMENT CONTRACT OPPORTUNITY
BID #2012-01
GEOTHERMAL EFFLUENT PIPELINE**

The Oregon University System (OUS) is accepting sealed bids for a public improvement project at 3201 Campus Drive, Klamath Falls, OR 97601, Snell Hall Room 216 until 1:00 PM, Pacific Time, June 28, 2012 for the Geothermal Effluent Pipeline project located on the campus of the Oregon Institute of Technology, in Klamath Falls, Oregon. The project includes is generally described as the construction of an underground geothermal utility corridor beginning at the effluent of the Large Geothermal Power Plant Building and extending in a northeasterly direction to the injection well.

A **voluntary pre-bid examination of the site and conditions** will be conducted on June 15, 2012 at 1:00 pm, Pacific Time. Bidders should RSVP with Leticia Hill at 541-885-1133 for the walkthrough. Attendance will be documented through a sign-in sheet prepared by the OUS representative.

All questions in regard to this project shall be address to: Purchasing and Contract Services, 3201 Campus Drive, Klamath Falls, OR 97601; or by email to purchasing@oit.edu, or phone (503) 821-1277.

Bids will be opened and publicly read aloud on June 28, 2012 at 2:00 PM, Pacific Time, in the Sunset Conference Room of the College Union located at 3201 Campus Drive, Klamath Falls, OR 97601 by the OUS representative or designee.

Bids will be received on a lump-sum basis for all of the work. Bid packets may be obtained on the OUS Procurement Gateway website.

All bidders must comply with requirements of the prevailing wage law in ORS 279C.800 through ORS 279C.870. All bidders must be registered with the Construction Contractor's Board at the time of bid submission. No bid will be considered unless fully completed in the manner provided in the "Instructions to Bidders" upon the Bid Form provided and accompanied by Bid Security. OUS encourages bids from Minority, Women, and Emerging Small Businesses.

OREGON STATE BOARD OF HIGHER EDUCATION

By:  Date: 6/1/12
George Marlton

OREGON UNIVERSITY SYSTEM
STANDARD PUBLIC IMPROVEMENT CONTRACT
INSTRUCTIONS TO BIDDERS

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INSTRUCTIONS TO BIDDERS

Oregon Administrative Rules Chapter 580, Divisions 61 and 63 govern this OUS procurement process.

Article 1. Scope of Work

The work contemplated under this contract with the Oregon State Board of Higher Education, hereinafter referred to as the Owner, includes all labor, materials, transportation, equipment and services necessary for, and

reasonably incidental to, the completion of all construction work in connection with the project described in the Project Manual which includes, but is not necessarily limited to, the Advertisement for Bids, Instructions to Bidders, Supplemental Instructions to Bidders, Bid Form, Bid Bond, Public Improvement Agreement Form, Performance Bond, Payment Bond, OUS General Conditions, Supplemental General Conditions, Plans and Specifications.

Article 2. Examination of Site and Conditions

Before making a bid, the bidder shall examine the site of the work and ascertain all the physical conditions in relation thereto. The bidder shall also make a careful examination of the Project Manual including the plans, specifications, and other contract documents, and shall be fully informed as to the quality and quantity of materials and the sources of supply of the materials. Failure to take these precautions will not release the successful bidder from entering into the contract nor excuse the bidder from performing the work in strict accordance with the terms of the contract.

The Owner will not be responsible for any loss or for any unanticipated costs which may be suffered by the successful bidder as a result of such bidder's failure to be fully informed in advance with regard to all conditions pertaining to the work and the character of the work required. No statement made by an officer, agent, or employee of the Owner in relation to the physical conditions pertaining to the site of the work will be binding on the Owner, unless covered by the Project Manual or an Addendum.

Article 3. Interpretation of Project Manual and Approval of Materials Equal to Those Provided in the Specifications

If any bidder contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the plans, specifications or forms of contract documents, or detects discrepancies or omissions, such bidder may submit to the Architect (read "Engineer" throughout as appropriate) a written request for an interpretation thereof at least 10 calendar days prior to the date set for the bid closing.

When a prospective bidder seeks approval of a particular manufacturer's material, process or item of equal value, utility or merit other than that designated by the Architect in the Project Manual, the bidder may submit to the Architect a written request for approval of such substitute at least 10 calendar days prior to the date set for the bid closing. The prospective bidder submitting the request will be responsible for its prompt delivery.

Requests of approval for a substitution from that specified shall be accompanied by samples, records of performance,

certified copies of tests by impartial and recognized laboratories, and such other information as the Architect may request.

To establish a basis of quality, certain processes, types of machinery and equipment or kinds of materials may be specified in the Project Manual either by description of process or by designating a manufacturer by name and referring to a brand or product designation or by specifying a kind of material. Whenever a process is designated or a manufacturer's name, brand or item designation is given, or whenever a process or material covered by patent is designated or described, it shall be understood that the words "or approved equal" follow such name, designation or description, whether in fact they do so or not.

Any interpretation of the Project Manual or approval of manufacturer's material will be made only by an Addendum duly issued. Addendum will be posted to the OUS Procurement Gateway. The Owner will not be responsible for any other explanation or interpretation of the Project Manual nor for any other approval of a particular manufacturer's process or item.

When the Architect approves a substitution by Addendum, it is with the understanding that the Contractor guarantees the substituted article or material to be equal or better than the one specified.

Article 4. Performance and Payment Bond

The successful bidder will be required to provide a 100 percent performance bond and 100 performance payment bond. Should the successful bidder fail to execute and deliver the contract as provided for in Article 12, including a satisfactory performance bond and payment bond within 15 calendar days after the bid has been accepted by the Owner, then the contract award made to such bidder may be considered canceled. The date of the acceptance of the bid and the award of the contract as contemplated by the Project Manual shall mean the date of acceptance specified in the Notice of Award.

Article 5. Protests

Protests of the Bid Specifications. Protests must be in accordance with OAR 580-061-0145. Protests of Specifications must be received in writing on or before 5:00 p.m (Pacific Time), June 15, 2012 at the Purchasing

and Contract Services address identified in the Notice of Public Improvement Contract Opportunity. Protests may not be faxed. Protests of the Bid specifications must include the reason for the protest and any proposed changes to the requirements.

Protest of Contractor Selection, Contract Award.

Any Bidder who feels adversely affected or aggrieved may submit a protest within five (5) calendar days after the Owner issues a notice of intent to award a Contract. The protest must be clearly identified as a protest, identify the type and nature of the protest, and include the Invitation to Bid number and title. The rules governing protests are contained in OAR 580-061-0145.

Article 6. Execution of the Bid Form

Each bid shall be made in accordance with the sample Bid Form accompanying these instructions; the appropriate signatures for a sole individual, partnership, corporation or limited liability corporation; numbers pertaining to base bids shall be stated both in writing and in figures; the bidder's address shall be typed or printed.

The Bid Form relates to bids on a specific Project Manual. Only the amounts and information asked for on the Bid Form furnished will be considered as the bid. Each bidder shall bid upon the work exactly as specified and provided in the Bid Form. The bidder shall include in the bid a sum to cover the cost of all items contemplated by the Contract. The bidder shall bid upon all alternates that may be indicated on the Bid Form. When bidding on an alternate for which there is no charge, the bidder shall write the words "No Charge" in the space provided on the Bid Form. If one or more alternates is shown on the Bid Form, the bidder shall indicate whether each is "add" or "deduct."

The Bid Form included in the Project Manual is a sample. One additional copy of the Bid Form may be furnished with the Project Manual. One additional copy of the Bid Bond form may also be provided with the Project Manual. Only one copy needs to be submitted with the bid.

Article 7. Prohibition of Alterations to Bid

Bids which are incomplete, or contain ambiguities or conditions not provided for in the Bid Form, may be rejected.

Article 8. Submission of Bid

Each bid shall be sealed in an envelope, properly addressed to the appropriate project Owner within the Oregon University System, showing on the outside of the envelope the name of the bidder and the name of the project. Bids will be received at the time and place stated in the Advertisement for Bids.

Article 9. Bid Closing and Opening of Bids

All bids must be received by the Owner at the place and time set for the bid closing. Any bids received after the scheduled closing time for receipt of bids will be rejected and returned to the bidder unopened.

At the time of opening and reading of bids, each bid received will be publicly opened and read aloud, irrespective of any irregularities or informalities in such bids.

Article 10. Acceptance or Rejection of Bids by Owner

Unless all bids are rejected, the Owner will award a contract based on the lowest responsive bid from a responsible bidder. If that bidder does not execute the contract, it will be awarded to the next lowest responsible bidder or bidders in succession.

The Owner reserves the right to reject all bids and to waive minor informalities. The procedures for contract awards shall be in compliance with the provisions of Oregon Administrative Rules adopted by the Owner.

Bids shall be binding for 60 calendar days following the bid closing.

In determining the lowest bidder, the Owner reserves the right to take into consideration any or all authorized base bids as well as alternates or combinations indicated in the Bid Form.

Article 11. Withdrawal of Bid

At any time prior to the time and place set for the bid closing, a bidder may withdraw the bid. This will not preclude the submission of another bid by such bidder prior to the time set for the bid closing.

After the time set for the bid closing, no bidder will be permitted to withdraw its bid within the time frames specified in Article 10 for award and execution, except as provided for in that Article.

Article 12. Execution of Contract, Agreement, Performance Bond and Payment Bond

The Owner will provide the successful bidder with contract forms within 5 calendar days after the award of the Contract. The bidder is required to execute the contract forms as provided, including a performance bond and a payment bond from a surety company licensed to do surety business in the State of Oregon, within 15 calendar days after the award of the contract. The contract forms shall be delivered to the Owner in the number called for and to the location as noted in the Notice of Award.

Article 13. Recyclable Products

Contractors will use recyclable products to the maximum extent economically feasible in the performance of the Contract.

OREGON UNIVERSITY SYSTEM
STANDARD PUBLIC IMPROVEMENT CONTRACT
SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

BID #2012-01
Project Name: Geothermal Effluent Pipeline

The following modify the Oregon University System “Instructions to Bidders” for this procurement. Where a portion of the Instructions to Bidders has been modified by these Supplemental Instructions to Bidders, the unaltered portions shall remain in effect.

1. **Submission of Bids by email:** Complete Bids (including all attachments) may be emailed and must be electronically received by the closing time and date **1:00 p.m. Pacific Time, June 28, 2012.** **The Bid must be emailed to: purchasing@oit.edu.** Email subject line must be “**Bid for BID #2012-01 – Geothermal Effluent Pipeline.**” Bidders should telephone and confirm electronic receipt of the complete emailed document(s) before the above time and date deadline. Bids delayed or lost by email system filtering or failures may be considered at OUS’ sole discretion.

In addition to electronic submission, the original copy of the Bid must be postmarked no later than June 28, 2012. The envelope/package containing the Proposal must be clearly marked “**Bid #2012 – Geothermal Effluent Pipeline.**”

2. The Oregon Institute of Technology has implemented a policy to increase participation by Historically Underrepresented Businesses. Historically Underrepresented Businesses are Oregon certified and self-identified minority, women and emerging small business as well as firms that are certified federally or by another state or entity with substantially the similar requirements of the State of Oregon.

Bidders must perform Good Faith Effort and submit **Form 1 and Form 2** for the Bidders Bid to be considered responsive. Good Faith Effort is a requirement of a prime contractor to reach out to at least three Historically Underrepresented Business Subcontractors for each Division of Work that will be subcontracted out. The outreach should be performed with sufficient time to give the subcontractors at least 5 calendar days to respond to the opportunity. Compliance with the Good Faith Effort and submission of Forms 1, 2 and 3 is a contractual requirement for final payment.

**OREGON INSTITUTE OF TECHNOLOGY
GOOD FAITH EFFORT
SUBCONTRACTOR AND SELF-PERFORM WORK LIST
(FORM 1)**

Prime Contractor Name:
Project Name: Geothermal Effluent Pipeline

Total Contract Amount:

PRIME SELF-PERFORMING: Identify below **ALL** GFE Divisions of Work (DOW) to be self-performed. Good Faith Efforts are otherwise required.

<u>GFE DOW BIDDER WILL SELF-PERFORM (GFE not required)</u>	

PRIME CONTRACTOR SHALL DISCLOSE AND LIST ALL SUBCONTRACTORS, including those M/W/ESBs that you intend to use on the project. .

<u>LIST ALL SUBCONTRACTORS BELOW</u> Use <u>correct legal name</u> of Subcontractor	Division of Work (Painting, electrical, landscaping, etc.) List ALL DOW performed by Subcontractors	DOLLAR AMOUNT OF SUBCONTRACT	If Certified or self – reported MBE/WBE/ESB Subcontractor Check box <input checked="" type="checkbox"/>		
			MBE	WBE	ESB
Name Address City/St/Zip Phone# Fax# OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax# OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GFE SUBCONTRACTOR AND SELF-PERFORM WORK LIST (FORM 1) cont'd

Prime Contractor Name:
Project Name: Geothermal Effluent Pipeline

Total Contract Amount:

LIST ALL SUBCONTRACTORS BELOW Use <u>correct legal name</u> of Subcontractor	Division of Work (Painting, electrical, landscaping, etc.) List ALL DOW performed by Subcontractors	DOLLAR AMOUNT OF SUBCONTRACT	If Certified or self- reported MBE/WBE/ESB Subcontractor Check box <input checked="" type="checkbox"/>		
			MBE	WBE	ESB
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**OREGON INSTITUTE OF TECHNOLOGY
GOOD FAITH EFFORT
M/W/ESB CONTACT / BIDS RECEIVED LOG
(FORM 2)**

Prime Contractor:
Project: Geothermal Effluent Pipeline

Prime Contractor must contact at least 3 M/W/ESB Subcontractors for each Division of Work at least 5 calendar days before a response is due to the Prime Contractor. Prime Contractor shall record its contacts with MBE/WBE/ESB Subcontractors through use of this log (or equivalent) entering all required information. All columns shall be completed where applicable. Additional forms may be copied if needed.

NAME OF M/W/ESB SUBCONTRACTOR	Divisions of Work (Painting, electrical, landscaping, etc.)	Date Solicitation Letter / Fax Sent	PHONE CONTACT		BID ACTIVITY Check Yes or No			REJECTED BIDS (if bid received & not used)		Notes
			Date of Call	Person Receiving Call	Will Bid	Bid Received	Bid Used	Bid Amount	Reason Not Used (Price, Scope or Other. If Other, explain in Notes>>)	
					<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			
					<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			
					<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			
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					<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			

**OREGON INSTITUTE OF TECHNOLOGY
GOOD FAITH EFFORT
PROJECT COMPLETION REPORT
(FORM 3)**

Prime Contractor Name:
Project Name: Geothermal Effluent Pipeline

Total Contract Amount:

Complete this form and submit with your request for final payment upon the project completion. Please list all subcontractors used for the project. Use additional sheets as necessary.

LIST ALL SUBCONTRACTORS BELOW Use <u>correct legal name</u> of Subcontractor	Division of Work (Painting, electrical, landscaping, etc.) List ALL DOW performed by Subcontractors	FINAL DOLLAR AMOUNT OF SUBCONTRACT	If Certified MBE/WBE/ESB Subcontractor Check box <input checked="" type="checkbox"/>		
			MBE	WBE	ESB
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name Address City/St/Zip Phone# Fax # OCCB#			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BY SIGNING BELOW, I HEREBY CERTIFY THAT THE ABOVE LISTED FIRMS HAVE BEEN UTILIZED BY OUR COMPANY IN THE AMOUNTS REPRESENTED ABOVE AND THAT THE INFORMATION CONTAINED HEREIN IS COMPLETE AND ACCURATE.

Authorized Signature of Contractor Representative

Date

BID #2012-01

GEOHERMAL EFFLUENT PIPELINE

Large Geothermal Power Plant Effluent Pipeline Corridor

Narrative:

Oregon Institute of Technology (OIT) is a leader in the field of Renewable Energy. The University's energy strategy maximizes the abundant natural resources available to the campus. A geothermal reservoir beneath the Klamath Basin supplies hot water for over 600 geothermal wells. OIT currently utilizes three geothermal wells for space heating and power generation purposes. In 2009, OIT drilled an additional geothermal well to expand its electrical power generation capabilities. The successful proposer to this Bid will construct the effluent pipeline that connects the power generator to the injection well system.

Work to Date

Work to date includes the drilling of geothermal supply well #7 in 2009. Well #7 produces 2,500 gpm at 194°F. The installation of a utility corridor between supply well #7 and the university's power generation facilities was constructed in 2010. Also completed is the drilling of an injection well for the power plant's effluent. The Power Plant building and the distribution systems connected to the power generators will be constructed under a separate contract.

Scope of Work:

Construct the underground geothermal utility corridor in accordance with the Technical Specifications. The project should be completed as soon as feasibly possible with a completion date no later than November 1, 2012.

The pipeline consists of a 12" ductile iron discharge pipe with 5" electrical and 2" data conduits for future use.

Cultural Monitoring

The Klamath Basin has a rich cultural heritage. The Klamath, Modoc and Yahooskin tribes have existed in this region for thousands of years. In order to protect potentially sensitive cultural heritage sites this project will utilize the services of cultural monitors. These monitors will be on-site whenever excavation and/or backfilling take place. Their purpose is to monitor excavated materials for culturally significant artifacts. The successful bidder will work with OIT's representatives and the cultural monitors throughout the duration of the project preserve any culturally significant material or human remains.

TECHNICAL SPECIFICATIONS

OIT 2011 GEOTHERMAL
UTILITY CORRIDOR

KLAMATH FALLS, OREGON



EXPIRES 12/31/12

Project No. 1090-27
May 2012



Engineers ▲ Planners ▲ Surveyors

2950 Shasta Way • Klamath Falls, OR 97603 • (541) 884-4666 • FAX (541) 884-5335

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Section 00210 - Mobilization

Description

00210.00 Scope - This work consists of operations and preparatory work necessary to become ready to perform the work or an item of work.

Construction

00210.40 Mobilization - Mobilization includes, but is not limited to, the following:

- Move personnel, equipment, supplies, and incidentals to the Project site.
- Establish offices, buildings, temporary power, water, temporary toilets, and other facilities necessary for work on the Project.
- Perform other work and operations or incur costs as necessary before beginning work on the Project.

Measurement

00210.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

00210.90 Payment - Payment for mobilization will be made at the Contract lump sum amount for the item "Mobilization".

The amounts paid for mobilization in the Contract progress payment will be based on the percent of the original Contract amount that is earned from other Contract items, not including advances on materials, and as follows:

1. 25% of the lump sum bid amount of Mobilization will be paid (minus retainage requirement) when 5% of the total contract amount has been earned.
2. 50% of the lump sum bid amount of Mobilization will be paid (minus retainage requirement) when 30% of the total contract amount has been earned.
3. 75% of the lump sum bid amount of Mobilization will be paid (minus retainage requirement) when 50% of the total contract amount has been earned.
4. 100% of the lump sum bid amount of Mobilization will be paid (minus retainage requirement) when 75% of the total contract amount has been earned.

This schedule of mobilization progress payments will not limit or preclude progress payments otherwise provided by the Contract.

When the Contract Schedule of Items does not indicate payment for mobilization, no separate or additional payment will be made for mobilization. Payment will be included in payment made for the appropriate items under which this work is required.

Section 00220 - Accommodations for Public

Description

00220.00 Scope - This work consists of maintaining facilities to accommodate the public and public traffic through and within the Project for the life of the Contract. Public traffic includes motor vehicles, bicycles, and pedestrians.

00220.01 Beginning of Contractor's Responsibility - The Contractor's responsibilities for accommodating the public and public traffic begin on the day any on-site work begins within the Project limits.

00220.02 Public Safety and Mobility - Provide for the safety and mobility of the public and:

- Work hours in residential areas shall be between the hours of 7 a.m. to 7 p.m., five (5) days a week, Monday through Friday. No construction operations shall be performed outside these hours or on Legal Holidays without the approval of the Engineer.
- Conduct work at all times so that there is the least possible interference with or hazard to the traveling public and the affected community.
- Locate stockpile materials and park construction equipment and vehicles that are not in active use a minimum of 30 feet from the traveled way. If this is not possible, protect the stockpile materials, equipment, and vehicles, with barrier or as directed.
- Provide and maintain safe temporary access to business and residence driveways, temporary intersections, and temporary connections with roads, streets, and bicycle and pedestrian facilities.
- Provide approved protection and delineation between each work area and public traffic.
- Allow emergency vehicles immediate passage at all times.
- When included in the Contract Schedule of Items, use portable changeable message signs to provide appropriate work zone information to the public.
- For all sidewalk or sidewalk ramp closures, install signs as shown on the standard drawings. Mount signs between the panels of the type II barricade or, if installed on a single-post TSS, locate the signs behind type II barricades. Close the sidewalk at a point where there is an alternate way to proceed or provide an alternate pedestrian route. Pave the alternate pedestrian route surface or provide an approved, non-slip 36 inch minimum wide surface meeting the requirements of the Americans with Disabilities Act (ADA). If appropriate, delineate this route and protect pedestrians by placing pedestrian work zone delineation fencing. Fencing is to remain in place, except as required for actual work, until the sidewalk is reopened to pedestrian traffic. Reopen the sidewalk during non-work hours or continue to provide an alternate route for pedestrians. Provide alternate pedestrian routes that match existing facilities and provide additional Traffic Control Measures to meet the accessibility requirements in Part VI of the MUTCD.
- Do not impede the flow of traffic or close any lanes of traffic except as listed in 00220.40(e).
- Do not stop or hold vehicles on the traveled way, at intersections, or other connecting roadways within the Project limits for more than 5 minutes.
- Do not block driveways for more than two hours unless otherwise authorized in writing.
- Do not close any lanes until the area is signed according to the plans and the requirements of this Section and Section 00225
- Do not perform work which would restrict or interrupt traffic movement on opposite sides of the traveled way at the same time.
- Do not use temporary steel plating within the roadway or shoulder having a pre-construction posted speed zone greater than 35 mph.

00220.03 Work Zone Notifications - Provide the following work zone notifications:

(a) Over-Dimensional Vehicle Restrictions - When a project restricts the width, length, height, or weight of vehicles through a work zone or detours trucks around a work zone, notify the Motor Carrier Transportation Division (MCTD) by using the web based electronic version of the "Highway Restriction Notice-Size and/or Weight" form (Form No. 734-2357) at least 28 calendar days before the restriction or detour takes effect.

(b) Closures - Submit to the Engineer, in writing, for approval, all proposed closure schedules, as follows:

- **Lanes** - A minimum of 7 calendar days before a lane closures begin.
- **Roads** - A minimum of 14 calendar days before closure. Also, notify in writing, all affected emergency services, school districts, and US Postal Service a minimum of 14 days before any closure.
- **Bicycle and Pedestrian Facilities** - A minimum of 14 calendar days before a bike lane, sidewalk, and multi-use path closure. After receiving written approval, provide 48 hour public notification before the closure.

Construction

00220.40 General Requirements - Provide the following for public traffic in all construction areas:

(a) Traffic Nuisance Abatement - If loose rock or dust exists on roadway surfaces and shoulders, the Engineer may direct one or more of the following at no additional cost to the Project:

- Use flaggers or pilot cars and flaggers.
- Apply a fine spray of water to the surface as directed.
- Sweep paved surfaces with power brooms.

(b) Detours and Stage Construction - Construct and remove, if required, detours, stage construction roadways, shoulders, and temporary bridges, including accessory features shown or ordered.

(c) Driveways - Provide reasonable access as follows:

- Replace and maintain business accesses, driveways, approaches, crossings, and intersections as directed.
- Use reasonably well-graded aggregate material.
- Before placing the permanent base, do one of the following:
 - Uniformly spread the temporary aggregate material over the subgrade.
 - Remove and place the temporary aggregate material in the shoulder slope area if it meets quality requirements.
 - Dispose of the temporary aggregate material in a manner satisfactory to the Engineer.

(d) Adjacent to Excavations - Where paved shoulders adjacent to excavations are less than 4 feet wide, protect the traffic as follows:

- At the end of each working day, backfill pavement edge excavations to the elevation of the existing pavement with permanent base material or with a temporary wedge of aggregate as shown on the standard drawings.

- Do not excavate along both edges of the pavement adjacent to traffic at the same time. Before excavating at the edge of the pavement on the opposite side of the roadway, complete the construction to existing pavement elevation on the side which was excavated first.
- Remove the temporary wedge of aggregate material, if used, before placing permanent base material, and place it in the shoulder slope area or spread it uniformly over the subgrade.

(e) Lane Restrictions - Do not close any traffic lanes during the periods listed below, unless approved by the Engineer:

(1) Weekdays:

- Between 7:00 a.m. and 8:00 a.m. and between 3:30 p.m. and 6:00 p.m. Monday through Thursday
- Between 7:00 a.m. and 8:00 a.m. Friday morning

(2) Weekends - Between 3:00 p.m. on Friday and midnight on Sunday.

(3) Holidays - Between noon on the day preceding a legal holiday or holiday weekend and midnight on a legal holiday or the last day of holiday weekend, except for Thanksgiving, when no lanes may be closed between noon on Wednesday and midnight on the following Sunday.

For the purposes of this Section, legal holidays are as follows:

- New Year's Day on January 1
- Memorial Day on the last Monday in May
- Independence Day on July 4
- Labor Day on the first Monday in September
- Thanksgiving Day on the fourth Thursday in November
- Christmas Day on December 25

When a holiday falls on Sunday, the following Monday shall be recognized as a legal holiday. When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

(4) Special Events - Between noon on the day preceding and midnight on the final day of the special event.

Maintenance

00220.60 Surface Maintenance Responsibilities - Provide adequately maintained accommodations at all times for public traffic through and within the Project according to this Section and Section 00225.

(a) During Construction - The responsibility for maintaining all surface during construction is as follows:

Contractor Responsibility - Do the following at Contractor's expense:

- Keep roads, streets, bikeways, sidewalks, multi-use paths, and shoulders being used by public traffic, free of debris, aggregate, dirt, mud, and other materials that impede traffic.
- Repair damage to surfaces caused by the Contractor's operations.
- Maintain all detour or stage construction surfacings not constructed as specified or directed.

(b) Right of Owner To Perform Work At Contractor Expense - If the Contractor fails to provide adequate accommodations for traffic and to maintain the traveled ways and connections as provided in the Contract, the Engineer may proceed immediately to provide adequate accommodations and maintenance. The cost of this work will be deducted from monies due, or that become due, to the Contractor.

Measurement

00220.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

00220.90 Payment - No separate or additional payment will be made for work performed under this Section.

In addition, no payment will be made for costs incurred by the Contractor because of:

- Inconvenience, additional length of travel to conform to established traffic patterns and planned access features; or
- Compliance with laws governing traffic regulations and load limitations.

Section 00225 - Work Zone Traffic Control

Description

00225.00 Scope - This work consists of providing temporary traffic control measures (TCM) and furnishing, installing, moving, operating, maintaining, inspecting, and removing traffic control devices (TCD) throughout the Project area according to the ODOT standard drawings, the traffic control plan (TCP) for the Project, these Specifications, or as directed.

00225.01 Abbreviations, Definitions, and Standards:

(a) Abbreviations:

ADT - Average Daily Traffic
TCD - Traffic Control Devices
TCM - Traffic Control Measures
TCP - Traffic Control Plan
TCS - Traffic Control Supervisor
TSS - Temporary Sign Support

(b) Definitions:

Traffic Control Devices (TCD) - Signs, signals, markings, and other devices placed on, over, or adjacent to a roadway used to regulate, warn, or guide public traffic by authority of a public body or official having jurisdiction.

Traffic Control Measures (TCM) - Elements of the TCP including, but not limited to, TCD, personnel, materials and equipment used to control public traffic through a work zone.

Traffic Control Plan (TCP) - A written and drawn plan for providing the safe and efficient movement of public traffic through or around a work zone while protecting workers, incident responders, and equipment.

Work Zone - An area within highway construction, maintenance, or utility work activities which extends from the first warning sign to the last TCD.

(c) Standards - When designing, applying, installing, maintaining, inspecting, and removing traffic control devices, use and follow the most current versions in effect of the following:

- Oregon Department of Transportation's "Sign Policy and Guidelines for the State Highway System"
- The Manual on Uniform Traffic Control Devices (MUTCD)
- FHWA "Standard Highway Sign" manual
- ODOT "Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less" when directed by the Engineer only for mobile pavement marking operations or surveying work

00225.02 General Requirements - Be responsible to provide and maintain all TCM. The Engineer may verbally or in writing require immediate changes to the TCM being used on the Project. Immediately make these changes, as directed. Submit all proposed TCM revisions to the Engineer for approval.

Do not start work on any stage of construction until the TCP has been reviewed and accepted and all TCM are in place and the TCP is operating satisfactorily. During construction, determine if additional

TCM are required to those in place and immediately notify the Engineer. Immediately make changes as approved or directed, but do not place or remove devices without prior approval.

Work may be suspended as specified in 00180.70 or the TCM may be performed by the Owner if the Contractor fails to correct an unsafe condition. Costs for work performed by the Owner will be deducted from monies due the Contractor.

Install a 48 inch "TRUCKS" sign with an 18 inch "500 FEET" rider, approximately 500 feet before each point of access of all noncommercial stockpile sites, work zone staging area, material sources, waste areas, and plant set-up areas to a public roadway.

Install a 54 inch "TRUCKS LEAVING HIGHWAY 1500 FT" sign approximately 1,500 feet in advance of each entrance point to the work area. Install a 54 inch "TRUCKS ENTERING HIGHWAY 1500 FT" sign approximately 1,500 feet in advance of each exit point from the work area.

Do not allow construction vehicles to accelerate or decelerate in a travel lane open to traffic on a freeway or multi-lane facility. Do not use a flagger to allow construction vehicles to access an open traffic lane on a freeway or a multi-lane facility.

When a through road intersects the work zone, place a 48 inch "ROAD WORK AHEAD" sign in advance of the intersection at sign spacing "A" from the "TCD Spacing Table" shown on the ODOT standard drawings. These signs do not require sign flag boards, unless otherwise directed.

When paving operations create an abrupt edge, protect traffic by installing signing according the "2-Lane, 2-Way Roadway Overlay Area" detail shown on the ODOT standard drawings.

When a cold planed pavement surface is used by traffic, install a 48 inch "BUMP" sign at the transverse paving edge. Install a 48 inch "GROOVED PAVEMENT" sign in advance of the bump sign at sign spacing "A" from the "TCD Spacing Table" shown on the ODOT standard drawings. Face both signs toward incoming traffic and install them before opening the cold planed surface area to active traffic.

During flagging operations, monitor the length of traffic queues and when extended traffic queues develop, protect traffic by providing advance flagger(s) and signing according to the "Extended Traffic Queues for Advance Flagging" detail shown on the ODOT standard drawings.

00225.03 Traffic Control Outside Project Site - Provide TCM outside the Project Site when required.

00225.04 Regulations and Codes - All electrical equipment, materials, and work shall conform to NEC requirements and all other laws that apply.

00225.05 Contractor Traffic Control Plan - Submit for approval, the Contractor TCP in writing five days before the pre-construction conference. If modifying or if not using the Owner TCP, submit the following:

- Proposed TCP showing all TCM and quantities of all TCD.
- Proposed order and duration of the TCM.
- Two copies of a sketch map of the Project showing all existing tourist-oriented directional (TOD) and business logo signs and a written narrative describing how these signs will be kept in service and protected throughout all the construction stages.
- A detailed temporary striping plan.

Further TCP revisions will be subject to a Contract change order before implementation.

Materials

00225.10 General - Evaluate the condition of TCD using the criteria shown in the most current version in effect of the American Traffic Safety Services Association (ATSSA) publication titled "Quality Guidelines for Work Zone Traffic Control Devices". Use new or acceptable TCD for all installations unless otherwise specified. Provide test results, quality compliance certificates, equipment lists, and drawings when specified. After TCD have been installed and accepted on the Project, inspect and maintain the condition of the devices.

All work zone TCD shall comply with the crashworthy requirements of the National Cooperative Highway Research Program (NCHRP) Report 350.

00225.11 Temporary Signage - Furnish new or acceptable temporary signs and accessories meeting the following requirements:

(a) Signs - Use materials and fabricate signs conforming to ODOT requirements and the following:

(1) Size and Shape - Use standard size and shape signs meeting the requirements of 00225.01(c) unless otherwise specified or ordered. Double-face signs will not be allowed except for the flagger "STOP/SLOW" paddle.

(2) Type - Use Type "O3", "O4" or "O5" signs, unless otherwise indicated in this Section or in the TCP. Fabricate these signs on one of the following materials:

- New sheet aluminum sign blanks.
- New extruded aluminum panels.
- Used sheet aluminum sign blanks that are without bends, tears, holes, or dents and that have been cleaned to bare metal.
- 3/4 inch high-density overlay plywood.
- 3/4 inch medium-density overlay plywood.

(3) Folding or Turning Signs - Temporary signs on posts may be the folding or turning type as long as they can be locked when not in use so the sign message is not visible to any traffic.

(4) Roll-up Signs - Use roll-up signs with fluorescent orange roll-up sign sheeting in accordance to ODOT standards.

(b) Sign Supports:

(1) Portable Sign Supports - Use portable sign supports conforming to the following:

- Free standing.
- Capable of supporting signs in vehicle-caused turbulence and in winds common to the area where they are used. If additional ballast is required to maintain the signs in an upright position, use sandbags to anchor the sign support legs. Place a sandbag filled with loose sand (approximately 25 pounds) across the bottom of each leg as needed.

(2) Temporary Sign Supports - Fabricate and use TSS as shown on the standard drawings and according to 02110.40, except posts may be untreated.

(3) Square Tube Sign Supports - Use square tube sign supports in accordance with ODOT requirements and as shown on the ODOT standard drawings.

(c) Sign Covers:

(1) Temporary Signs - Sign covers for temporary signs shall be:

- One-piece plywood.
- Other approved sign cover.
- Large enough to completely cover the sign.
- Easy to attach to and remove from the sign without damaging the sign face.
- Black, non-reflective and opaque.

(2) Permanent Signs - Sign covers for permanent signs shall conform to ODOT standards.

(d) Sign Flags - Sign flags shall be:

- Fluorescent red-orange.
- 16 inch square or larger.
- Made from an acceptable tightly woven fabric or plastic sheeting.

(e) Amber Flashers - Amber flashers shall:

- Be industry standard 8 inch traffic signal head with visors.
- Be visible the full width of the traveled way and shoulders 1,200 feet from the flashers.
- 110/120 volt or 12 volt, rechargeable, battery-operated.
- Provide a constant flash rate of one flash per second $\pm 10\%$.
- Provide an illuminated period of each flash of $30\% \pm 10\%$ of each flash cycle.

(f) Sign Flag Boards - Use sign flag boards as shown on the standard drawings.

00225.13 Temporary Traffic Delineation - Furnish temporary traffic delineation items and accessories meeting industry standard requirements:

00225.17 Flagger Station Lighting - Furnish flagger station lighting in accordance to ODOT standards and meeting the following requirements:

- Illuminates the flagger so that the flagger is visible, and is discernable as a flagger, from a distance of 1,000 feet.
- Illuminates the flagger from above at a height of 18 feet ± 3 feet.
- The light is shielded from approaching traffic.

Equipment

00225.20 General - Equipment will be accepted based on compliance with the Specifications and the Engineer.

00225.27 Flaggers - Provide flaggers with the following:

(a) Flagger Equipment - Equip flaggers as follows:

- Clothing to cover the complete body except head, neck, and arms below the point of the shoulders.

- An ANSI Class II orange, yellow, strong yellow green or fluorescent versions of these colors, retroreflective vest, shirt, or jacket. The vest, shirt, or jacket shall be designed to identify the wearer as a person and be visible through the full range of body motions.
- A fluorescent yellow-green, orange, yellow, or bright white hardhat or baseball-style cap. Wear hardhats when there is danger of falling or flying objects or electrical shock or burns.
- A minimum 18 inch x 18 inch "STOP/SLOW" paddle made of rigid substrate and fabricated using type "R1"/"O4" sheeting. A 24-inch x 24-inch STOP/SLOW paddle is recommended for higher speed situations or where more conspicuity is desired.
- Portable, self-contained two-way radio and repeaters, as required, with a range suitable for communications throughout the Project.

(b) Flagger Station Lighting - Use flagger station lighting conforming to the following:

- Provide flagger illumination sufficient to ensure the safety of the flagger, motorists, and workers during flagging operations.
- Provide shielding to prevent light beams from being directed toward traffic.

Labor

00225.30 General - Observe all laws concerning safety, health, and sanitation standards according to 00170.60. Provide flaggers, TCS, signal operators, and pilot car operators, to stop, direct, and maintain traffic control through the work zone.

00225.31 Qualifications - Use flaggers and TCS that meet the following requirements:

- Have a valid drivers license.
- Are at least 18 years old.
- Have the mental and physical ability to provide timely, clear, and positive guidance to the traveling public.
- Have a sense of responsibility for public and work crew safety.
- Have a professional appearance.
- Have a courteous but firm manner.
- Have completed an approved work zone traffic control flagging course within the past three years and have in their possession a current, official state Flagger Certification card from either Oregon, Washington, Idaho, or Montana.

00225.32 Traffic Control Supervisor

The TCS duties include the following:

- Files his/her name and phone number with the Engineer and local police.
- Notify the Engineer of any corrections being made to the TCP when it is not functioning as required.
- Inspect TCD during each construction work shift for proper function, location, installation, message, cleanliness, and effect on the traveling public.
- Check post-mounted signs once a week. Inspect traffic control devices to be left in place for more than 24-hours during non-working hours immediately following initial placement of TCD. Conduct additional TCD inspections for extended periods, as requested. Check for effectiveness in both daylight and darkness.
- Review and inspect nighttime lighting and its effect on the traveling public.
- Make temporary revisions to the TCP in the event of an emergency. Immediately follow-up with and report any changes to the Engineer.

- Oversee all requirements of the Contract to ensure the convenience, safety and orderly movement of vehicular, bicycle, and pedestrian traffic.
- Have the documents listed in 00225.01 and applicable standards and specifications available on the Project at all times.
- Discussing proposed TCM and coordinating implementation of the TCP with the Engineer.
- Coordinating all TCM, including those of subcontractors, suppliers, and any adjacent construction or maintenance operation.
- Coordinating the Project's activities (such as ramp closures, road closures, and lane closures) with appropriate police, fire control agencies, city or county engineering, medical emergency agencies, school districts, Postmaster and transit companies.
- The TCS may make minor revisions to the TCP to accommodate site conditions as long as the original intent of the TCP is maintained and the revision has been approved by the Engineer.
- Attending Project meetings specifically scheduled to discuss the TCP and TCM.
- Providing supervision over all TCM on a 24-hour per day basis.

Maintain a 24-hour telephone number at which the TCS can be contacted. Make arrangements so that the TCS will be available on every working day, on call at all times, and available upon the Engineer's request at other than normal working hours. During non-work periods, the TCS, or authorized representative, shall report to the Project site within 45 minutes after notification in the event of a work zone incident. The TCS shall have appropriate manpower, equipment, and material available at all times to expeditiously correct any deficiency in the TCM for the Project.

Notify the Engineer of an alternate TCS who can assume the duties of the assigned TCS in the event of that person's inability to perform. Alternate TCS shall be adequately trained and certified to the same degree as the assigned TCS. Notify the Engineer within 24 hours of designating the TCS for the following 24-hour period. Make succeeding notifications within 24 hours every time a subsequent TCS is appointed to the Project.

The on-duty TCS shall not act as a flagger except in an emergency.

Construction

00225.40 General - Install, inspect, move, operate, maintain, and remove temporary TCD according to the plans, these Specifications, and the following:

- Install, maintain, and move all TCD by working with the direction of traffic.
- Provide additional TCM, according to 00225.02, when necessary or directed.
- Turn, cover, or remove the existing TCD as directed when they are not necessary or conflict with temporary devices. Remove and obliterate, without damaging the wearing surface, all evidence of all temporary TCD when the Contract is completed.
- Remove TCD in a sequence reverse to installation.

Temporary TCD are to remain the property of the Contractor.

Existing TCD shall remain in operation throughout the Contract or until replaced by new, permanent TCD as appropriate.

00225.42 Pedestrian Fencing - Install temporary barricades, guardrail, barrier, attenuators, pedestrian fencing, and accessories as follows:

- (a) **Temporary Pedestrian Fencing** - Install temporary pedestrian work zone delineation fencing as shown or as directed.

00225.43 Temporary Traffic Delineation - Install and remove traffic delineation items and accessories as follows:

(a) Tubular and Conical Markers - Install tubular or conical markers as shown or directed.

Place tubular or conical markers no more than 10 feet apart along both sides of driveways, streets, and road connections within work areas.

Within individual runs of tubular or conical markers, use one shape for the entire run. Conical markers may substitute for tubular markers.

(c) Plastic Drums - Install plastic drums as shown or as directed.

00225.46 Temporary Electrical Items - Provide and install electrical resources as follows:

(a) Temporary Power Source - Arrange for, provide, and pay for all electrical power.

00225.47 Flaggers and Flagger Station Lighting - Use flaggers and flagger station lighting as follows:

(a) Flaggers - Locate flaggers far enough in advance of the work area to permit adequate time for the motorist to respond to the flagger's instructions. All flaggers, including advance flaggers, shall use a STOP/SLOW paddle. Do not use the roll-up STOP/SLOW paddle for non-emergency flagging operations.

During advance flagging operations, only display the SLOW face of the paddle by covering the STOP face of the paddle with black, opaque, nonreflective material.

Position flaggers, as directed, at locations where traffic can enter the highway within the limits of the work zone. Flaggers shall direct vehicles entering the highway to follow the pilot car line.

Flagging stations shall be staffed continuously or until the Engineer determines flagging is no longer required.

(b) Flagger Station Lighting - Provide continuous flagger station lighting for nighttime flagging as follows:

- Locate the light equipment on the same side of the roadway as the flagger between 5 to 10 feet from the edge of the travel lane, on or beyond the roadway shoulder, or as directed.
- Place the flagger station lighting to direct the lighting away from the approaching traffic in the near lane at approximately a 15 ° horizontal angle $\pm 10^\circ$ perpendicular to the centerline of the roadway.
- Aim all of the luminaires directly at the flagger.
- Increase the output wattage or number of luminaires as the luminance from, and number of, surrounding and background lights increases. Do not provide a total output more than 2,500 watts, unless otherwise directed.

00225.48 Traffic Control Supervisor - Supervise the safe operation of traffic control within the construction work zone.

Maintenance

00225.60 Temporary TCD - Evaluate the condition of TCD and maintain them using the criteria shown in the current American Traffic Safety Services Association (ATSSA) publication titled "Quality Guidelines for Work Zone Traffic Control Devices". Except for electrical devices, replace all TCD that are in marginal or unacceptable condition with equal devices, in new or acceptable condition, within a time period agreed upon by the Engineer.

Electrical devices that are in marginal or unacceptable condition may be repaired instead of being replaced, as long as the repairs are satisfactorily completed within a time period agreed upon by the Engineer.

The replacement or repair of TCD, found to be in marginal or unacceptable condition, shall be made at no additional cost to the Owner.

Evaluate, maintain, repair or replace TCD, and perform other duties including the following:

- Keep the devices in proper position, clean, and legible at all times.
- Keep lights, reflectors, and flashers clean, visible, and operable during both daylight and darkness.
- Trim or remove vegetative growth or other materials so the devices can be seen.
- Verify, by inspection, the effectiveness of the installations at frequent intervals, both in daylight and darkness, at actual travel speeds.
- Repair, replace, or restore damaged or destroyed devices to maintain continuity and effectiveness.
- Maintain temporary TCD during suspensions of work the same as if work were in progress.

00225.61 Signs and Other Existing TCD - Maintain existing guide signs, warning signs, regulatory signs, specific service signs (business logos), tourist-oriented directional signs (TODS), and other existing TCD, in the same manner as temporary signs and devices associated with the Project.

00225.67 Flagger Station Lighting - Maintain and use the required flagger station lighting according to the manufacturer's recommendation and as required.

When flagger station lighting is in use, have on the Project site, the following:

- Repair equipment and electronic components recommended by the manufacturer.
- At the beginning of each shift, have approved backup flagger station lighting available for immediate use in event of failure.
- Sufficient fuel to maintain continuous operation of the diesel generator.

Measurement

00225.80 Measurement

Lump Sum Basis – No measurement of quantities will be made.

Payment

00225.90 Payment

Lump Sum Basis - Work zone traffic control will be paid for at the Contract lump sum amount for the item "Traffic Control".

Payment will be payment in full for furnishing, installing, moving, operating, maintaining, inspecting, and removing materials and TCD, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

Section 00280 - Erosion and Sediment Control

Description

00280.00 Scope - This work consists of implementing structural and non-structural Best Management Practices (BMP) and the approved DEQ 1200-C permit requirements for the purpose of controlling soil erosion by wind or water and keeping eroded sediments and other construction-generated pollutants from moving off project sites.

Requirements described in these Specifications and the approved DEQ 1200-C permit as submitted by the Owner constitute the project Erosion and Sediment Control Plan (ESCP) and are the minimum for all project construction sites and conditions. These Specifications and plans cover all project activities performed under the authority and jurisdiction of the Owner, including material sources, disposal sites, and off-site mitigation areas unless specific project activities are excluded elsewhere in these Specifications or in other Owner approved documents controlling the work.

00280.02 Erosion and Sediment Control Plan (ESCP) – The Contractor shall implement the approved DEQ 1200-C permit requirements that address the following:

- Installation of a construction entrance at every point of access from construction (except for construction in public right of way), staging and stockpile areas onto paved surface.
- Installation of sediment fencing along irrigation/drainage ditches and all other waterways and wetlands.
- Watering unpaved roads and construction areas to minimize dust due to construction activities.
- Excavation stockpiles shall be covered in the event of high winds or storm activities.
- Replanting vegetated areas impacted by construction and staging area activities and restoring the areas to original condition upon completion of the construction.
- Monitoring and visual inspection of mitigation and construction activities shall occur weekly for the duration of the project by the contractor.

00280.04 Erosion and Sediment Control Manager - Designate and provide a representative as the Erosion and Sediment Control Manager (ESCM) who meets the qualifications of 00280.30. The Owner will designate its own ESCM as required in the approved DEQ 1200-C permit to oversee the Contractor's ESCM.

Materials

00280.15 Runoff Control Materials:

Check Dams – When required by the ESCP, furnish check dam material meeting the following requirements:

- **Type 1: Aggregate** - Aggregate shall be unweathered, hard, angular, durable, free draining material, visibly well graded from course to fine with a maximum size between 6" and 3".
- **Type 2: Straw Bales** - Standard rectangular straw bales.
- **Type 3: Biofilter Bags** - Minimum size 18 inch x 6 inch x 30 inch plastic mesh bags with 1/2 inch openings filled with approximately 45 pounds of clean, non-toxic 100% recycled wood product waste containing no fine materials or sediments, or as shown on the standard drawings for this device.

- **Type 4: Sand Bags** - Durable, weather-resistant bags woven tightly enough to prevent leakage of filler material. Fill bags with at least 75 pounds of firmly-packed fine PCC 3/8" - 0 aggregate, or round 3/8" - 3/16" pea gravel.
- **Check Dam Stakes** - Stakes shall be commercial grade metal posts with a weight of at least 1.35 pounds per foot.

00280.16 Sediment Control Materials:

(a) Construction Entrances - When required by the ESCP, furnish materials meeting the following requirements:

- **Aggregate** - Aggregate shall be unweathered, hard, angular, durable, free draining material, visibly well graded from course to fine with a size between 6" and 3".

(b) Sediment Fence - When required by the ESCP, furnish sediment fence materials meeting the following requirements:

- **Geotextile** - Geotextile meeting industry standard requirements for sediment fencing.
- **Posts** - Furnish the following posts for the types of fence shown:
 - **Sediment Fence, Supported** - Commercial grade metal posts with a weight of at least 1.35 pounds per foot.
 - **Sediment Fence, Unsupported** - Minimum 1 1/2 inch x 1 1/2 inch x 48 inch untreated wood posts (wood stain is acceptable).
- **Wire Mesh** - For supported sediment fence, furnish galvanized wire mesh with 2 inch x 2 inch openings, horizontally and vertically self-supporting prior to fastening to posts, a minimum tensile strength of 70 ksi, and meeting the requirements of ASTM A 82.

Labor

00280.30 Erosion and Sediment Control Manager - Designate and provide an ESCM with the following minimum qualifications:

- Knowledgeable in principles of and practice of erosion and sediment controls.
- Skilled in assessing site conditions and effectiveness of erosion control BMP used.
- Responsible participation in construction of at least one project of comparable scope with erosion control.
- Authority to immediately mobilize necessary personnel to correct and modify erosion control BMP as required.

Duties typically required of ESCM include:

- Manage and ensure proper implementation of the ESCP.
- Accompany the Owner during field review of the ESCP prior to construction activities.
- Monitor rainfall on and in the vicinity of the Project site.
- Monitor water quality in receiving streams in the vicinity of the Project site.
- Inspect erosion and sediment control on active construction sites weekly.
- Inspect erosion and sediment control on inactive sites every two weeks.

- Inspect erosion control BMP on all active and inactive sites at least daily during rainy periods when 5/8 inch or more of rain has fallen within a 24 hour period.
- Mobilize crews to make immediate repairs to BMP or install additional BMP during working and non-working hours.
- Record actions taken to clean up significant amounts of sediment.
- Report potential permit violations to the Owner in a timely manner.
- Regularly update the approved Erosion Control Monitoring form.
- Update the ESCP monthly and within 24 hours after changes or major BMP modifications are implemented.
- Prepare a contingency plan in preparation for emergencies and the rainy season.
- Accompany the Owner on inspections and, if required, on inspections by representatives of regulating agencies.

Provide the ESCM name and contact phone number ten days before the preconstruction conference. If changes in the appointment of the ESCM occur during the term of the Contract, provide written notice to the Owner within five calendar days.

Construction

00280.40 Installation - Install erosion and sediment control BMP as shown and according to the approved DEQ 1200-C permit. Install these BMP before performing clearing, grading, or other land-altering activities. Ensure that sediment laden water does not leave the Project boundaries, enter drainage systems or waterways, or violate applicable water standards.

Included in this work are both non-structural BMP, such as limiting clearing of vegetation, and structural BMP such as various kinds of physical devices or materials like sediment fences. BMP may be temporary or they may be permanent when required to continue functioning after the Contract ends. Coordinate temporary erosion control BMP with permanent BMP and all related project work.

Provide continuous erosion prevention and sediment control throughout the period the Contractor is responsible for project sites under the Contract as determined by the Owner. Take all reasonable steps to minimize or prevent any erosion and transport of sediment. Install and maintain all erosion and sediment control BMP to function as required. If planned or installed BMP are not effective, modify or change them so they are effective. Effective functioning is defined as preventing erosion, controlling runoff, or controlling sediment in each location where a measure is needed so all erosion-related impacts of site construction are fully mitigated as required.

00280.41 Work Restrictions - The following work restrictions apply:

(a) Disturbance Limits - Flag all construction site-clearing limits with high visibility flagging and do not disturb areas outside the flagging limits. Maintain the flagging during Project construction.

(b) Perimeter Controls - Perimeter controls include sediment fences, ditches, filter berms in flatter areas, and other methods for channeling flows. Install all appropriate perimeter controls before beginning any ground disturbing activities, especially at critical locations such as stream banks, the toe of fill or cut slopes, and sites near the two-year flood elevation.

(c) Wet Season Work and Temporary Work Suspension - Wet season work is defined as work between October 1 and May 30. Update the ESCP and schedule for work proposed during the wet season to ensure that all appropriate controls, including work suspension controls, are implemented and maintained. Submit the updated ESCP and schedule to the Owner and receive approval before beginning any work during the wet season. The Owner may not approve work on critical sites with high erosion potential if controls are not properly installed or have a likelihood of failure.

During the wet season, limit excavation and bare ground activities to only that required for immediate operations. Stabilize soil stockpiles at the end of each workday by diverting flows, placing covers, or installing sediment barriers at the stockpiles.

(d) Disturbance Restrictions - If soil erosion and sediment resulting from construction activities is not effectively controlled, the Owner will limit the amount of disturbed areas to that which can be effectively controlled. Implement erosion and sediment control BMP at the earliest practicable time. Install all erosion and sediment control devices according to the approved ESCP and schedule. If the Contractor fails to control erosion, the Owner will stop all construction work according to 00180.70.

00280.42 Stabilization - Protect exposed soils from erosion by water, wind, or vehicles when required by permits or directed by the Owner.

Use temporary erosion control features for the following situations:

- To correct conditions occurring during construction activities that were not foreseen during the design stage of the Project.
- That are needed prior to installing permanent erosion control features.
- To temporarily control erosion that develops during normal construction activities.

Where potential for erosion exists and if construction permits, construct permanent erosion control features immediately after clearing and grubbing and grading operations are complete. If permanent erosion control BMP are not practicable to construct, furnish and install temporary erosion control BMP.

00280.44 Erosion Prevention BMP - Install erosion prevention BMP as shown and according to the following:

(a) Dust Control - Apply appropriate dust control for wind or equipment-caused erosion.

00280.45 Runoff Control BMP - Install runoff control BMP as shown and according to the following:

(a) Check Dams - When required by the ESCP, construct check dams as shown or directed.

- **Type 1: Aggregate** - Place aggregate in the ditch section with the center low point below the outside edge.
- **Type 2: Straw Bales** - Straw bales are not acceptable for use as check dams except in emergency situations and when approved at each location. If straw bales are used as check dams, replace with another acceptable check dam as soon as practicable but no longer than seven calendar days.
- **Type 3: Biofilter Bags** - Place aggregate in ditch section and extend check dam with biofilter bags sufficient to direct flow over aggregate weir. Aggregate weir may be replaced with additional biofilter bags if approved.
- **Type 4: Sand Bags** - Place aggregate in ditch section and extend check dam with sand bags sufficient to direct flow over aggregate weir. Aggregate weir may be replaced with additional sand bags if approved.

00280.46 Sediment Control BMP - Install sediment control BMP as shown and according to the following:

(a) Construction Entrances - Install construction entrances at every point of access from staging and stockpile areas onto paved surfaces.

When construction entrances are in use and mud and dirt tracking is still evident, take additional steps necessary to eliminate tracking.

(b) Sediment Fence - Construct supported (mesh and metal posts) and unsupported (no mesh) as follows:

- When installing geotextile and mesh, or geotextile alone, use a continuous roll of geotextile cut to the length of the barrier to avoid joints.
- Manufacturer's factory seams are acceptable. Field sewn seams are not acceptable.
- Drive posts into undisturbed soil as shown.
- Securely fasten the geotextile (and mesh) to the upslope side of the posts. Securely fasten each end of the geotextile (and mesh) to the end posts.
- Use stitched loops over posts for unsupported silt fence.
- Excavate a trench on the upslope side of the fence and place geotextile to the bottom of the trench. Backfill the trench with native material and compact.
- Attach the supported sediment geotextile to the wire mesh.
- Install the manufactured silt fence system according to the plans and manufacturer's recommendations. Connect end of rolls as shown.

Maintenance

00280.60 General - Maintain installed erosion and sediment control devices in good working order at all times. Keep the devices in place until the Owner issues notification of acceptance of stabilization. All maintenance and repairs are at no additional cost to the Owner.

00280.61 Ineffective Controls -The project shall be inspected daily throughout the construction period to ascertain the effectiveness of the erosion and sediment control practices. If a control feature does not function effectively, immediately repair, replace, or provide additional devices. Devices repaired, replaced, or added due to improper installation, insufficient maintenance, damage from Contractor operations or the ineffectiveness of existing controls will be made at no additional cost to the Owner.

00280.62 Inspection and Monitoring - Ensure that regular site inspection and monitoring is performed according to the schedule.

00280.63 Sediment Removal - Remove sediment and upgrade or repair the devices as needed as soon as practicable, but not later than two days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment needed for repair operations. If rainfall continues over a 24 hour period, or other circumstances that preclude equipment operation in the area, hand carry and install additional sediment control devices with best management practices and approved by the Owner.

(a) Sediment Controls - Remove sediment from sediment fences, sediment barriers, check dams, and sediment traps once it has reached one third of the exposed height of the device or storage depth. Replace aggregate and rock filter material with new aggregate material when the sediment reduces the filtering capacity of the device by one half. Replace biofilter bags with clean, washed bags when removing sediment from them. Wash bags in an approved sediment control area.

(b) Paved Areas - Keep all paved areas clean for the duration of the Project. Use cleaning methods that do not transport sediment-laden water to receiving streams.

(c) Construction Entrances - Add and remove aggregate or other specified material as needed to maintain the proper function of the construction entrances.

(d) Permanent Stabilization - Restabilize within two calendar days of disturbance all areas disturbed by the Contractor's operations or other causes including wind, water, and vandalism.

(e) Straw Bales - Replace straw bales when they become non-functional or, at a minimum, on an annual basis or at the beginning of each construction season as appropriate.

Finishing and Clean Up

00280.70 Removal - Within 30 days of the notification of acceptance of permanent stabilization, remove temporary erosion and sediment control devices and materials from the area. Remove accumulated sediment before removing the devices and materials. Immediately shape and permanently stabilize areas affected by the removal process. All temporary erosion and sediment control features that are not incorporated into the permanent work remain the property of the Contractor. Do not remove temporary erosion and sediment control devices before permanent stabilization is accepted.

00280.71 Sediment Disposal - Regrade removed sediment into slopes or remove and dispose of off-site according to 00290.20. Do not flush sediment-laden water into waterways or drainage systems.

Measurement

00280.80 Measurement

Lump Sum Basis - No measurement of quantities will be made for lump sum items.

Payment

00280.90 Payment

Erosion and Sediment Control will be paid for at the Contract lump sum amount for the item "Erosion Control".

Section 00290 - Environmental Protection

Description

00290.00 Scope - This Section describes the Contractor's duties and obligations with respect to protection of the land, waters, air, wildlife, and other environmental resources of the State.

Comply with all applicable federal, State, and local environmental, health, safety, and other laws, acts, statutes, regulations, administrative rules, ordinances, orders, and permits, as they may be amended from time to time (referred to in this Section as "Laws"). Comply with all applicable Laws, whether or not specifically referenced in this Section or elsewhere in the Contract.

If any provision of these Specifications appears to conflict with one or more Laws, the more stringent requirement shall apply, unless the Engineer directs otherwise in situations where these Specifications are more stringent.

Comply with all additional requirements or Laws imposed by any agency or governmental unit having authority to enforce the Endangered Species Act (ESA) and other Laws.

All penalties assessed against the Owner because of the Contractor's violation of Laws referenced above, or permits applicable to the Project, will be withheld from the progress or final payments.

No condition of the Contract releases the Contractor from any responsibility or requirement under any environmental or other Law.

00290.10 Staging and Disposal Sites - Locate staging areas and disposal sites in previously improved or disturbed sites, including existing roadways, pullouts, turnouts, parking lots, and storage yards that have been compacted, graveled and paved, unless otherwise approved, in writing, by the Engineer.

00290.11 Water Conservation - Minimize use of water by maintaining equipment, immediately fixing water line and container leaks, ensuring water valves are turned off promptly, and using recycled water when feasible.

00290.20 Waste, Hazardous Waste, and Hazardous Substances - Comply with all applicable federal, State, and local Laws as they pertain to the storage, handling, management, transportation, disposal, and documentation of waste, hazardous waste, and hazardous substances.

(a) Hazard Communication - Ensure the following documents are readily available on-site to employees, subcontractors and inspectors:

- Material Safety Data Sheets (MSDS) for all hazardous substances stored or used on-site.
- Written hazard communication program, including employee training documentation.

The Oregon Occupational Safety and Health Division (OR-OSHA) provides guidance to meet these requirements in their publication "Hazard Communication: A Safe-Work-Practice Guide".

(b) Fuel Storage - Store fuel according to the current edition of the International Fire Code and all applicable federal, State, and local Laws.

If total fuel and petroleum storage, in containers 55 gallons or larger, exceeds 1,320 gallons, comply with the applicable spill prevention control and countermeasures (SPCC) requirements of 40 CFR 112. If applicable, submit the professional engineer stamped SPCC plan, 10 days before the preconstruction conference. Comply with the plan and keep a copy on-site and readily available. The SPCC plan may be combined with the Pollution Control Plan required under 00290.30(b).

(c) Waste Management:

(1) General - Prepare a hazardous waste determination for all waste generated on-site to determine whether the waste is classified as hazardous waste, universal waste, excluded waste, waste water, or solid waste. The Owner may provide initial analytical results for some wastes such as lead-based paint and asbestos containing material. Conduct additional testing necessary for waste characterization and disposal using an Oregon Environmental Laboratory Accreditation Program (ORELAP) accredited laboratory, under chain of custody procedures.

Segregate all demolition debris according to its intended end use (reuse, recycle, or dispose). If required, store in designated areas in a manner that prevents contamination to soil and water and prevents fugitive dust emissions. Remove all waste materials recovered from the site unless otherwise approved, in writing. Retain disposal and recycling facility receipts for wastes generated on-site for at least one year after completion of the Project. Provide copies of the receipts to the Engineer within seven calendar days of the disposal or recycling.

Do not reuse demolition material, coated or treated materials, or concrete and masonry materials in waters of the State or U.S.

(2) Clean Fill - Clean fill, as defined by OAR 340-093-0030(13), becomes the property of the Contractor at the place of origin.

(3) Reuse, Recycle, and Dispose of Materials - Waste materials become the property of the Contractor at the place of origin. Unless prohibited by Law, treat waste materials according to the following priority:

- Reuse demolition debris on-site.
- Recycle demolition debris.
- If it is not feasible to reuse or recycle, ("feasible" is defined as a facility that is capable of handling the material, will take the material and the cost of transportation plus the cost to reuse or recycle the material is equal to or less than the costs of disposal) dispose of waste material according to the following:

a. Burnable Materials - Dispose of burnable material, that cannot be reused or recycled, according to 00290.30(c-3).

b. Woody Matter - Woody matter may be burned according to 00290.30(c-3) or may be chipped to a size of no more than 3 inches in any direction then uniformly spread over selected landscape areas, as directed, in loose layers not more than 3 inches thick. Burying wood, stumps, or other woody material is not allowed.

c. Preserved and Coated Wood - Dispose of chemically preserved wood, pressure treated wood, and wood coated with latex paint that does not contain lead according to the following:

- Reused whole.
- Provided to others to reuse.
- Burned as fuel at an energy recovery facility with a DEQ or LRAPA stationary source permit.
- Delivered to a DEQ permitted municipal solid waste landfill or a DEQ permitted construction and demolition landfill.

Dispose of wood coated with lead-containing paint at a DEQ permitted municipal solid waste landfill or a DEQ permitted construction and demolition landfill.

Test wood as required by the receiving facility.

d. Disposal on Owner-Owned Lands - Do not dispose of waste materials on Owner-owned or Owner-controlled lands, except when shown, specified, or allowed in writing to be used as fill. If allowed, place waste materials only at specified locations, as directed.

e. Off-Site Disposal - Dispose of waste at an energy recovery facility with a DEQ or LRAPA Stationary Source Permit, at a permitted landfill, or at other waste disposal facilities as required depending on that type of waste.

Subject to local zoning codes, materials that meet the definition of clean fill may be placed on other properties in a manner consistent with environmental requirements, and with written permission of the property owner. Furnish the Engineer a copy of the signed agreement with the owner before placement of the clean fill material. Do not place the clean fill material at locations that are visible from a public highway, road, or street unless the site is zoned and licensed for landfill.

(d) Hazardous Waste Management - Determine the generator category for the Project, based on the amount and type of hazardous waste generated. Use the following definitions. If they differ from current Laws, use the current Laws.

- **Conditionally Exempt Generator** - A conditionally exempt generator (CEG) generates 220 pounds or less of hazardous waste per month or 2.2 pounds or less of acutely hazardous waste per month and accumulates up to 2,200 pounds hazardous waste or 2.2 pounds acutely hazardous waste on-site.
- **Small Quantity Generator** - A small quantity generator (SQG) generates 220 pounds to 2,200 pounds hazardous waste per month, can accumulate up to 13,200 pounds hazardous waste on-site (or more with a permit), and ship hazardous waste off-site within 180 days of generation.
- **Large Quantity Generator** - A large quantity generator (LQG) generates more than 2,200 pounds hazardous waste per month or more than 2.2 pounds acutely hazardous waste per month, has no accumulation limit, but ship all hazardous waste off-site within 90 days of generation.

In addition to current Laws, comply with the following:

- If the Project generator category is SQG or LQG, or if it requires a hazardous waste identification number, obtain a Resource Conservation and Recovery Act (RCRA) site identification number from the DEQ. Pay all fees and complete the RCRA application form as follows:
 - List the Contractor as the Site Contact, the Site Operator, the Hazardous Waste Form Contact, and the Hazardous Waste Fee Contact.
 - List DEQ as the Site Location, the Land Owner, and the Legal Owner.
 - Fill in the Comments section with the following statement:

"[Contractor name] is responsible for the following: All hazardous waste management on site for the duration of this construction project, for delivery of the waste to a permitted recycling or disposal facility, and for all forms and fees associated with the hazardous waste management including cancellation of the RCRA site identification number at the end of the Project. DEQ is the owner of the waste and maintains long term responsibility for the waste as required by RCRA, excluding all wastes generated solely from materials brought to the site by the Contractor, which remain the property of the Contractor."
 - The Contractor may sign hazardous waste manifests for the off-site shipment of hazardous wastes as the "offeror" rather than as the "generator".
- Maintain all required waste management records, including monthly hazardous waste generation records, manifests, recycling and disposal receipts, test results, and annual DEQ reports. Submit monthly records to the Engineer by the fifteenth day of the following month and submit DEQ

reports to the Engineer concurrently with DEQ. Keep copies for at least three years following completion of the Project and resolution of any regulatory violations or citations.

- If the quantity of hazardous waste projected to be generated meets the requirements for a CEG, store hazardous wastes on-site for no more than 180 days.
- If the quantity of hazardous waste projected to be generated meets the requirements for a SQG or for a LQG, prepare a Hazardous Waste Contingency Plan according to 40 CFR 265.51. Maintain a copy of the Contingency Plan on-site at all times during construction activities, readily available to employees and inspectors.
- If the project is SQG or LQG, retain a Certified Hazardous Materials Manager (CHMM) in good standing and with experience managing the hazardous wastes associated with the Project to oversee waste management at the site.
- All employees involved in the handling and management of CEG hazardous waste shall comply with the federal and State Laws for hazardous waste management. All employees involved in the handling of SQG and LQG hazardous waste shall be trained according to federal and State Laws. For LQC hazardous waste projects, keep employee training records on-site and readily available.
- If the quantity of hazardous waste generated in a month changes the generator category, immediately implement the requirements for the new category and comply with them for the remainder of the year. Complete the new documentation and training requirements within 30 calendar days of the change.
- Ensure hazardous waste containers are clearly and visibly labeled with the contents and accumulation start date, compatible with the contents and in good condition. Store them in a designated weather-protected area that is secured from public access, has secondary containment adequate to contain a release, and has sufficient aisle space to safely maneuver containers and respond to spills (minimum 30 inches).
- If hazardous waste will be treated on-site, obtain approval from DEQ and the Engineer for each specific treatment or recycling process, treat wastes within accumulation tanks or closed containers that meet RCRA requirements, conduct treatment within the storage time for the applicable generator category, maintain current copies of all required notifications and waste analysis plans readily available on-site and request DEQ technical assistance prior to starting any on-site recycling or treatment.

(e) Hazardous Substance Transportation - Comply with the following requirements for transportation of hazardous substances and hazardous waste:

- Train all employees involved in transportation and shipping as required by US DOT.
- Use drivers who have a commercial driver's license with a hazardous materials endorsement when required.
- Ship hazardous wastes from SQG and LQG projects using a DEQ registered hazardous waste transporter under a hazardous waste manifest.
- Ensure shipments are appropriately packaged and labeled, and vehicles are appropriately placarded.
- Submit copies of the completed manifests and documentation to the Engineer and retain copies for at least one year.

(f) Unexpected Contamination - If, during construction, unanticipated hazardous substances are discovered that threaten the health and safety of workers, the public, or the environment, do the following:

- Immediately remove all affected employees and secure the area to prevent access.
- Notify the Engineer immediately and provide written notification within 24 hours, setting forth a description of the hazardous substances encountered.

The Engineer will attempt to resolve the unanticipated situation expeditiously according to the General Conditions. Delays to work due to the discovery of unexpected contamination shall be considered for exclusion from Contract time according to the General Conditions.

(g) Spills and Releases - Obtain a response agreement with a professional on-call spill response team. The professional on-call spill response team, identified in the PCP, agrees to be available and respond to spills that cannot be cleaned up with on-site resources. A professional spill response team is a company or section of a company specifically dedicated to hazardous materials emergency spill response, insured, and bonded for hazardous materials cleanup, and employing experienced personnel certified according to 29 CFR 1920.120.

In the event of a spill or release of a hazardous substance or hazardous waste or any other material, do the following:

- Immediately commence response actions to protect human health and the environment. Follow the PCP, SPCC and Contingency Plan, as appropriate. If any of the provisions in these plans conflict, implement the actions providing the greatest protection of public health and safety and the environment.
- If the spill can not be safely contained and cleaned up with on-site resources, activate the professional on-call spill response team.
- Immediately notify the Engineer.
- If the quantity released exceeds the State or Federal reportable quantities, or if the release impacts or threatens to impact any surface water body, immediately notify DEQ by the Oregon Emergency Response System (OERS) at 1-800-452-0311 and the EPA and USCG through the National Response Center (NRC) at 1-800-424-8802 (Federal reportable quantities or spills impacting or potentially impacting water only). If the quantity released is unknown, proceed with OERS and NRC notifications. Reportable quantities are listed at 40 CFR 302.4 and OAR 340-142-0040 to OAR 340-142-0050.
- Conduct cleanup of the released material according to all applicable Laws and DEQ requirements. Cleanup to background levels unless otherwise agreed to by the Owner in writing.
- Provide a written report to the Engineer, using the DEQ Spill/Release Report form, within 10 calendar days of completing spill response, but no more than 30 calendar days after the initial event. If the spill was reported to DEQ, submit the report to DEQ concurrently. Include a description of how future releases will be prevented.

00290.29 Health and Safety - Comply with all applicable health and safety Laws as they pertain to the hazardous substances and wastes used, stored and generated on-site. If any of these requirements are in conflict, the more stringent requirements apply.

00290.30 Pollution Control - Prevent, control, and abate pollution of the environment. Comply with new or amended environmental pollution Laws, not contemplated at the time of bid preparation, according to 00140.50 and ORS 279C.525. A Pollution Control Plan (PCP) shall be submitted in accordance to 00290.30(b).

(a) Pollution Control Measures - Comply with the following requirements:

(1) General:

- Allow no pollutant of any kind (e.g., petroleum products or fresh "green" concrete) to come in contact with an active flowing stream or waters of the State and U.S.
- Comply with the erosion prevention and sediment control requirements of Section 00280 and all applicable DEQ NPDES 1200 Permit requirements.
- Do not cause turbidity to waters of the State and U.S. outside of regulated levels.

(2) Materials and Waste Management:

- Store construction equipment, materials and debris in a manner that prevents contamination of water and soil and prevents fugitive dust.
- Store hazardous substances in the original containers or labeled compatible containers according to State Fire Marshal's regulations, International Fire Code and product MSDS.
- Locate areas for storing fuels and other potentially hazardous materials at least 150 feet away from any waters of the State and U.S. or storm inlet, unless otherwise approved by the Engineer.
- Dispose of material waste according to 00290.20.
- Do not use treated timbers within any waters of the State and U.S.

(3) Equipment Fueling, Repair and Maintenance:

- Promptly correct or repair operational procedures, leaks, or equipment problems that may cause pollution at the Project Site. If soils or other media become contaminated as a result of operational procedures or equipment problems, remove and dispose of them according to applicable Laws and 00290.20(g).
- Locate areas for parking, refueling and servicing mobile equipment and vehicles at least 150 feet away from any waters of the State and U.S. or storm inlet, unless otherwise approved by the Engineer.
- For large equipment that is not easily moved, prevent fuel and operating fluids from reaching any waters of the State and U.S. or storm inlet by, at a minimum, using spill containment systems designed to completely contain potential spills during all refueling and equipment repair operations.

(4) Equipment Cleaning and Washouts:

- Inspect and clean all equipment prior to operating it within 150 feet of any waters of the State and U.S. or storm inlet. Check for fluid leaks and remove all external oil, grease, weed seed, and dirt.
- Do not discharge untreated wash and rinse water into the any waters of the State and U.S. or storm inlet.
- Establish wash areas that contain all fluids and debris, at least 150 feet from any waters of the State and U.S. or storm inlet, such that untreated waste water does not impact those systems.
- Clean concrete equipment in washout areas that contain all fluids and debris. Recycle washout materials into fresh mixes or dispose of according to applicable permits.

(5) Off Site Tracking:

- Limit water leakage from trucks carrying saturated soils to less than 1 gallon per hour before allowing them to leave the Project Site.
- Remove all loose dirt and debris from trucks prior to leaving the Project Site.

(6) Other Spill Prevention and Response Measures:

- Inspect heavy equipment, storage containers, staging areas and other potential sources of hazardous substances daily to identify and prevent potential releases.
- If flooding of the Project site is expected to occur within 24 hours, evacuate areas used for staging, access roads, or storage and remove materials, equipment, and fuel.
- Immediately contain and repair leaking equipment or containers and cleanup any releases according to 00290.20(g).

- Maintain hazardous material containment kits and spill containment kits on-site to facilitate the cleanup of hazardous material spills on dry-land and/or waters of the State and U.S.

(b) Pollution Control Plan (PCP) - Develop and submit a PCP to prevent pollution related to Contractor operations for approval 10 calendar days before the preconstruction conference. Maintain a copy of the PCP on-site at all times during construction activities, readily available to employees and inspectors. Ensure that all employees comply with the provisions of the PCP.

Include the following information in the PCP:

- Identify a professional on-call spill response team.
- Identify all contractor activities, hazardous substances used and wastes generated.
- Describe how hazardous substances and wastes will be stored, used, contained, monitored, disposed of and documented. Include pollution prevention, spill response, waste reduction, dust prevention, off site tracking prevention, washout facility design, vehicle and equipment fueling and maintenance procedures, employee training and emergency contact information.
- Include the waste determination results from 00290.20(c-1). Provide reuse, recycle, and disposal options, the reason for selecting that alternative, and estimated quantities for each reuse, recycle, and disposal option.
- Include or refer to the SPCC plan and the hazardous waste contingency plan, if required.
- Include scaled site plans showing locations for hazardous substance storage, spill response equipment, communications equipment and fire suppression equipment.

(c) Air Pollution Control Measures - Comply with ORS 468, ORS 468A, OAR 340-014, OAR 340-200 through OAR 340-268, and all other applicable Laws.

(1) Vehicle and Equipment Idling - Establish truck staging areas for diesel-powered vehicles located where truck emissions have a minimum impact on sensitive populations, such as residences, schools, hospitals and nursing homes.

Limit idling of trucks and other diesel powered equipment to five minutes, when the equipment is not in use or in motion, except as follows:

- When traffic conditions or mechanical difficulties, over which the operator has no control, force the equipment to remain motionless.
- When operating the equipment's heating, cooling or auxiliary systems is necessary to accomplish the equipment's intended use.
- To bring the equipment to the manufacturer's recommended operating temperature.
- When the outdoor temperature is below 20 °F.
- When needed to repair equipment.
- Under other circumstances specifically authorized by the Engineer.

(2) Dust Control and Permitting - Prevent airborne dust and fugitive dust emissions from construction activities including rock, concrete, and asphalt crushing operations and obtain permits according to 00160.70. Do not use oil, waste, waste water, or other illegal materials as dust suppressants.

(3) Burn Restrictions - Burn wastes only if open burning is allowed by State, LRAPA, and local burning Laws. Obtain and comply with all required permits including DEQ permits required by OAR 340-264-0010 through OAR 340-264-0020, LRAPA permits, and local fire district permits. Provide copies of all permits to the Engineer prior to burning. Do not conduct burning within riparian

areas. Conduct burning at locations where existing structures will not be damaged and where smoke will not impact traffic. Do not burn the following materials on-site:

- Rubber products
- Tires
- Plastic
- Wet garbage
- Petroleum and petroleum treated materials
- Asphalt or industrial waste
- Any material that creates dense or noxious odors
- Painted materials
- Asbestos, mercury or PCB containing materials or equipment
- Hazardous wastes
- Scrap wiring or electrical equipment
- Painted or treated wood

Buildings intended for demolition may be burned by the local fire department for training purposes. Contact the local fire department for applicable restrictions.

00290.32 Noise Control - Comply with ORS 467, OAR 340-035, all other applicable Laws, and the following construction noise abatement measures:

- Do not perform construction within 1,000 feet of an occupied dwelling on Saturdays, Sundays, legal holidays, or between the hours of 7:00 p.m. and 7:00 a.m. on other days, without the approval of the Engineer.
- Use equipment with sound control devices no less effective than those provided on the original equipment. Equipment with un-muffled exhausts is prohibited.
- Use equipment complying with pertinent equipment noise standards of the EPA.

If a specific noise impact complaint occurs during the construction of the Project, one or more of the following noise mitigation measures may be required, at no additional cost to the Owner, as directed by the Engineer:

- Locate stationary construction equipment as far from nearby noise sensitive properties as feasible.
- Shut off idling equipment.
- Reschedule construction operations to avoid periods of noise annoyance identified in the complaint.
- Notify nearby residents whenever extremely noisy work will be occurring.
- Install temporary or portable acoustic barriers around stationary construction noise sources.
- Operate electric-powered equipment using line voltage power or solar power.

00290.34 Protection of Fish and Fish Habitat - Comply with the Laws of the Oregon Department of Fish and Wildlife, National Marine Fisheries Service, and U.S. Fish and Wildlife Service, and the rules and practices developed through the Oregon Plan for Salmon and Watersheds. Conduct operations to avoid any hazards to the safety and propagation of fish and shellfish in waters of the State and U.S.

(a) Regulated Work Areas - Perform work within regulated work areas only within the regulated in-water work periods. Do not allow equipment to enter any waters of the State or U.S. or the regulated work area except as allowed in permits issued for the Project.

The regulated work area, if any, will be identified in the Special Provisions.

(b) Prohibited Operations - Except where allowed by the Contract or by permit, do not:

- Blast underwater
- Use water jetting
- Release petroleum products or chemicals in the water
- Disturb spawning beds
- Obstruct stream channels
- Cause silting or sedimentation of waters of the State and U.S.
- Use treated timbers within the regulated work area
- Impede adult and juvenile fish passage, including intermittent streams

00290.36 Protection of Wildlife and Wildlife Habitat - Comply with the Laws of the Oregon Department of Fish and Wildlife and U.S. Fish and Wildlife Service. Conduct operations to avoid any hazards to the safety and propagation of wildlife.

(a) Migratory Birds - Comply with the Migratory Bird Treaty Act (16 U.S.C. 703-712) which protects most species of birds in Oregon and prohibits the removal of nests containing eggs and dependent young. Migratory birds include most birds in Oregon, except pigeons, house sparrows, and starlings. Except where allowed by the Contract and by permit, do not disturb a migratory bird nest containing eggs or dependent young, or the surface the nest is built on.

If migratory bird nests are encountered that contain eggs or dependent young, stop all actions that may disrupt the nest and contact the Engineer. Do not resume work that may disrupt nesting, until approved by the Engineer.

(b) Bats - Avoid destruction of bat colonies as shown.

00290.38 Protection of Plants - Plant habitats to be protected will be shown with the plant habitat boundaries flagged by the Engineer. Avoid destruction of plant habitats by ensuring construction personnel, equipment, and associated pollutants, including sediment, chemical contaminants, discharge water, non-native grass and weed seed, do not enter the habitat.

00290.41 Protection of Wetlands - Comply with and require that all the Contractor's employees, agents, and subcontractors on the Project Site comply with the following:

- Clean Water Act Section 404 (33 U.S.C. 1344); Federal Rivers and Harbors Act of 1899, Section 10 (33 U.S.C. 403 et seq.).
- ORS 196.800 to ORS 196.990 (Oregon Removal-Fill law).
- ORS 390.805 to ORS 390.925 (Oregon Removal and Filling in Scenic Waterways law).
- All other applicable Laws governing preservation of wetland resources.

For the purposes of this Section, "wetland" or "wetlands" shall be understood to include wetlands as defined in 00110.20, as well as other jurisdictional waters of the State and U.S.

Willful violation of permit conditions and applicable laws exposes the offending Contractor and other violators to criminal and civil sanctions. Civil sanctions include, but are not limited to, the offender's sole liability for all costs associated with site restoration, maintenance and additional mitigation work required by federal or State authorities.

(a) Identifying Wetlands - Wetlands known to be on the Project Site are identified on the Plans.

(b) Disturbing Wetlands - Where wetlands are shown on the Plans, meet with the Agency Wetland Specialist, the Engineer, and inspector on-site prior to moving equipment onto the site or beginning any work, to ensure that all parties understand the locations of wetlands and the measures that shall be taken to protect them.

Ensure protection of no work zones as follows:

- Fence off no work zones using pedestrian safety fence or approved equivalent.
- Except as authorized by the Engineer for the purpose of installing or maintaining approved wetland protective measures, keep all persons, equipment and materials off no work zones.
- The Engineer has the authority to bar from the Project any person entering a protected site other than for the purpose of installing or maintaining protective measures.

Install all site protection for wetlands as shown on the Plans.

The Engineer may suspend work until the Contractor, Engineer, Agency Wetland Specialist, and other required federal and State personnel, if any, meet to determine damage to the site and the nature and scope of necessary site restoration and maintenance. The Engineer may require the Contractor to submit a written plan for protection of other sites for the duration of the Project before work resumes.

00290.50 Protection of Cultural Resources - Comply with all Laws governing preservation of cultural resources. Cultural resources may include, but are not limited to, dwellings, bridges, trails, fossils, and artifacts.

If cultural resources are encountered on the Project area or in material sources, and their disposition is not addressed in the Special Provisions, do the following:

- Immediately discontinue operations or move to another area of the Project Site or material source.
- Protect the cultural resource from disturbance or damage.
- Notify the Engineer.

The Engineer will do the following:

- Contact the Agency Archaeologist, to arrange immediate investigations.
- Arrange for disposition of the cultural resources. The Engineer may direct the Contractor to perform salvage operations as Extra Work.
- Notify the Contractor when to begin or resume construction operations in the affected area.

00290.51 Protection of Sensitive Cultural Sites - Comply with and require that all the Contractor's employees, agents, and subcontractors on the Project Site comply with all Laws applicable to the preservation and protection of sensitive cultural sites. The existence of any sensitive cultural sites affecting the Project, and the mandatory preservation and protection measures applicable to the sites, are determined according to the Laws including, but not limited to the following:

- National Historic Preservation Act (NHPA) of 1966, Section 106, codified in 36 CFR Part 800 (Protection of Historic Properties).
- ORS 97.740 to ORS 97.760, ORS 97.990(5), and ORS 97.990(6) (Indian Graves and Protected Objects).
- ORS 358.905 to ORS 358.955 (Archaeological Objects and Sites).
- ORS 390.235 to ORS 390.240 (Archaeological Sites and Historical Material).

Ensure protection for sensitive cultural sites according to the following:

- Except as authorized by the Engineer for the purpose of installing or maintaining approved sensitive cultural site protective measures, keep all persons, equipment, and materials off known sensitive cultural sites.
- Install all sensitive cultural site protection required by the plans and Special Provisions prior to staging equipment or starting work near the site(s).
- Instruct all Contractor and subcontractor personnel to regard the locations of these sites and their contents as confidential.

The Engineer has the authority to bar from the Project any person entering a protected site other than for the purpose of installing or maintaining protective measures.

If sensitive cultural sites are known to be on the Project, additional information will be provided in the Special Provisions.

(a) Disturbing Known Sensitive Cultural Sites - Willful violation of Laws exposes the offending Contractor and other violators to criminal and civil sanctions. Civil sanctions include, but are not limited to the offender's sole liability for all costs associated with monitoring, recovery, site restoration or other archaeological work required by Tribal, federal, and State authorities. Costs can exceed \$100,000.

The Engineer may suspend work until the Contractor and the Engineer meet to determine damage to the site and the nature and scope of necessary site restoration and maintenance. The Engineer may require the Contractor to submit a written plan for protection of other sites for the duration of the Project before work resumes.

(b) Disturbing Unknown Sensitive Cultural Sites - If the Contractor finds a previously undiscovered sensitive cultural site, immediately cease all activities at that site, follow procedures listed in 00290.50, and notify the Engineer. If the Contractor inadvertently disturbs unknown sensitive cultural sites, but immediately ceases all activities and follows the procedures listed in 00290.50, the Owner, to the extent permitted by Article XI, section 7 of the Oregon Constitution and by the Oregon Tort Claims Act, will indemnify, within the limits of the Tort Claims Act, the Contractor for costs associated with monitoring, recovery, site restoration or other required archaeological work, provided neither the Owner nor the State shall be required to indemnify the Contractor for such costs resulting from, arising out of or relating to the willful misconduct, negligence or other wrongful acts attributable to the Contractor or other persons on the Project site.

Delays to work due to new cultural resource finds will be considered for exclusion from Contract time.

Work required for monitoring and site restoration for newly discovered sensitive cultural sites encountered by the Contractor will be paid according to the General Conditions.

Measurement

00290.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

00290.90 Payment – Environmental Protection work shall be considered incidental and no separate payment will be made.

Section 00320 - Clearing and Grubbing

Description

00320.00 Scope - This work consists of removing and disposing of vegetation and buried matter within a specified area or as directed. The work also includes preserving vegetation and objects designated to remain in place and cleanup of the work area.

00320.01 Areas of Work - The areas to be cleared and grubbed are shown on the plans, or if not shown on the plans, the clearing lines are 10 feet outside the following:

- Top of side slopes of ditches and channel changes.
- Top of cut slope.
- Top of cutbank rounding if rounded.
- Toe of fill slope.
- Outside edge of structure.
- Other work areas shown on the plans, such as material sources, borrow areas and road connections.
- Tree, plant, or natural areas to be preserved.

00320.02 Definitions:

(a) Clearing - Clearing consists of:

- Preserving trees and other vegetation designated to remain in place.
- Salvaging marketable timber, when required by the Special Provisions.
- Cutting and removing vegetation, such as weeds, grasses, crops, brush, and trees.
- Removing down timber and other vegetative debris.

(b) Grubbing - Grubbing consists of removing:

- Brush stems remaining above the ground surface after the clearing work.
- Tree stumps.
- Roots and other vegetation found below ground surface.
- Partially buried natural objects.

(c) Clear Zone - The clear zone is the roadside border area, starting at the edge of the traveled way, available for safe use by an errant vehicle. The minimum clear zone line, for purposes of this Section, is 30 feet from the edge of the traveled way, but this distance may vary depending on design speed, horizontal alignment and side slope requirements.

Construction

00320.40 Clearing Operations:

(a) Clearing Trees and Other Vegetation - Remove and dispose of noxious weeds and Specified Weeds according to Section 01030 prior to beginning clearing of trees and other vegetation.

Cut trees and brush so they fall into the areas specified to be cleared.

Cut off tree stumps, not required to be grubbed under 00320.41 as follows:

- Flush with the ground surface if within the clear zone.
- No higher than 4 inches above the ground surface if between the clear zone and the clearing line.

Remove all evidence of clearing matter and debris. This work includes removal of:

- Sod, weeds and dead vegetation.
- Down timber, brush and other vegetation.
- Sticks and branches with diameters greater than 1/2 inch.
- Dead trees, down timber, stumps, and specified trimmings from areas where live trees and other vegetation are designated to remain.

(b) Preserving and Trimming Vegetation:

(1) Within the Work Areas - Avoid injuring vegetation designated to remain in place. Preservation of this vegetation includes protection and special care.

(2) Outside the Work Areas - Avoid injuring any vegetation. Confine operations which may injure vegetation to areas that have no vegetation or to the work areas.

Remove hazardous, dead and damaged trees outside the clearing limit as directed.

(3) Tree Trimming - Trim trees according to good tree surgery practices and as directed to remove safety hazards such as:

- Unsound branches of trees to remain in place.
- Branches over roadways and bridges to provide at least 20 feet of clearance above the roadway surface.
- Branches over walks to provide at least 8 feet of clearance above the walk surface.
- Branches obstructing sight distance at intersections or impairing visibility of signs.

Preserving vegetation includes keeping equipment and materials off of the critical root zone as directed.

00320.41 Grubbing Operations - Within excavation limits, remove tree stumps, roots, and other vegetation to a depth of at least 6 inches below excavation subgrade or sloped surfaces.

Within embankment limits, remove tree stumps, roots, and other vegetation.

00320.42 Ownership and Disposal of Matter - All matter and debris accumulated from clearing and grubbing operations become the Contractor's property at the place of origin. Dispose of this matter and debris according to 00290.20(c).

00320.43 Backfilling Holes - Except in areas to be excavated, backfill holes remaining after grubbing operations with clean fill (see 00290.20(c-2)) according to 00330.45.

Measurement

00320.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

00320.90 Payment - No separate or additional payment will be made for work performed under this Section. Payment will be included in payment made for the appropriate items under which this work is required.

Section 00330 - Earthwork

Description

00330.00 Scope - This work consists of excavation, ditching, backfilling, embankment construction, grading, leveling, borrow, and other earth-moving work required in the construction of the Project, excepting such work specifically included and provided for as:

- A pay item elsewhere in the Contract Specifications.
- Incidental work in the detailed Specifications for other Contract pay items.

The term "earthwork" will be used as a general term to designate the work included within the scope of this Section.

00330.01 Lines, Grades, and Cross Sections - All earthwork shall conform to the grades as shown on the Plans.

00330.02 Definitions:

Abandoned Pipes and Miscellaneous Matter - Sewers, pipes, conduits, logs, timbers, concrete and other structures, materials, objects, and matter encountered in the work, excepting only items identified for removal or preservation.

General Excavation - All excavation covered by this Section, except foundation, toe trench, and borrow excavation.

Overbreak - Material beyond and outside of the slope limits established by the Engineer, which becomes displaced or loosened during excavation and is excavated.

Selected Materials - Those materials with pertinent characteristics that are preserved and sorted as directed from specified excavations and handled for specific uses.

00330.04 Sources of Borrow:

(a) Agency Furnished Borrow - Use materials obtained from Agency furnished sources lying outside of, separated from and independent of planned excavations within the Project limits, only when called for by the Contract or when specifically directed. (see 00330.41(d))

(b) Contractor Furnished Borrow - Unless otherwise specified or directed, all borrow shall be furnished by the Contractor. Sources shall lie wholly outside of and beyond the limits of Agency-controlled lands. Acquire at Contractor's own expense.

Materials

00330.10 Selected Materials - When other provisions of this Section call for selecting or sorting material for various parts of the work, select and sort the materials to meet the directed requirements.

00330.11 Selected Topsoil - Furnish topsoil selected for use according to 00330.10 meeting the requirements of 01040.14.

00330.12 Borrow Material - Furnish borrow materials for general embankment construction with soil that is free of unsuitable materials or other characteristics detrimental to the construction of firm, dense and sound embankments. Furnish borrow materials for other uses meeting the specified requirements for the use intended.

00330.13 Selected General Backfill - Soil, selected as directed from specified excavations, and containing no particle with any dimension greater than 3 inches, or other unsuitable material.

00330.14 Selected Granular Backfill - Durable sand, gravel or combinations of these, selected as directed from specified excavations, and containing no particle with any dimension greater than 3 inches or other unsuitable material.

00330.15 Selected Stone Backfill - A combination of durable sand, gravel and cobbles, selected as directed from specified excavations, which contains no particle with any dimension greater than 3 inches, and no unsuitable material.

00330.17 Quality Control - Provide quality control according to the General Conditions.

Equipment

00330.20 Tamping Foot Rollers - If specified, use tamping-foot rollers with a weight of at least 115 tons, with each tamping-foot protruding from the drum at least 4 inches.

00330.21 Vibratory Rollers - If specified, use vibratory rollers having a smooth drum, exerting a dynamic force of at least 30,000 pounds per impact and operating at a frequency of at least 1,000 vibrations per minute. Limit roller speed to no more than 1 1/2 mph.

Construction

00330.40 General:

(a) Quantities - Quantities and locations of earthwork materials indicated on the plans are approximate only. Make sure there is enough suitable material available to complete embankments and other required fillings before disposing of any excavated materials. Make up any shortage of materials caused by premature disposal at no additional cost to the Agency.

The Agency makes no guarantee or representation by implication or otherwise, that any material available on the Project site is suitable for incorporation into any portion of the Project. No material will be considered unsuitable on the sole basis that special or additional processing or handling is required to make it suitable for incorporation into the Project.

(b) Preservation of Existing Surfacing - Protect existing surfacings of all types which are to remain in place from being damaged or fouled with undesirable material. Repair or replace damaged or fouled surfaces as directed at no additional cost to the Agency.

(c) Avoidance and Correction of Detrimental Operations - Perform all operations involved in excavating, hauling and placing of earthwork materials so no damage or detriment to the completed or partially completed work results. At all times provide sufficient drainage of completed or partially completed earthwork to prevent damage or loss due to rainfall, surface water or any other cause. In all cases, take proper precautions to ensure that embankment construction and filling does not move, endanger or cause undue strain or stress to any structure or adjacent ground. Temporary and final embankment slopes within any cross section shall not be constructed steeper than the slope staked for that cross section.

Recondition or remove unstable materials resulting from improper operations, inadequate drainage or over watering, and restore or replace with stable material at no additional cost to the Agency.

00330.41 Excavations - Perform excavation of earthwork as indicated on the plans, as directed and according to the following:

(a) General:

(1) Selection and Sorting of Excavated Materials - All materials available from excavations, including borrow materials, are subject to selection and separate handling for their best utilization in various parts of the work. Select the types of materials to be used according to 00330.42, 00330.44, 00330.45, 00330.47, and as directed. Select and sort excavated materials, as necessary, to meet Contract requirements.

(2) Selected Topsoil - Stockpile and place selected topsoil according to 01040.43.

(3) Unsuitable Materials - Unsuitable materials encountered in required excavations shall be classed as waste material and disposed of according to 00330.41(a-5).

(4) Excess Materials - If the quantities of excavated materials are greater than required to construct embankments and to do all filling and backfilling, the remaining materials shall be classed as waste materials and be disposed of according to 00330.41(a-5).

(5) Waste Materials - Waste materials under 00330.41(a-3) and 00330.41(a-4) become the property of the Contractor at the point of origin. Unless otherwise specifically allowed and subject to the requirements of 00280.03, dispose of waste materials outside and beyond the limits of the Project and Agency controlled property according to 00290.20(c). Do not dispose of any materials on any wetland, either public or private or within 300 feet of any river or stream.

(6) Excavation of Existing Surfaces - Unless otherwise specified, earthwork includes excavating, hauling and depositing of existing surfacings which are within the limits of the excavation work.

(7) Abandoned Pipes and Miscellaneous Matter - Remove and dispose of abandoned pipes and miscellaneous matter encountered in the work as a part of the earthwork, unless otherwise specified.

Remove ends of remaining abandoned pipe or portions of other miscellaneous matter remaining exposed in slopes or at subgrade after excavation work to at least 2 feet back of the finished slope or below subgrade.

Place a watertight cap or plug in the inlet ends of remaining abandoned pipes. Leave outlet ends open. Place free draining cover material and/or take other measures as directed to allow for free passage of drainage at remaining outlet ends. Shape and finish the affected area so no evidence of their existence is apparent upon completion of the work.

(8) Ditches, Channel Changes, Approaches, Connection, Etc. - Perform excavations to construct ditches, channel changes, approach roadways, road connections, and other items, as required.

(9) Excavation Below Grade:

a. Rock - If directed, excavate rock found in roadbed excavation to a depth of 12 inches below subgrade or as directed. Backfill to subgrade elevation with selected granular backfill material as directed.

b. Selected Material - Where the plans indicate the placement of a selected material below subgrade in excavation areas, excavate to the depth necessary to place the material to its specified compacted thickness.

c. Unstable Subgrade Material - Where unstable material is encountered below subgrade in roadbed excavations, excavate such material below subgrade as directed. Dispose of these unstable materials according to 00330.41(a-5). Backfill with selected general backfill, or selected granular backfill material to provide a firm roadbed as directed. A geotextile may be required before backfilling.

(10) Protection of Excavation Side Slopes - Use methods in making roadbed excavations that will not shatter or loosen excavation slopes, avoid overbreaks, and leave slopes accurately and smoothly trimmed. As far as practical, excavate materials without previous loosening and in limited layers or thickness to avoid breaking the material back of the established slope line. Overbreak is incidental to the work except in cases where the Engineer determines that such overbreak was unavoidable.

After the main excavation in rock or rocky cuts is completed, thoroughly test the slopes with bars or by other approved means and remove all loose, detached, broken, or otherwise unstable material. Remove jutting points and bring the entire cut slope area to a safe, trim, neat and stable condition. Dispose of the materials removed under this provision in the same manner as other excavated material. Remove all exposed roots, debris and all stones more than 3 inches in size which are loose or could become loosened.

(11) Rounding of Cutbanks - As part of the earthwork, blend the tops of cutbanks with the adjacent ground by rounding as called for by the plans. Rounding will not be required when rock requiring blasting to excavate extends to the top of cutbanks, and makes rounding impractical.

(12) Outside Earthwork Limits - Outside earthwork limits but within the clear zone, (see 00320.02(c)), remove partially buried natural objects, such as boulders, which the Engineer determines would be dangerous to an errant vehicle. Place them within embankments as specified or dispose of them as directed.

(b) Foundation Excavation - Excavate unsuitable materials in embankment foundations and elsewhere as designated. This work will be classed as "Foundation Excavation". Dispose of these materials according to 00330.41(a-5) and replace with selected general backfill, selected granular backfill or other suitable materials as directed.

(c) Toe Trench Excavation - Excavate trenches at the toe of slopes that are to be protected with stone embankment, riprap or other protective material, as shown or directed, to provide a suitable foundation. Maintain the toe trenches until the geotextile or filter blanket, if any, and stone embankment, riprap or other protective materials are placed.

(d) Borrow Excavation - Whenever the Specifications or Contract plans call for an Agency furnished borrow source for earthwork materials, the material excavated from such source and used in the work as earthwork materials will be classed as "Borrow Excavation". Excavate and use these materials according to the Contract provisions, or as directed.

(e) Blasting - The use of explosives will not be allowed on the Project.

00330.42 Embankment, Fills, and Backfills - Consider the nature, characteristics, and qualities of the materials to be selected before performing embankment, fill, and backfill work. Select and use excavated materials in various parts of the work according to 00330.41(a). Use all materials originating from required excavations, as far as practical, in the formation of embankments and subgrade, and for bedding, backfilling and other purposes shown on the plans, as directed, and according to the following:

(a) Embankment Foundation Preparation - In addition to the excavation and replacement of unsuitable materials as provided in 00330.41(b), and before constructing embankments, prepare the areas on which embankments are to be constructed as follows:

(1) Unstable Areas - Where the embankment foundation will not support hauling or compaction equipment and only if directed, place an initial layer of selected materials. Place the initial layer by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the equipment and not greater than 3 feet, unless otherwise authorized. Do not place the initial layer higher than 3 feet below subgrade. Commence consolidation of the initial layer by routing construction equipment uniformly over the entire layer. The initial layer shall meet the compaction

requirements of 00330.43 except for layer thickness. Subsequent layers shall meet all requirements of 00330.43.

(2) Ends of Abandoned Pipe - Place a watertight cap or plug in the inlet ends of remaining abandoned pipes. Place a screen over the outlet ends of remaining abandoned pipes, and if directed, place free draining cover material and/or take other measures as directed to allow for free passage of drainage.

(3) Drainage - Provide drainage and drainage structures as called for by the plans or as directed.

(4) Existing Surfacing - Scarify and break up existing surfacings before placing embankment material.

(5) Roughen Ground Surface - Break up, roughen or scarify the ground surface if the slope is 1V:5H, or less, to positively bond embankment materials with the existing ground with benching allowed as a supplement.

(6) Foundation Benching - If existing ground surfaces or existing embankment surfaces are steeper than 1V:5H, bench the existing ground or embankment.

Make the bottom bench at least 10 feet wide. Each succeeding bench shall penetrate the slope at least 3 feet horizontally beyond the vertical side of the previous bench, and be wide enough to operate placing and compaction equipment. Each bench and embankment layer surface shall be brought to a slope flatter than 1V:10H. The benching, placing and compaction operation shall be performed simultaneously from the bottom up.

Place and compact the bench excavation material combined with new embankment material in layers to the thickness and compaction required in 00330.43.

(7) Compact Existing Ground - After roughening the existing ground surface and/or benching, compact the top 1 foot of existing ground and embankment in place to the density specified and with compaction equipment specified, according to 00330.43.

(b) Excess Moisture - Do not place material in final position in embankments or as backfill until excess moisture has been removed to within minus 4% to plus 2% of optimum moisture as required in 00330.43. Remove excess moisture by manipulation, aeration, drainage, rehandling or other means, at no additional cost to the Agency.

(c) Embankment Construction:

(1) General - Except as provided in 00330.42(a-1), do not construct embankments or fillings when the embankment material, the foundation or the embankment on which it would be placed is frozen, not stable or not compacted, unless otherwise directed.

Make embankment slopes as smooth, safe and slightly as practical with the materials used to construct the embankments.

Route hauling equipment over the full width of embankments. Traveling over the same areas repeatedly will not be allowed unless approved by the Engineer as unavoidable.

Place embankments and all fillings in nearly horizontal layers not more than 8 inches thick, except as provided in 00330.42(c-2). Compact each layer separately and to the density required in 00330.43.

Place slope berms, if required, according to 00280.

(2) Rock in Embankment Construction:

a. General - Retrieve cobbles and boulders that fall or roll outside embankment limits and place them within embankments as specified, or dispose of them as directed.

b. Limited Quantities of Rock - If embankment materials contain up to 50% rock, sort the materials until they can either be placed in 8 inches layers, or meet the requirements of and be placed according to 00330.42(c-2-c).

c. Oversize Durable Rock Fragments - Placing isolated individual durable rock fragments having dimensions greater than the specified layer thickness will be allowed if:

- Clearance between adjacent fragments provides adequate space for placement and compaction equipment between rock fragments to place materials in horizontal layers as specified and for compaction according to 00330.43.
- No part of the fragment comes within 36 inches of subgrade.

d. Durable Rock - If embankment materials contain more than 50% durable rock, distribute and manipulate the rock so that the voids between the larger pieces are filled with smaller pieces forming a dense and compact mass. Durable rock is defined in 00110.20. In the absence of two cycle slake durability test results, the rock durability will be visually evaluated.

When such embankments cannot be placed in 8 inches horizontal layers, place the embankment in nearly horizontal layers of the thickness directed, but not more than 15 inches.

If the visible quantity of silt and clay materials passing the No. 200 screen is less than 20% by volume, as determined by the Engineer, the maximum rock fragment size and layer thickness may be increased to 36 inches, but the layer thickness shall not exceed the average maximum size of the rock fragments.

e. Nondurable Rock - In the absence of two cycle slake durability test results, the Engineer will visually evaluate if the rock is potentially degradable. If embankment materials contain more than 50% nondurable rock, as defined in 00110.20, process the material as follows:

- Pulverize nondurable rock to 12" - 0 size and place in nearly horizontal layers not more than 12 inches thick.
- Water to promote slaking and breakdown of the nondurable material according to Section 00340.
- The moisture content of the material at the time of compaction shall be within the requirements of 00330.43.
- Compact the material to density/deflection requirements specified in 00330.43 with a tamping-foot roller that meets the requirements of 00330.20. Each embankment layer shall receive a minimum of three coverages with the tamping-foot roller. Operate the roller at a uniform speed not exceeding 3 mph. No additional compensation will be made for additional roller coverages to meet the requirements of 00330.43.

(3) Embankment Slope Protection - Construct outer portions of embankments exposed to erosion by stream flow or other erosive action with rock fragments, or other desirable materials, if directed, and such are available in the excavations. Also, if directed, place similar material as a protective layer on the outside of the regular embankment slopes as embankment widening. Placement shall closely follow construction of the embankment when directed. Protective materials placed as embankment widening need not be compacted but shall present a reasonably smooth surface, resistant to washout or slippage.

(4) Embankments for Approaches, Connections, Etc. - Construct embankments as required and as directed to provide a complete Project. Construct according to 00330.42(c) and 00330.42(d).

(5) Embankment Construction Around Minor Structures - Backfill prior excavations in the vicinity of curbs, walks, driveways, inlets, manholes and other such minor structures with selected general backfill, or selected granular backfill material as directed with no particles larger than 1 inch and that is compatible with the adjacent material, unless otherwise specified. The material shall have a moisture content as specified in 00330.43, be placed in layers according to 00330.42(c-1), and compacted according to 00330.43.

(6) Embankment Construction at Pipes - Before installing any pipes with 72 inch or smaller, inside nominal diameter that will protrude above the existing ground surface:

- Provide temporary drainage at no additional cost to the Agency, unless provided for in Section 00240.
- Construct specification embankments at least five pipe diameters each direction from the pipe centerline and to a height equal to the following:
 - 12 inches minimum above the outside top of pipe elevation.
 - A higher height if called for on the plans or directed.
- Then trench, bed, and install the pipe, and backfill around all pipes according to 00445.45.

(d) Stone Embankment - If the Contract plans or Specifications require embankments, or parts of embankments, to be constructed of stone embankment material, furnish and place the stone embankment material according to this provision and as directed. Furnish materials from Contractor provided sources which conform to the requirements of 00330.16, unless otherwise specified.

Construct these embankments according to the other provisions of 00330.42, unless otherwise specified or directed, and as follows:

- Material placed in the upper 1 foot of embankments or within 1 foot of a culvert or other structure, shall not be more than 3 inches in size.
- If placement in water is allowed, construct the first layer of embankment to an elevation 2 feet above water. Continue thereafter as specified or directed.
- Some rock fragments larger than 15 inches, but not larger than 36 inches may be placed provided they are placed and compacted according to 00330.42(c-2-c).

00330.43 Earthwork Compaction Requirements:

(a) General - Compact natural ground, embankment foundations, foundations for structures, each layer of embankment, fills, and backfills, the upper 1 foot of roadbeds in cuts and other earthwork which is to support any part of the roadbed prism according to this subsection.

Unless otherwise specified, compact in place the entire surface of each layer of all specified materials with a minimum of three coverages, using equipment made specifically for compaction. Select compaction equipment based on the type of material being compacted and the layer thickness. Normal compaction equipment consists of sheeps-foot rollers, tamping-foot rollers, grid rollers, pneumatic-tired rollers, and vibratory rollers. Routing of hauling and grading equipment will not be accepted as adequate to achieve compaction, except as provided in 00330.42(a-1).

In the immediate vicinity of minor structures as provided in 00330.42(c-5), in holes, around and under isolated individual rock fragments, and elsewhere where embankment and filling materials can or cannot be reached by normal compaction equipment, compact with machine-operated pneumatic or mechanical tampers, or by hand methods if allowed, as required to ensure intimate contact between the backfill material and the structure or fragment and provide thorough compaction.

(b) Moisture-Density Testable Materials:

(1) Test in-place materials for compaction.

(2) In-place materials shall meet the following moisture content, density, and deflection requirements, each of which has equal weight and each of which shall be satisfied:

a. Moisture Content - Moisture content at the time of compacting the materials shall be prepared to within minus 4% to plus 2% of optimum moisture content. Material which does not contain sufficient moisture to obtain proper compaction shall be wetted and thoroughly mixed as directed. Material containing an excess of moisture shall be dried by manipulation, aeration, drainage or other means before being compacted.

b. Density - After compaction of each layer the density shall be at least:

- 95% of maximum density per ASTM D698 in roadbed cuts, to a depth of 1 foot below established subgrade elevation.
- 90% of maximum density per ASTM D698 in embankments, fills, backfills, and specified portions of existing ground.

c. Deflection Requirement - In addition to moisture-density testing, conduct at least one deflection test according to ODOT TM 158 for each 3 feet, or portion of 3 feet, of embankment placed. If the layer being tested exhibits any yielding, deflection, reaction or pumping, rework the area to provide acceptable test results prior to placement of any additional material.

Conduct deflection tests, witnessed by the Engineer, on the finish grade of all subgrades. During placement of subbase or base aggregates or MHMAC, if deflection is observed, remove the MHMAC, base and subbase aggregates and correct the deflecting areas at no additional cost to the Agency.

Provide a signed test report to the Engineer at the end of each shift after completing the required testing. At no additional cost to the Agency, remove and replace embankment constructed thicker than 3 feet that was not deflection tested.

(c) Non-Moisture-Density Testable Materials - When material is not moisture-density testable because rock fragments in the material prevent moisture-density testing, place and compact the material as follows:

- Place non-moisture density testable material in nearly horizontal layers with thickness not exceeding 12 inches.
- Water or aerate the material to ensure each layer can be compacted to form a dense mass, free of pumping.
- Compact each layer uniformly with a minimum of four full coverages using a smooth drum vibratory roller.
- Conduct at least one deflection test according to ODOT TM 158 for each layer of embankment placed. If the layer being tested exhibits any yielding, deflection, reaction or pumping, rework the area to provide acceptable test results prior to placement of any additional material.

(d) Small, Irregular Fill Areas - The density requirements of 00330.43 do not apply to irregular fill areas that have a total volume of no more than 150 cubic yards outside of the travel lanes. Construct these areas according to the following:

- Place embankment material in nearly horizontal layers with thickness not exceeding 8 inches.

- Water or aerate the material to ensure each layer does not deflect under the action of the roller used for compaction.
- Compact each layer using a roller appropriate to the material being placed and as directed. Use a smooth drum vibratory roller for sands and gravels; use a sheepsfoot or tamping foot roller for silts and clays. The Engineer will determine the classification of the embankment soil
- Compact each layer uniformly with a minimum of five full coverages of the specified roller.
- In areas not accessible to rollers, use compaction equipment suitable for the area and compact each layer with sufficient coverages to produce a firm unyielding surface.

00330.45 Filling of Holes - Backfill holes outside the limits of required excavation or embankment construction that result from grubbing and removal work, basements, trenches and other such holes as directed. Smooth and shape to blend with the surrounding area. If the basis of performance is the excavation basis, no separate payment for this work will be made. If the basis of performance is the embankment basis, payment for this work will be made according to 00330.94.

00330.46 Watering of Materials - Water materials as directed to provide compaction and required density to embankments and backfills and to alleviate dust nuisance according to Section 00340.

00330.47 Specified Selected Courses or Layers of Materials - In addition to the requirements of 00330.42, select, sort, and place courses or layers of materials if included in the Contract Schedule of Items. Select and sort the materials obtained from required excavations and place in locations and thicknesses specified or as directed.

Place and construct selected courses or layers to conform to the requirements of 00330.42 and 00330.43, unless otherwise specified.

The work covered by this provision may include, but is not limited to:

- Selected Embankment Material
- Selected Subgrade Material
- Selected Stone Embankment Material
- Selected Topsoil

00330.49 Construction Slide Removal and Repair - Remove construction slide materials and repair construction slide damages to the work according to Specifications, or as directed, and as follows:

(a) **Definition** - For the purposes of this provision:

(1) **Slide** - A slide is a lateral movement of earth materials.

(2) **Construction Slide** - A slide outside the designated limits of excavations, or below the foundation within designed limits of embankments or within embankments, which occur after excavation or embankment construction starts and before final acceptance of the Contract.

(3) **Slide Materials** - Materials displaced as the result of a slide.

(b) **Remove Construction Slide Materials** - Within the limits of established or reestablished lines, grades and slopes, do the following:

- Excavate and remove construction slide materials.
- Sort and dispose of unsuitable materials.
- Use excavated slide materials, to the extent practical, in embankments, fills, backfills, widenings, and for flattening slopes within the Project limits.

- Dispose of excess material according to 00330.41(a-4)

(c) Construction Slide Repair - Reconstruct or restore subgrade and slopes to the established or reestablished lines, grades and slopes. Reconstruct or repair damaged structures or facilities within construction slide areas.

(d) Responsibility For Construction Slide Removal and Repair:

(1) Contractor Responsibility - Perform construction slide removal and repair work at no additional cost to the Agency when caused by any of the following:

- Embankment foundation conditions or pre-existing subsurface conditions that were reasonably anticipated in the Contract.
- Contractor's method and manner of operations.
- Contractor's failure to perform or to protect the work according to plans and Specifications.

(2) Agency Responsibility - Slide removal and repair work will be paid for according to 00330.90 when all of the following apply:

- Caused by embankment foundation conditions or pre-existing subsurface conditions that were not reasonably anticipated in the Contract.
- Not caused by Contractor's method and manner of operation.
- Not caused by Contractor's failure to perform or to protect the work according to plans and Specifications.

Finishing and Cleaning Up

00330.70 General - Immediately before completing the earthwork:

- Blend the tops of cutbanks with the adjacent terrain.
- Trim and finish all roadbeds, ditches, waterway channels, and other excavations and embankments to the lines, grades, and cross sections established.
- Clean up debris and foreign matter of all kinds on the entire right-of-way area. Dispose of materials as directed.
- Finish the subgrade to be within a tolerance of plus or minus 3/4 inch and to be free of ruts, depressions and irregularities.
- In planting and seeding areas, remove all rocks, boulders, and vegetative matter.
- Remove all litter, debris and obstructions.

00330.71 Daily Progress Reports - For projects that have more than 2,500 cubic yards of embankment material, regardless of the basis of performance, (excavation or embankment), provide daily progress reports documenting the quantities of materials placed and a summary of tests performed. The Contractor is required to obtain an approved testing laboratory to monitor the placement of embankment materials. Use report forms approved by the Agency. Submit the reports to the Engineer at least weekly.

Measurement

00330.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

00330.90 Payment - No separate or additional payment will be made for work that is required to be done under these Specifications that does not appear as a separately listed item in the Contract Schedule of Items.

Section 00340 - Watering

Description

00340.00 Scope - This work consists of furnishing and applying water for:

- Compacting and preparing excavations, embankments, backfills, subgrades, subbases, bases and surfacings.
- Preventing or alleviating dust nuisance originating within the Project limits, which is not caused by Contractor operations at the Contractor's plants or plant setups.
- Other watering when ordered, except for Extra Work.

00340.02 Exclusions - Watering which is specified as Incidental and included in payment for other items or parts of work is excluded from measurement under this Section.

Materials

00340.10 Water - Furnish water free of silts and other matter harmful to the quality of the material to which it is applied or with which it is mixed.

Comply with Chapter 537 of the "Oregon Water Laws", which is administered by the Water Resources Department, covering the appropriation of water.

Most adjudicated water may be limited to agricultural uses, so it should not be assumed that there will be any water sources in the immediate area of the Project available for the Contractor's use.

Equipment

00340.20 Watering Equipment - Perform uniform and controlled application of watering by one or more of the following methods:

- Tank trucks equipped with spray bars
- Hose and nozzle
- Wetting materials in stockpile or in excavation areas before excavating
- Other means, as directed

The use of splash boards will not be allowed without prior approval. When required, provide a metering device for water measurement.

Construction

00340.40 Watering:

(a) General - Make all necessary arrangements to obtain water and pay all costs involved in its procurement. Maintain an adequate supply of water at all times.

Perform watering only when and where directed at an approved rate and manner of application. Water at any hour of the day, and on any day of the week, as directed, for proper performance or protection of the work and for alleviation of dust nuisance.

Maintenance

00340.60 Avoidance of Detrimental Operations - Avoid wasting water or watering detrimental to other work. Cease such operations until corrective measures are directed.

Measurement

00340.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

00340.90 Payment - No separate or additional payment will be made for work performed under this Section.

No separate or additional payment will be made for obtaining permits, water rights, or any other costs related to complying with the "Oregon Water Laws".

When the Contract Schedule of Items does not indicate payment for work performed under this Section, no separate or additional payment will be made. Payment will be included in payment made for the appropriate items under which this work is required.

00340.91 Quantity Variations - Payment for watering items performed beyond 25% of the quantity shown in the Contract Schedule of Items will be made at the Contract unit price if the Engineer determines that the Contract unit price does not exceed the value of the work as determined on the basis of rates given in Section 00197. If the Engineer determines that the Contract unit price exceeds the value of the work, payment for the additional work will be made according to Section 00196.

Section 00405 - Trench Excavation, Bedding, and Backfill

Description

00405.00 Scope - This work consists of excavating trenches, constructing trench foundations, and placing bedding, pipe zone material and backfill.

00405.01 General - Excavate, backfill and dispose of excess excavated materials related to waterline and appurtenances and vaults.

Trench excavation does not include earthwork covered under any other section, or any earthwork that may be specifically included and provided for other pay items of the Contract.

00405.02 Definitions:

Boulder Excavation - The removal, without drilling, blasting or splitting, of masses of rock having one or more dimensions of 3 feet or greater.

Common Excavation - The removal of all material not classified as rock excavation.

Flexible Pipe - For the purpose of these Specifications, potable water pipes and pipes constructed of corrugated metal, PVC, and polyethylene are considered flexible pipes.

Pipe Bedding - Furnishing, placing and compacting specified materials on the trench foundation so as to uniformly support the barrel of the pipe.

Pipe Zone - The area from the top of the bedding to a point 12 inches, minimum, above the top outside of the pipe barrel for the full width of the trench.

Rigid Pipe - For the purpose of these Specifications, pipes constructed of concrete and ductile iron are considered rigid pipes.

Rock Excavation - Excavation of solid ledge rock that, in the opinion of the Engineer, requires for its removal drilling, wedging, sledging, barring or breaking up with power-operated tools.

The term "Rock Excavation" indicates a method of removal and not a geological formation.

Surface Removal - The removal of surface material such as topsoil, sod, pavement, sidewalks, or gravel, that requires different equipment or methods than those used for trench excavation.

Trench Backfill - Furnishing, placing, and compacting material other than Controlled Low-Strength Material (CLSM) in the trench, between the top of the pipe zone material and the bottom of the pavement base rock, ground surface or surface material.

Trench Excavation - The removal of all material encountered in the trench to the depths as shown or as directed. Trench excavation is classified as either common or rock excavation.

Trench Foundation - The bottom of the trench on which the pipe bedding is to lie and which provides support for the pipe.

00405.03 Lines, Grades, and Cross Sections - Excavate trenches to the lines, depths, grades and cross sections shown on the plans or as established. Variations will be allowed only when necessary to ensure firm foundations and when such variations will not be detrimental to the work and approved by the Engineer.

Materials

00405.10 General - Materials may be native or imported, as specified.

00405.11 Trench Foundation - Where additional excavation is required due to groundwater or other unstable conditions so that the native material cannot support the pipe, furnish one of the following materials for trench foundation:

- Selected stone backfill consisting of a combination of durable sand, gravel and cobbles, selected as directed from specified excavations, which contains no particle with any dimension greater than 3 inches, and no unsuitable material.
- Other approved material.

00405.12 Bedding - If groundwater is present in the bedding zone, use 3/4" - 0 aggregate bedding. If groundwater is not present, and unless otherwise specified, furnish one of the following materials for bedding the pipe:

- Commercially available 3/4" - 0 aggregate.
- Reasonably well graded, from maximum size to dust, sand with 100% passing the 3/8 inch sieve.

00405.13 Pipe Zone Material - For pipes, backfill the pipe zone with bedding material as described in 00405.12 and as shown on the Plans.

00405.14 Trench Backfill - Furnish the following materials where shown or required:

- (a) **Class A Backfill** - Use native or common material that contains no particles larger than 3 inches, and in the opinion of the Engineer, meets the characteristics required for the specific surface loading or other criteria of the backfill zone.
- (b) **Class B Backfill** - Use granular material consisting of gravel or crushed rock meeting the requirements of Section 00641. Designated size shall be 3/4" - 0.
- (c) **Class E Backfill** - Use Controlled Low-Strength Material (CLSM) conforming to Section 00442.

00405.15 Quality Control - Provide quality control according to the General Conditions.

Construction

00405.40 General - Perform all excavation and backfilling according to the following requirements:

- (a) **Temporary Handling of Water** - Provide temporary measures according to 00405.43.

00405.41 Trench Excavation - Excavate trenches according to the following:

- (a) **Within Paved Areas to Be Preserved** - Excavate trenches for pipe installation by the open excavation method, unless otherwise directed. Do not disturb the adjoining pavement.
- (b) **Open Trench Limit** - Limit the length of open trench to 100 feet, or as allowed.
- (c) **Trench Width** - Keep the trench width at the ground surface to the minimum necessary to install the pipe in a safe manner, but not less than 24 inches. In all cases, make trenches of sufficient width to allow for shoring and to permit proper jointing of the pipe and backfilling of material along the sides of the pipe. Refer to the Plans for minimum trench widths for various diameter pipes. Make excavations for structures wide enough to provide a minimum of 12 inches between the structure surface and the sides of the excavation. Keep the top of the trench within right-of-way or permit limits.

(d) Trench Grade - Excavate trenches to the lines and grades shown or as established, with proper allowance for pipe thickness, pipe bedding and foundation stabilization. Place pipe bedding on a firm, undisturbed, foundation, true to grade. If the trench is excavated below grade without authorization, restore to grade with material of the type specified for pipe bedding at no additional cost to the Owner. Place the material over the full width of the trench, in compacted layers not exceeding 6 inches.

(e) Disposal of Excess Material - Place excavated material at locations and in such a manner that it does not create a hazard to pedestrian or vehicular traffic, or interfere with the function of existing drainage facilities.

Make arrangements for and dispose of all excess material not required elsewhere on the Project in an approved manner, at no additional cost to the Owner.

If the quantities of excavated materials are greater than required to construct embankments and to do all filling and backfilling, the remaining materials shall be classed as waste materials and be disposed of.

Waste materials become the property of the Contractor at the point of origin. Unless otherwise specifically allowed and subject to the requirements of 00280.03, dispose of waste materials outside and beyond the limits of the Project and Owner controlled property according to 00290.20(c). Do not dispose of any materials on any wetland, either public or private or within 300 feet of any river or stream.

(f) Trench Protection - Provide the materials, labor and equipment necessary to protect trenches at all times. Provide safe working conditions in the trench and protect the work, existing property, utilities, pavement, and the public. The method of protection shall be according to the Contractor's design. The Contractor may elect to use any combination of shoring, overbreak, tunneling, boring, sliding trench shields or other methods of accomplishing the work, provided the method meets with the approval of the Engineer and complies with all applicable local, state, and federal safety codes.

Be responsible for damages resulting from improper removal of shoring or from failure to shore.

(g) Existing Abandoned Facilities - Remove and dispose of existing abandoned pipe, structures and other facilities as necessary to construct the trench according to 00405.41(e).

00405.42 Rock Excavation - Where rock excavation as defined in this Section is required, remove the rock to provide the minimum clearances shown on the Drawings. Excavate and remove the overburden and expose the rock to allow the Engineer to measure the rock prior to removal.

00405.43 Dewatering - Contractor is responsible for all dewatering required for the Project. Promptly remove and dispose of all water entering the trench during the time the trench is being prepared for the pipe laying, during the laying of the pipe and until the backfill at the pipe zone has been completed. Dispose of the water in an approved manner as Engineer directed without damage to adjacent property.

Control groundwater to prevent softening of the bottom of excavations or formation of "quick" conditions or "boils". Design and operate dewatering systems to prevent removal of the natural soils and so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.

When dewatering near a river, lake, or stream, conform to the requirements of 00290.30(a) and Section 00280. When the presence of water or other conditions in the excavated area would be detrimental to the purpose of the work, obtain approval of the Engineer for the temporary measures required to correct or care for the condition.

00405.44 Trench Foundation - Make the full length and width of completed trench bottoms firm. Do not place bedding material before the trench foundation is inspected and approved. If bell and spigot pipe is used, recess the trench bottom to accommodate the bell.

When, in the judgment of the Engineer, the existing material in the bottom of the trench is unsuitable for supporting the pipe, excavate below grade, as directed. Replace the excavated material with imported trench foundation material conforming to 00405.11. Place the trench foundation material in 6-inch layers and compact according to 00330.43 except compact selected stone backfill material in 12-inch layers. Bring the trench foundation material to the elevation established.

00405.45 Pipe Bedding - Spread the bedding smoothly to the proper grade so that the pipe is uniformly supported along the barrel. Excavate bell holes at each joint to permit proper assembly and inspection of the joint. Bedding under the pipe shall provide a firm, unyielding support along the entire pipe length.

00405.46 Backfilling - Backfill with material conforming to 00405.13 and the details shown, or as directed.

(a) General - Begin backfilling when:

- The foundation has been prepared, if required.
- The bedding has been prepared.
- The drainage facilities and fittings are installed.
- The installation has been inspected and approved.

Thoroughly tamp and compact all trench backfill with machine or pneumatic operated tampers of a size and type that will obtain the required density.

(b) Pipe Zone - Place the materials in the pipe zone in layers not greater than 6 inches thick and in a manner that equalizes pressure on the structure and minimizes stress. Before placing backfill material, condition, aerate, or wet the material so that the moisture content of each layer is within minus 4% to plus 2% of optimum moisture content.

As required under the haunches of pipe and in areas not accessible to mechanical tampers or to testing, compact with hand methods to ensure intimate contact between the backfill material and the pipe or structure. Provide thorough compaction.

Ponding or jetting will not be allowed within the pipe zone.

(c) Trench Backfill - The following requirements apply in the trench backfill area and in the pipe zone, except where in conflict with the requirements of 00405.46(b):

(1) General - Use Class A trench backfill unless otherwise specified or approved.

The Engineer may sample excavated material to determine the suitability of the Class A material for use as backfill. If the material is approved, the Contractor may elect to use the material in place of the specified backfill. Prevent excavated material from becoming saturated beyond the critical moisture limits, and replace any saturated Class A material with Class B material, as specified, at no additional cost to the Owner.

(2) Class A or B Backfill - Backfill the trench above the pipe zone in successive lifts. Do not allow the backfill to free-fall into the trench until at least 3 feet of cover is provided over the top of the pipe. Modify the method of compaction as necessary to protect the pipe.

Compact the top 3 feet of trench backfill material within the roadway and shoulders, and within a 2V:1H slope line projected from each subgrade shoulder, to not less than 95% of maximum density. Compact all other trench backfill material to not less than 90% of maximum density.

The Owner will determine the maximum density by ASTM D698. If the specified compaction is not obtained, the Contractor may be required to use a modified compaction procedure or reduce the thickness of lifts. Do not proceed with excavation and pipe laying operations until the backfill can be compacted to the satisfaction of the Engineer.

Initial compaction testing will be performed by the Owner when the Contractor notifies the Engineer that the material is ready to be tested. If sufficient compaction has not been obtained, the cost for subsequent re-testing to confirm conformance with the Specifications will be borne by the Contractor.

If the material is not density testable, the Engineer will observe each layer for deflection or reaction under the compaction equipment to verify that no soft or pumping areas remain. Compact until there is no perceptible deflection under the compaction equipment.

When the backfilling is complete, finish the surface area as specified. In paved or graveled areas, maintain the surface of the trench backfill level with the existing grade with 3/4" - 0 crushed aggregate material, or asphalt concrete if directed, until final pavement replacement is complete and accepted.

(3) Class E Backfill - Backfill the trench above the pipe zone with CLSM material. If the CLSM is to be used as a temporary surfacing, backfill the CLSM to the top of the trench and strike it off to provide a smooth surface. If the CLSM is not to be used as a temporary surfacing, backfill the CLSM up to the bottom of the proposed resurfacing. No compaction of CLSM is allowed. Use steel plates to protect the CLSM from traffic a minimum of 24 hours. After 24 hours, the CLSM may be paved, or opened to traffic until permanent surface restoration is completed, if it has hardened sufficiently to prevent rutting.

(d) Temporary Trench Plating - When temporary steel plates are installed over a street or driveway cut, they shall be capable of carrying at least an MS-18 loading. Place steel plates with a minimum of 12 inches bearing on all sides of a cut. Anchor steel plates to minimize shifting. Shim the edges of all steel plates with cold mix asphalt.

(e) Temporary Resurfacing in Cold Weather - If asphalt resurfacing is not completed prior to the winter shut-down of the asphalt plant, open cuts in the asphalt shall be temporarily surfaced with cold patch asphalt material. Contractor shall periodically inspect and maintain the temporary patches, or as directed by the Engineer, until the asphalt plates reopen and HMAC is installed.

00405.48 Surface Removal:

(a) General - For trench resurfacing, see Section 00495.

(b) Topsoil - Where trenches cross lawns, garden areas, pastures, cultivated fields or other areas on which topsoil exists, remove the topsoil to a minimum 12 inch depth and place the material in a stockpile. Do not mix the topsoil with other excavated material. After the trench has been backfilled, replace the topsoil.

In lieu of stockpiling the topsoil, approved imported topsoil may be substituted, to a depth specified or approved, at no additional cost to the Owner.

Maintain the finished grade of the topsoil level with the area adjacent to the trench until final acceptance by the Engineer, and repair damage to adjacent topsoil caused by the Contractor's operations. Remove all rock, gravel, clay and other foreign materials from the surface. Regrade and add topsoil as required.

(c) Pavement - Use saws to cut bituminous pavement, regardless of thickness. In bituminous pavement, when no pavement overlay will occur, saw-cut the pavement along each edge of the area to be removed. When roadways will receive a pavement overlay as part of the Project or following trench resurfacing, bituminous pavement to be removed may be cut by wheel cutter, jack hammer, or other approved methods.

Upon completion of backfill and just prior to pavement re-surfacing, saw the surfacing on both sides of the trench a minimum of 12 inches wider than each top of the trench. In areas of any undermined or damaged surfacing, re-saw to a width outside these areas. When saw-cutting, follow lines parallel to the pipe centerline.

Where the width changes in areas of asphalt pavement re-surfacing, cut the transition between the different widths at 45 degrees. When the pipe line changes direction, or there is a connecting pipe line that requires the saw cut alignment to change at an angle greater than 60 degrees, make a minimum 24 inch transition saw cut. If there is damaged or undermined surfacing at the transition point, make the transition saw cut beyond the damaged or undermined surfacing. Make the transition saw cut angle half the angle change in the direction of the pipe line or connecting line.

If the asphalt surfacing is to be overlaid, the second saw cut will only be required to firm subgrade.

A second saw cut for pavements will not be required unless needed to reach firm subgrade.

Remove and dispose of pavement lying within the limits of the cuts and from any adjoining areas damaged by the cutting and removal operations according to Section 00310.

Measurement

00405.80 Measurement - Except for rock excavation, boulder excavation, and trench foundation, no measurement of quantities will be made for work performed under this Section.

00405.81 Rock Excavation and Boulder Excavation - The quantities of rock excavation and boulder excavation will be measured as follows:

(a) Rock Excavation - Rock excavation will be measured on the volume basis. Measurement will be of the actual dimensions of rock removed within the following limits:

- **Length** - Length will be the horizontal distance measured along the centerline of the trench excluding manholes, inlets, and other structures.
- **Width** - Width will be the width of the rock removed but will not be greater than the outside diameter of the pipe bell plus 16 inches as shown on the Drawings.
- **Depth** - Depth will be measured at 30 foot intervals, or as specified, along the centerline of the trench. The depth will not be greater than 6 inches below the outside bell of the pipe.

Rock excavation for manholes, inlets, and other structures will be computed from the rock excavated to a depth 6 inches below the bottom of the structure and an area within a line parallel with, and 12 inches outside of, the actual dimensions of the manhole, inlet, or structure.

No separate measurement will be made for the following:

- Soft or disintegrated rock.
- Hardpan or cemented gravel that can be removed with a hand pick or power-operated excavator or shovel.
- Loose, shaken, or previously blasted rock or broken stone in rock fillings or elsewhere.

- Rock outside of the minimum limits of measurement allowed, which may fall into the excavation.

(b) Boulder Excavation - Boulder excavation will be measured on the volume basis. Measurement will be made in the field by the Engineer after removal of each boulder from the excavation but prior to removal from the site. Each boulder removed will be measured for length, width, and height. The volume of each boulder will be determined as the product of 85% of each of the three measured dimensions.

00405.82 Trench Foundation - The quantities of unsuitable trench foundation will be measured on the volume basis as follows:

- **Volume Basis** - Trench foundation will be measured on the volume basis, computed using the following dimensions:
 - **Length** - Length will be the horizontal distance measured along the centerline of the trench. Measurement will be continuous through manhole or structure locations.
 - **Width** – Width will be the outside diameter of the pipe plus the minimum width from outside of pipe to trench wall as shown on the drawings.
 - **Depth** - Depth will be the vertical distance from the top of the underlying surface (following excavation of unsuitable material) to the bottom of the pipe bedding. The depth will be measured at intervals of 30 feet, or as specified, along the centerline of the trench and the average depth between points will be used for the volume computation.

Payment

00405.90 Payment - The accepted quantities of rock excavation, boulder excavation, and trench foundation will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Rock Excavation	Cubic Yard
(b) Boulder Excavation	Cubic Yard
(c) Trench Foundation.....	Cubic Yard

Item (c) includes removal of unsuitable material and replacement as necessary to provide a stable foundation for the pipe.

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.

Imported topsoil will be paid for according to 01040.90.

No separate or additional payment will be made for:

- trench excavation
- trench backfill
- saw cutting
- trench protection
- pipe bedding
- pipe zone material
- dewatering

- asphalt concrete
- temporary resurfacing in cold weather

Section 00440 - Commercial Grade Concrete

Description

00440.00 Scope - This work consists of furnishing, placing and finishing commercial grade concrete (CGC).

Materials

00440.10 Materials - Furnish materials meeting the following requirements:

Admixtures	02040
Aggregates	02690
Cement.....	02010
Curing Materials	02050
Modifiers.....	02030
Water.....	02020

00440.11 Proportions - Furnish, in writing to the Engineer, the proportions by weight of the following materials before using any CGC:

- air entraining admixtures
- cement
- each size of aggregate
- fly ash
- other admixtures
- water

00440.12 Properties of CGC - Furnish a workable CGC mixture that is uniform in composition and consistency, and has the following characteristics:

- **Entrained Air** - 4.0% to 7.0% (GCG used for thrust blocks do not require entrained air.)
- **Slump** - 5 inches or less
- **Compressive Strength** - Minimum 3,000 psi at 28 days
- **Temperature** - Minimum 50 °F to maximum 90 °F

00440.13 Field-Mixed Concrete - CGC may be field mixed for work items listed in 00440.14(a).

00440.14 Acceptance Sampling and Testing:

(a) General - Acceptance sampling and testing will be based on samples obtained at the site of placement from the discharge of the delivery vehicle. All sampling and testing shall be performed by the Contractor.

(b) Delivery Tickets - Send a delivery ticket with each load of CGC recording the source, day, time of batch, size of load, and quantity of individual constituents in the load. A delivery ticket will not be required for field-mixed concrete.

(c) Plastic CGC - Acceptance of plastic CGC will be based on tests performed by the QCT according to Section 00440.12.

(d) **Hardened CGC** - Acceptance of the hardened CGC will be according to 00440.12.

Construction

00440.40 General:

(a) **Mixing** - Mix CGC to the extent that ensures a uniform distribution of materials throughout the mixture.

(b) **Placing** - Place CGC according to the appropriate Sections in which CGC is required and the following:

- Place using the best common practices to avoid segregation.
- Vibrate and spade to achieve a dense homogeneous concrete, free of voids and rock pockets.
- Place within 90 minutes after batching and mixing.

(c) **Forms** - Provide forms for CGC according to the appropriate Sections in which CGC is required and best common practices. Place to the lines and grades shown or directed.

(d) **Weather** - Do not place CGC when the air temperature is below 35 °F without approval.

Protect CGC from freezing if the air temperature is expected to drop below 35 °F during the first five calendar days after placement.

(e) **Curing** - Cure CGC by covering with wet burlap, canvas, sand, or other acceptable material, and keep moist for a minimum of seven calendar days.

Curing compounds may be used except on concrete surfaces or reinforcement that will come in contact with adjacent concrete pours. Apply curing compounds at a rate of not be less than 1 gallon per 150 square feet.

00440.41 General Surface Finish - Give concrete surfaces a general surface finish

00440.42 Replacement or Price Reduction - Remove concrete represented by cylinders that fail to meet the minimum strength requirement and replace at no additional cost to the Owner. If the Engineer determines that the low-strength concrete is suitable for the purpose intended, the Contractor may accept a price reduction established by the Engineer instead of removal and replacement.

Measurement

00440.80 Measurement - No measurement of quantities will be made for CGC.

Payment

00440.90 Payment - No separate or additional payment will be made for CGC. Payment will be included in payment made for the appropriate items under which this work is required.

Section 00442 - Controlled Low Strength Materials

Description

00442.00 Scope - This work consists of furnishing and placing controlled low-strength materials (CLSM).

00442.01 Definition - Controlled low-strength material is highly flowable lean concrete mix; a mixture of fly ash, cement, fine aggregates, water and admixtures, if necessary.

Materials

00442.10 Materials - Furnish materials meeting the following requirements and as modified in the Special Provisions:

Admixtures	02040
Fly Ash	02030.10
Portland Cement	02010.10

00442.11 Fine Aggregates - Furnish fine aggregates that are commercial quality concrete sand.

00442.12 Proportioning of CLSM Mixture - Furnish the following, to the Engineer, prior to using any CLSM on the Project:

- Written certification of proposed CLSM materials proportions and compressive strength.
- 28-day cylinder reports from a trial CLSM batch based on above certification. Include evidence that compressive strength requirements for specific applications are met.

00442.13 Compressive Strength - CLSM shall attain a 28-day compressive strength of 160 psi - 200 psi under roadways.

00442.14 Acceptance - Acceptance will be based on the Engineer's review and approval of written certification and trial batch cylinder reports as required by 00442.12.

Measurement

00442.80 Measurement - No measurement of quantities will be made for CLSM.

Payment

00442.90 Payment - No separate or additional payment will be made for CLSM. Payment will be included in payment made for the appropriate items under which this work is required.

Section 00445 – Sanitary and Irrigation Pipe

Description

00445.00 Scope - This work consists of constructing or reconstructing sanitary sewer and irrigation pipes in the kinds, sizes, and lengths and at the locations shown or as directed to the lines and grades established. The work includes furnishing and constructing joints and connections to other drainage structures or systems, as necessary, for complete installation.

00445.01 Definitions and Descriptive Terms - The following terms have the meanings presented below when used in this Section:

Aluminum, Concrete, Steel and Polyethylene - The basic material of the pipe

Concrete Block - Encasements, thrust blocks, anchor blocks, plugs and cutoff diaphragms

Culvert - Concrete, corrugated metal, ductile iron or polyethylene pipe

Flexible Pipe - Pipes constructed of corrugated or spiral rib metal, PVC, and polyethylene. For the purposes of these Specifications, all potable water pipes are considered to be flexible pipes.

HDPE - High Density Polyethylene

Irrigation Pipe - Gravity or low-pressure transmission pipe. Refer to Section 01120 for sprinkler-type irrigation pipe.

Joint - The place where the ends of sections or modified sections of pipe contact one another

Metal - Aluminum and steel

Pavement - Driveways, curbs, gutters, walks, dikes, walls and other similar asphalt or portland cement concrete structures

Pipe - All pipe, regardless of kind, size, shape or use

Plain - Unreinforced concrete

PVC - Polyvinyl Chloride

Rigid Pipe - Pipes, other than potable water pipes, constructed of concrete and ductile iron

Sanitary Sewer Pipe - Concrete, PVC, solid wall HDPE or ductile iron pipe

SDR (Standard Dimensional Ratio) - The pipe's minimum outside diameter divided by its wall thickness

Section - The individual pieces in which the furnished pipe is manufactured

Siphon, Storm Sewer, and Irrigation Pipe - Concrete, PVC, HDPE, ductile iron or metal pipe

Steel - The base metal for galvanized sheets and aluminum coated sheets

00445.02 Contractor's Options - If the Contractor has an option of using different kinds of pipe, the option and its installation and other limits will be shown on the plans or on a "Pipe Data" sheet in the plans.

The limiting factors and requirements shown on the Plans or on the Pipe Data sheet are minimums. The Contractor may substitute stronger, larger, and higher quality material at any installation site, provided the substitution is approved and is made at no additional cost to the Agency.

00445.03 Size Determination - The nominal size of pipe will be determined according to AASHTO tolerances for pipe dimensions for the appropriate kind or class of pipe.

Materials

00445.10 General - The manufacturer or fabricator shall furnish appropriate certification, based on the manufacturer's quality control tests, that the materials used in the production of the pipe meet these Specifications. Materials and strength shall be as specified for the particular kind of pipe and fittings required.

Use flexible elastomeric gasket joints on all pipes and fittings. Furnish caps or plugs with each fitting, outlet or stub as required, with the same type gasket or joint as the pipe.

For sanitary sewers provide tee or wye fittings in the main of the same materials as the pipe. All fittings shall be of sufficient strength to withstand all handling and load stresses encountered. Material joining the fittings to the pipe shall be free from cracks and shall adhere tightly to each joining surface.

Cap or plug all fittings and provide with gaskets of the same material as used in the pipe joint. Fit with an approved mechanical stopper, or install an integrally cast knockout plug. The cap or plug shall be capable of withstanding test pressures without leaking and, when later removed, shall permit continuation of piping with jointing similar to joints in the installed line.

00445.11 Materials - Furnish materials meeting the following requirements:

Commercial Grade Concrete in Blocks.....	00440
Metal Reinforcement in Blocks	02510.10
Polyvinyl Chloride (PVC) Pipe	02410.70
Rubber Gaskets	02440.40

(a) Tracer Wire - Use 12-gauge stranded or solid copper insulated high molecular weight polyethylene (HMW-PE) tracer wire. The HMW-PE insulated cover shall be green and a minimum 45 mil thick. The wire shall be UL rated for 140 °F.

00445.15 Quality Control - Provide quality control according to the General Conditions.

Construction

00445.40 General - Construct sanitary sewer and irrigation pipe according to the following:

(a) Trench Work - Excavate trench, prepare bedding, pipe zone material and trench backfill, and dispose of excavated material according to Section 00405 for pipes 72 inches and less in diameter.

(b) Line and Grade - Centerline and grade control will be established prior to the start of construction by the Contractor.

Do not vary from established line and grade by more than 1/32 inch per inch of pipe diameter. Variance shall not exceed 1/2 inch, subject to the following limitations:

- The variation does not result in a level or reverse sloping invert.
- The variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed 1/64 inch per inch of pipe diameter, or 1/2 inch maximum.

(c) Pipe Distribution and Handling - Unload pipe only by approved means.

Inspect the pipe and fittings prior to lowering into the trench to ensure no cracked, broken or otherwise defective materials are used. Clean the ends of the pipe thoroughly, remove foreign matter and dirt from the inside of the pipe, and keep the pipe clean during laying and joining.

(d) Laying Pipe on Curves - Lay pipe on horizontal or vertical curves as shown or approved. When deflecting the pipe from a straight line, either in the vertical or horizontal plane, or when long radius curves are shown, the amount of deflection allowed shall not exceed that recommended by the pipe manufacturer.

00445.41 Installing Pipe under Railroad - Prior to beginning any under-track work, submit plans of construction, and details of the methods and equipment proposed to be used, to the Engineer for submittal to the Railroad. Do not begin under-track work until Railroad approval is obtained.

Within the limits indicated on the plans, do not install the pipe under the railroad tracks by the open trench method. Within these limits install the pipe by tunneling, jacking, boring or similar methods, approved by the Railroad, as the Contractor elects, according to Section 00406. Install the pipe to the lines and grades established and backfill completely all voids around the installation with specified material, to the satisfaction of the railroad.

00445.42 Laying Pipe - Begin pipe laying at the downstream end of the pipe line with the lower segment of the pipe in contact with the shaped bedding throughout its full length and as follows:

- **Rigid Pipe** - Place with bell or groove ends facing upstream.

00445.43 Placing and Joining Pipe:

(a) General - Lay pipe proceeding upgrade with spigot ends in the direction of flow. Assemble joints according to the recommendations of the manufacturer for the type of joint used. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between joints.

Prevent excavated or other foreign material from getting into the pipe. Plug or close off pipes that are stubbed off for future connection. When cutting or machining of the pipe is necessary, use only the tools and methods recommended by the pipe manufacturer. All field joints shall:

- Provide equal or greater strength than the adjoining pipe.
- Fit close and tight.
- Provide a smooth and uniform interior surface.
- Secure and hold adjoining sections to each other.
- Fasten securely to adjoining structures and special sections.

(b) PVC Pipe - Install PVC pipe and fittings according to the manufacturer's recommendations.

Cut the pipe in a neat manner, at right angles to the axis of the pipe, and dress the cut end.

(c) Pipe Joints - Construct field joints, suitable for testing, for sanitary sewers, irrigation, and other installations as specified.

(d) Inspection - After the pipe is laid and joined, and before any backfilling over it, the installation will be inspected. Take up and relay or replace any pipe found to be out of alignment, unduly settled, or damaged.

00445.45 Backfilling:

(a) General - After the pipe is installed and inspected, backfill pipe zone and trench according to Section 00405 for pipes 72 inches and less in diameter.

(b) Exposed Pipe - When the top 25% of the pipe is exposed above the top of the trench, place and compact embankment materials in layers according to the requirements of the plans for the Pipe Zone.

Do not cross any pipe with tractors or other heavy equipment until it has been bedded and backfilled as specified, and is protected by at least a 4 foot cover of compacted fill.

00445.48 Tracer Wire - Install tracer wire in all trenches for sanitary sewers. Place the tracer wire directly over the pipe centerline and on top of the pipe zone material. Place a branch tracer wire over each pipe connected to the main sewer.

Make tracer wire splices using a solderless connection kit that effectively moisture seals two or more conductors for direct burial and securely join the wires both mechanically and electrically. Insulate splices to be moisture and waterproof. Splices wrapped with tape will not be accepted as waterproof. Have all splice kits approved prior to installation.

Test all tracer wire with locating equipment prior to acceptance.

Finishing, Clean Up and Testing

00445.70 General:

(a) Irrigation and Sanitary Sewer Installations - After laying and joining pipe for irrigation and sanitary sewers, and backfilling trenches, test the installations for watertightness, including inlet and outlet connections, to the Engineer's satisfaction. Perform video, deflection, hydrostatic, and low-pressure air testing.

00445.71 Requirements Prior to Tests:

(a) General - All sanitary gravity systems and irrigation systems and appurtenances shall successfully pass a hydrostatic or air test prior to acceptance and shall be free of visible infiltration of water. Test manholes as specified in Section 00470.

(b) Testing Equipment - Furnish all necessary testing equipment and perform the tests in a manner that provides observable and accurate measurements of either air or water leakage under the specified conditions. Calibrate and certify gauges at the direction of the Engineer. Provide the certification with the gauge.

(c) Cleaning - Prior to the testing and inspection of the system, flush and clean all parts of the system and remove all debris.

00445.72 Pipe Testing:

(a) General - After completing installation of the system, including all service connections, backfilling and compaction, and prior to wearing surface paving, conduct a low-pressure air test or a hydrostatic test. Provide all equipment and personnel for the test. Conduct tests during normal working hours. The Engineer may require testing of manhole-to-manhole sections as they are completed in order to expedite the acceptance of the system and allow connections.

The method, equipment and personnel used in testing shall be subject to approval of the Engineer. The Engineer may, at any time, require a calibration check of the instrumentation used.

(1) Safety Precautions - Only qualified personnel will be allowed to conduct the test. All plugs used to close the system for the testing shall be capable of resisting the expected internal pressures. Securely brace plugs, if necessary.

(2) Ground Water - The presence of ground water will affect the results of the test. Determine the average height of groundwater over the lines immediately before starting the test, using an approved method.

(b) Hydrostatic Testing - Pipe and joints shall sustain losses not exceeding 0.04 gallons per hour per inch diameter per 100 feet of pipe when field tested by exfiltration methods, except 0.3 gallons per hour may be used in arid climate zones if approved by the engineer.

The hydrostatic head for test purposes shall exceed the maximum estimated ground water level in the section being tested by at least 72 inches of water column and in no case shall be less than 72 inches of water column above the inside top of the highest section of pipe in the test section, including service connections. The engineer shall make the final decisions regarding test height for the water in the pipe section being tested. The length of pipe tested by exfiltration shall be limited so that the pressure on the invert of the lower end of the section shall not exceed 28 feet of water column.

The pipe test section may be filled 24 hours prior to time of exfiltration testing, if desired, to permit normal absorption into the pipe walls to take place.

All service connection footage shall be taken into account in computing allowable leakage.

(c) Air Testing - The pressure gauge used in air testing shall have minimum divisions of 0.1 psi and an accuracy of 0.0625 psi. All air testing shall be by the Time Pressure Drop Method. The test procedure is as follows:

(1) The Contractor may wet the lines prior to testing.

(2) Determine the average height of the groundwater over the line. The test pressures required shall be increased 0.433 psi for each foot of average water depth over the exterior crown of the pipe.

(3) Add air slowly to the section of system being tested until the internal air pressure is raised to 4 psi greater than the average back pressure due to groundwater.

(4) After the test pressure is reached, allow at least two minutes for the air temperature to stabilize, adding only the amount of air required to maintain pressure.

(5) After the temperature stabilization period, disconnect the air supply.

(6) Record the time in seconds that is required for the internal air pressure to drop from 3.5 psi to 2.5 psi greater than the average backpressure due to groundwater.

The tested section will be acceptable if the time recorded in (6) above is not less than the time in seconds (T) computed by the formula:

$$T = K/C$$

Where:

K = the sum of the computations $(0.011 d^2L)$ for each size of pipe and its length in the section

C = the sum of the computations $(0.0003882 dL)$ for each size of pipe and its length in the section, except that the minimum value for C shall be 1

d = inside diameter of the pipe in inches

L = length of pipe in feet

(d) Individual Joint Testing:

(1) General - The Contractor may test each individual joint for leakage using a pneumatic joint testing apparatus. The method, equipment and personnel used in individual joint testing shall be as approved. The Engineer may, at any time, require a calibration check of the instrumentation used. The pressure gauge used shall have minimum divisions of 0.1 psi and have an accuracy of 0.0625 psi. All air used shall pass through a single control panel.

(2) Method - All air testing shall be by the Time Pressure Drop Method. The test procedure is as follows:

- a. Determine the average height of the groundwater over the line. The test pressures required below shall be increased 0.433 psi for each foot of average water depth over the exterior crown of the pipe.
- b. Add air slowly to the section being tested until the internal air pressure is raised to 4 psi greater than the average backpressure due to ground water.

(3) Acceptance - The joint shall be considered acceptable if the pressure drops less than 1 psi within five seconds.

00445.73 Deflection Testing for Flexible Pipe - Conduct deflection tests of sanitary and storm sewers constructed of flexible pipe prior to wearing surface paving. Conduct the testing by pulling an approved mandrel through the completed pipeline. Use a mandrel having at least 6 vanes and a diameter 95% of the pipe's initial inside diameter.

Conduct testing on a manhole-to-manhole basis after the line has been completely flushed out with water. Conduct the tests not less than 30 days after the trench backfill and compaction have been completed. Tests may be conducted sooner if approved by the Engineer. The tests may be conducted concurrently with video inspection. If conducted concurrently, pull the mandrel in front of the camera so that the deflection testing is clearly recorded on the video tape unless approved by the Engineer. Provide a water depth gauge, located on the video camera side of the mandrel with the following characteristics:

- Graduated with marks at 0.50 inch increments clearly visible during video inspection.
- Capable of measuring water depth in 0.50 inch increments from 0.50 inch to 2.50 inches.
- Designed so that it will remain plumb regardless of the rotation of the mandrel or video camera.

00445.74 Video Inspection of Sanitary and Storm Sewers - After laying and joining sanitary sewer pipe installations from 6 inches to 72 inches in diameter, including backfill and compaction of trenches, but before any finish surfacing or final paving, conduct a video inspection and make a written report of all sanitary sewer pipes and storm sewer pipes.

The video inspection shall be conducted by a technical service that is equipped to make audio-visual recordings.

The audio-visual recordings shall:

- Be in color format.
- Be clear and usable.
- Include a visual footage reading on the recording.
- Include a voice recording of suspected deficiencies.
- Identify groundwater infiltration sources associated with construction or materials defects.

Submit the audio-visual recordings and written report to the Engineer for review. Correct all deficiencies that are revealed in the recording and written report. Make an additional video inspection of repaired pipes at no additional cost to the Agency.

All recordings and written reports shall become the property of the Agency.

00445.75 Repairs - Locate and repair any sections failing to pass the required tests and inspections. Repeat the specified tests and inspections on those sections at no additional cost to the Agency.

Following a successful hydrostatic or air test, visible infiltration of ground water in any section will be considered evidence that the original test was in error or that failure of the section has occurred. Correct such failures and retest the repaired sections, at no additional cost to the Agency.

Measurement

00445.80 Measurement - Pipes and related work performed under this Section will be measured according to the following:

(a) Pipes - The quantities of pipe of the various kinds, types, and sizes, will be measured on the length basis, and will be determined by the length of installation as follows:

- **Length** - The length will be measured, with no deduction for structures or fittings, along the pipe flow line from center to center of manholes, inlets, special sections, or the ends of pipe, whichever is applicable.

Payment

00445.90 General - The Contract unit price for each pay item reflects plan requirements. Repairs to existing irrigation piping will be considered incidental work.

00445.91 Payment - The accepted quantities of pipe and related work items performed under this Section will be paid for at the Contract unit price as listed in the Bid Schedule.

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:

- trench excavation, bedding, pipe zone material, and trench backfill for pipes 72 inches and less in diameter
- pipe plugs, stoppers, and other required fittings
- metal pipe anchors
- tracer wire
- hydrostatic, air, joint, and deflection testing

When the Contract Schedule of Items does not indicate payment for pipes or other work under this Section, no separate or additional payment will be made. Payment will be included in payment made for the appropriate items under which this work is required.

Section 00470 - Manholes

Description

00470.00 Scope - This work consists of constructing manholes. Construct the structures of commercial grade concrete with necessary frames, covers, and other fittings and hardware.

References to manholes, refer to standard structures of specific design and use, and are identified on the plans. The term "concrete" refers to commercial grade concrete.

00470.01 Cast-in-Place and Precast Construction - Concrete manholes shall be cast-in-place or precast, as shown or specified.

Materials

00470.10 Materials - Furnish materials meeting the following requirements:

Commercial Grade Concrete	00440
Joint Material.....	02440.40, 02440.50, 02440.60
Metal Frames, Grates, Covers, and Ladders.....	02450.30
Polyvinyl Chloride (PVC) Pipe, Schedule 40	02410.70
Precast Concrete Manholes.....	02450.10, 02450.20
Reinforcement.....	02510.10, 02510.40

00470.11 Precast Concrete Manholes and Bases - Furnish cones with the same wall thickness and reinforcement as riser sections.

Prior to delivery of precast manhole sections to the job site, yard permeability tests may be required at the point of manufacture. The precast sections to be tested will be selected at random from the stockpiled material to be supplied to the Project. All test specimens will be mat tested, and shall meet the permeability test requirements of ASTM C 497.

Precast manhole sections shall consist of circular sections with a standard nominal inside diameter of 48 inches.

Heights of sections shall be multiples of 6 inches, except heights of manhole sections 72 inches through 96 inches in diameter shall be as required to fit site conditions.

00470.12 Cap Screws - Cap screws and washers for watertight manhole covers shall be stainless steel with 60,000 psi minimum tensile strength conforming to the requirements of ASTM A 453.

00470.13 Inside Drop Manhole Connectors - Furnish stainless steel anchor bolts and anchor straps for inside drop pipe connections.

00470.14 Pipe and Fittings - Furnish pipe and fittings as specified and conforming to the applicable portions of Section 00445. Use tees, ells and other fittings for drop manholes made from the same material as the pipe connecting to the manhole.

00470.15 Pipe Stubouts for Future Sanitary Sewer Connections - Pipe stubouts shall be the same type and strength classification as approved for use in the lateral, main or trunk sewer construction. Where there are two different classes of pipe at a manhole, the higher strength pipe will govern strength classification. Furnish watertight plugs with each stubout and adequately brace against hydrostatic or air test pressures.

00470.17 Base Drain Backfill - Furnish aggregate base or selected granular backfill material that is free from silts or other fines.

Construction

00470.40 General:

(a) Excavation, Backfill and Foundation Stabilization - Excavate and backfill according to Section 00405. When specified, or as directed, remove unstable material that will not support the manhole or other structure, excavate below grade and backfill with trench foundation stabilization material according to Section 00405.

(b) Pipe Connections - Place connecting pipe at the required alignment and grade. Set the connecting pipe through the full thickness of the wall flush with the inner face of the wall. Ensure that pipe connections to the structure are completely watertight. Connect all pipe to manholes according to the manufacturer's recommendations.

Grout concrete pipe connections to manholes so they are watertight, using non-shrink grout conforming to 02440.50. When grouted into the manhole section, the pipe section shall not extend more than 18 inches outside the manhole. If an approved flexible connection for concrete pipe is provided at the manhole, full or partial pipe sections may be stubbed into the manhole as required.

Connect flexible pipe to sanitary manholes using an approved adapter specifically manufactured for the intended service. Use only flexible pipe adapters from the QPL. Do not use field-fabricated waterstops or improvised adapters. Adapters requiring the use of grout for installation shall be anchored and finished using non-shrink grout conforming to 02440.50.

00470.41 Precast Concrete Manholes - Precast manhole components may be used to construct standard, drop and carry-through manholes.

(a) Bases - If bases are cast in place, consolidate the concrete by mechanical vibration. Screed off the concrete so that the first manhole section to be placed has a level, uniform bearing for the full circumference.

If bases are precast, carefully place the base section on the prepared bedding so as to be fully and uniformly supported at true grade and alignment.

Construct the invert to match that of the sewer pipe. Where the size of the sewer pipe is changed at the manhole, construct the invert to form a smooth transition without abrupt breaks or unevenness of the invert surfaces. Where a full section of concrete sewer pipe is laid through the manhole, break out the top to the springline of the pipe for the full width of the manhole, and completely cover the exposed edge of the pipe with mortar. During construction divert existing flows of water or sewage away from new concrete or mortar surfaces to prevent damage to the fresh concrete or mortar until the initial set has been achieved.

(b) Precast Manhole Sections - Thoroughly wet all lift holes, completely fill with nonshrink grout, and smooth and point both inside and out to ensure watertightness.

(1) Sanitary Manholes - Use preformed plastic or rubber gaskets on all joints between manhole sections.

(c) Grates, Frames, Covers and Fittings - Set metal frames for manholes on full non-shrink grout beds to prevent infiltration of surface water or groundwater between the frame and the concrete of the manhole section. If concrete is to be poured around the frames, coat the portion of the frame that will contact the concrete with hot asphalt before placing the concrete. Set frames, covers and grates true to the locations and grades established. Clean bearing surfaces and provide uniform contact. Secure all fastenings. Construct all mortared, sanitary sewer manhole necks and all riser ring joints made with non-shrink grout using an approved commercial concrete bonding agent applied to all cured concrete surfaces being grouted.

00470.45 Steps and Ladders - Fasten steps and ladders to the manhole walls according to the manufacturer's recommendations and as shown.

Maintenance, Clean up and Testing

00470.70 Cleaning - Upon completion, clean each structure of accumulated silt, debris or foreign matter of any kind and keep clean until final acceptance of the work.

00470.71 Sanitary Manhole Acceptance Testing - Field test all sanitary sewer manholes for acceptance by either hydrostatic or vacuum testing after completion of backfilling, compaction and surface restoration, including paving. If the manhole fails the test, make necessary repairs by an approved method, and retest the manhole. Repair and retest the manhole until a satisfactory test is obtained.

(a) Hydrostatic Testing - Perform hydrostatic testing according to ASTM C 497. Plug all inlets and outlets and fill the manhole with water. Fill each manhole to the rim at the start of the test. Leakage in each manhole shall not exceed 0.3 gallons per hour per foot of head above the invert. Determine leakage by refilling to the rim using a calibrated container. Manholes may be filled 24 hours prior to the time of testing to permit normal absorption into the manhole walls.

(b) Vacuum Testing - Perform vacuum testing according to ASTM C 1244. Plug and brace all pipes entering the manhole. Place the test head in or on top of the manhole ring. Draw a vacuum of 10 inches of mercury on the manhole, close the valve on the vacuum line of the test head, and shut off the vacuum pump. Measure the time for the vacuum to drop to 9 inches of mercury. The manhole is acceptable if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches of mercury meets or exceeds the values indicated in the following table:

Minimum Test Times For Various Manhole Diameters

Depth * (feet)	Diameter (inches)								
	30 or less	33	36	42	48	54	60	66	72
8 or less	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	29	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	35	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

* Depth is measured from the top of the manhole to the lowest invert.

** Test times for manhole depths between those shown in this table may be calculated by interpolation.

Measurement

00470.80 Measurement - The quantities of manholes will be measured on the unit basis.

Payment

00470.90 Payment - The accepted quantities of work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Install Sanitary Sewer Manhole	Each

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:

- earthwork not covered as trench or ditch excavation
- pipe connections
- rock backfill
- aggregate base backfill
- acceptance testing

Section 00490 - Work on Existing Sewers and Structures

Description

00490.00 Scope - This work consists of joining new work to existing manholes.

00490.01 Descriptive Terms:

Bypass Pumping - The process of pumping sanitary sewer flows around a manhole or pipeline during the construction or rehabilitation of those facilities.

Manhole - Manhole or similar structure designed to permit entry and working space, usually at intersections of sewer pipes.

Manhole Neck - The upper portion of a manhole, having vertical walls and a uniform diameter or dimension just sufficient to receive and support the metal frame.

Materials

00490.10 Materials - Furnish materials of either existing materials in a condition suitable for reuse and meeting current design, or new materials meeting the following requirements:

Commercial Grade Concrete	00440
Joint Materials	02440.40, 02440.50, 02440.60
Metal Frames, Covers, Grates, and Ladders.....	02450.30
Precast Concrete Sections	02450.10, 02450.20
Reinforcement.....	02510.10

00490.11 High Early Strength Concrete - Furnish high early strength concrete meeting the requirements of commercial grade concrete, except it shall contain a minimum of 705 pounds per cubic yard of Type III or Type IIIA cement or an approved Type C or Type E admixture with a minimum of 592 pounds per cubic yard of Type I or Type II cement.

Construction

00490.40 General - Excavate and backfill according to Section 00405.

New construction shall conform to Section 00470.

Repair, replace or restore to existing condition any manhole or similar structure backfill, aggregate base or pavement disturbed or fouled by the adjustment work as directed.

Bypass pump sanitary sewer flows around the pipe section or manhole being connected to, repaired or replaced by plugging an existing upstream manhole and pumping the flow around the work to a downstream manhole. Submit a bypass pumping plan to the Engineer at least 48 hours before beginning bypass pumping. Use a pump with adequate capacity to handle existing flows and additional flow due to rain. Pumps shall not exceed a noise level of 86 dB at a distance of 50 feet. Do not operate bypass pumps at night except in an emergency. Do not discharge raw sewage onto private property or city streets, or into storm drain systems.

00490.41 Connection to Existing Sewer Manhole:

(a) **General** - Prevent material or debris from entering the line.

When required, provide all diversion facilities and perform all work necessary to maintain flow in existing lines. Obtain the Engineer's approval prior to diverting flows.

(b) Manhole Connections - Core or sawcut openings in the existing manhole base or barrel as required. Construct connections that are watertight and that will provide a smooth flow into and through the manhole. All sanitary sewer pipe connections, including those at invert level as well as penetrations for drop connectors shall conform to the requirements of Section 00470.

Measurement

00490.80 Measurement - The quantities of adjusted and reconstructed manholes inlets, boxes, and other similar structures will be measured on the unit basis.

The quantities of manholes over existing sewers, connections to existing structures, and filling abandoned structures will be measured on the unit basis.

Payment

00490.90 Payment - The accepted quantities of work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Connection to Existing Sanitary Sewer Manhole.....	Each

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:

- earthwork
- backfill
- aggregate bases
- pavements
- connections
- removing and disposing of existing structures and pipe
- bypass pumping

Section 00495 - Trench Resurfacing

Description

00495.00 Scope - This work consists of resurfacing pipe trenches, including replacement of pavement, curbs, sidewalks, rock surfacing, topsoil, landscaping and other features removed or damaged during pipe trenching operations.

Materials

00495.10 Materials - Furnish trench resurfacing materials that either match existing material removed from pipe trenches, or new materials meeting the following requirements:

Aggregate Base and Shoulder.....	00640
Emulsified Asphalt Tack Coat.....	00730
Minor Hot Mixed Asphalt Concrete (MHMAC).....	00744
Rock Surfacing.....	00641

Furnish sand used for edge sealing that is clean sand with no visible sign of silts or organic materials.

Construction

00495.40 General - The following construction requirements are for resurfacing trenches in various locations. Refer to Section 00405 for trench surface removal requirements.

- (a) Minor Hot Mixed Asphalt Concrete (MHMAC) Paving** - Place MHMAC paving according to Section 00744.

- (b) Edge Sealing Tack Coat Application** - Seal all adjoining asphalt concrete pavement surfaces with an edge sealing tack coat. Place sufficient tack coat to seal the adjoining surfaces. After the tack coat has been placed, place clean sand over the tack coat. Reapply additional tack coat and sand cover to any edges that are not completely sealed in the first application.

- (c) Aggregate Base** - Place aggregate base according to Section 00640.

Measurement

00495.80 Measurement – No measurement will be made for Trench Resurfacing.

Payment

00495.90 Payment - No separate or additional payment will be made for work under this Section. Payment will be included in payment made for the appropriate items under which this work is required.

Section 00620 - Cold Plane Pavement Removal

Description

00620.00 Scope - This work consists of removing existing pavement to prepare a foundation for placing new surfacing.

Equipment

00620.20 Equipment - Provide self-propelled planing machines or grinders:

- Capable of loosening pavement material.
- Capable of accurately establishing profile grades within a tolerance of 0.02 foot by reference from either the existing pavement or from independent grade control.
- With a positive means for controlling cross-slope elevations.
- With a totally enclosed cutting drum with replaceable cutting teeth.
- With an effective means of removing loosened material from the surface and preventing dust from escaping into the air.
- Capable of providing a true cross-slope grade that will allow placement of overlay pavement to a uniform thickness.

Construction

00620.40 Pavement Removal:

(a) General - Remove the existing pavement to the depth, width, grade and cross section shown or as directed. The use of a heating device to soften the pavement is not allowed.

(b) Depth 1 inch to 2 inches - If the depth of the existing pavement to be removed is 2 inches or less, but more than 1 inch and the section will be under traffic, schedule the work so the full width and length of travel lanes pavement can be removed during the same shift. Remove the shoulder area within 24 hours.

(c) Depth over 2 inches - If the depth of the existing pavement to be removed is over 2 inches and the section will be under traffic, schedule the work so the full width and length of the travel lanes and shoulders can be removed, leaving no longitudinal or transverse drop-offs, during the same shift.

(d) Pavement Removal Alternative - If unable to complete the pavement removal according to 00620.40(b) and (c), then within the same day construct a wedge of asphalt concrete, at a slope of 1V:10H or flatter along each exposed longitudinal drop-off, and 1V:50H or flatter along each exposed transverse drop-off. Place wedges completely across the milled area at intersections, points of beginning and ending of the milling operation, and around manholes, valve boxes and other structures. Longitudinal drop-offs of 1 inch or less do not require a wedge. Maintain wedges as long as the area remains under traffic or until pavement is replaced. Remove and dispose of wedges before placing new pavement.

(e) Warning Signs - Provide warning signs as required where abrupt or sloped drop-offs occur at the edge of the existing or new surface according to Section 00225.

00620.41 Surface Tolerance - Test with a 12 foot straightedge furnished and operated by the Contractor, as directed. The variation of the top of the ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed 1/4 inch.

00620.42 Disposal of Materials - Materials removed under this Section that are not used on the Project become the property of the Contractor at the point of origin. Dispose of the material according to 00290.20 unless special sites are specified in the Special Provisions.

00620.43 Maintenance Under Traffic - If the cold planed pavement surface will be exposed to traffic, sweep and clean prior to allowing traffic to use the roadway.

Measurement

00620.80 Measurement - The quantities of cold plane pavement removal will be measured on the area basis, in place.

When the depth of pavement to be removed is variable, the depth as shown is an estimate and is approximate only. No guarantee is made that the actual depth will be the same as the estimated depth.

Payment

00620.90 Payment - The accepted quantities of work performed under this Section will be made at the Contract unit price, per square yard, for the item "Cold Plane Pavement Removal (4" Thick)".

Payment will be payment in full for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for temporary wedges constructed, maintained, and removed under 00620.40(d), or for replacement of cutting teeth.

Section 00640 - Aggregate Base and Shoulders

Description

00640.00 Scope - This work consists of furnishing and placing one or more courses of aggregate base and/or shoulders on a prepared surface to the lines, grades, thicknesses and cross sections shown or established.

Materials

00640.10 Materials - Furnish aggregates of 3/4" – 0 conforming to Section 02640.

00640.16 Acceptance of Aggregates - Acceptance will be visual by the Engineer.

Construction

00640.40 Preparation of Foundation - Provide a compacted firm surface on which aggregates are to be placed.

00640.41 Hauling and Placing - Transport the aggregate to the job site, add water to obtain proper moisture content, and place on the prepared surface or material by means acceptable to the Engineer.

00640.42 Thickness and Number of Layers:

(a) **Base** - If the required compacted depth of the base course exceeds 6 inches, construct it in two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

Place each layer in spreads as wide as practical and to the full width of the course before a succeeding layer is placed.

(b) **Shoulders** - Place shoulder aggregates in a single layer, or two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

00640.43 Shaping and Compacting - Compact each layer of material placed in shoulder and base areas by rollers. Provide self-propelled rollers and compactors capable of reversing without backlash. Rollers and compactors shall have a gross static weight of at least 8 tons, and shall be capable of compacting to specified density while the mix is still moist.

Shape and maintain the surface of each layer during the compaction operations to meet the requirements of 00640.44. Produce a uniform texture and firmly key the aggregates.

Apply water over the materials for proper compaction with tank trucks equipped with spray bars, and as directed.

Continue the compactive effort until there is no reaction or yielding observed under the compactor.

00640.44 Surface Tolerance - The finished surface and the surface of each underlying layer of the aggregate shall parallel the established grade and cross section for the finished surface within 1/2 inch.

The finished surface of the compacted aggregate base, when tested with a 12 foot straightedge, shall not vary from the testing edge by more than 1/2 inch at any point. Furnish and operate the straightedge as directed.

Measurement

00640.80 Measurement - No measurement of quantities will be made for Aggregate Base and Shoulders.

Payment

00640.90 Payment - No separate or additional payment will be made for Aggregate Base and Shoulders. Payment will be included in payment made for the appropriate items under which this work is required.

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.

Furnish emulsified asphalt meeting the requirements of ODOT's publication "Standard Specifications for Asphalt Materials". Copies of the current publication are available from the ODOT Pavement Services Engineer.

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 T 40 prior to dilution with water, if allowed, at the frequency indicated in the MFTP. Samples will be tested at the ODOT Materials Laboratory, or other laboratory as designated by the Owner. 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 00744.40.

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 on the tack coat until the emulsified asphalt separates from the water (breaks), but before it loses its tackiness.

Measurement

00730.80 Measurement – Emulsified Asphalt Tack Coat work shall be considered incidental to the work for which it is required and no measurement will be made.

Payment

00730.90 Payment - Emulsified Asphalt Tack Coat work shall be considered incidental to the work for which it is required and no separate or additional payment will be made.

Section 00744 - Minor Hot Mixed Asphalt Concrete (MHMAC) Pavement

Description

00744.00 Scope - This work consists of constructing minor hot mixed asphalt concrete (MHMAC) pavement to the lines, grades, thicknesses, and cross sections shown or established.

00744.01 Abbreviations:

JMF - Job Mix Formula
TSR - Tensile Strength Ratio
VFA - Voids Filled with Asphalt
VMA - Voids in Mineral Aggregate

00744.02 Definitions:

Minor Hot Mixed Asphalt Concrete (MHMAC) - A hot plant mixed, uniformly coated mixture of asphalt cement, graded aggregate and additives as required.

00744.03 Reclaimed Asphalt Pavement (RAP) Material - Reclaimed HMA pavement (RAP) material used in the production of new MHMAC is optional. No more than 30% RAP material will be allowed in the new MHMAC pavement.

Materials

00744.10 Aggregate - Furnish coarse, fine, and RAP aggregates for MHMAC meeting the following requirements:

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

(a) **Soundness** - Provide coarse and fine aggregate with a weighted loss not exceeding 12% when subjected to five cycles of the soundness test using sodium sulfate solution according to AASHTO T 104.

(b) **Durability** - Provide aggregate not exceeding the following maximum values:

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

(c) **Fractured Faces** - Provide crushed aggregate with not less than the minimum number of fractured faces as determined by AASHTO TP 61 as follows:

Type of Mix	Percent of Fracture (by Weight)	
	Material Retained on 1 1/2", 1", 3/4", 1/2" and No. 4 Sieve (two fractured faces)	Material Retained on No. 8 sieve (one fractured face)
All Dense Graded MHMAC	75	75

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

Test	Test Method		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		T176		45 min

(e) **Coarse Aggregate** - Produce coarse aggregate from crushed rock or other inert material of similar characteristics.

(f) **Fine Aggregate** - Produce fine aggregate from crushed rock or other inert material of similar characteristics.

Blend sand is allowed for mix. Do not blend more than 10% by weight of natural or uncrushed blend sand into the total fine aggregate unless approved. Provide a means of verifying and documenting the amount of blend sand added to the aggregate.

(g) **RAP Aggregate** - Use RAP aggregates in the MHMAC, according to 00744.03, 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.

00744.11 Asphalt Cement and Additives - Furnish the following:

(a) **Asphalt Cement** - Use PG 64-22 or PG 64-28 asphalt unless otherwise specified in the Contract documents. Provide asphalt cement conforming to the requirement of ODOT's publication "Standard Specifications for Asphalt Materials". Copies of the publication are available from ODOT's Pavement Services Engineer. The applicable specifications are those contained in the current publication on the date the Project is advertised.

Testing of the asphalt cement used on this Project will be at the discretion and expense of the Owner.

Asphalt in RAP material, when blended with new asphalt shall provide properties similar to the above specified asphalt. When RAP material is used at a rate of less than 15%, no adjustment to the new asphalt will be required. When utilizing RAP at a rate at or above 15%, the combined RAP and new

asphalt shall provide blended properties equivalent to the specified grade. Determine the blended properties according to ASTM D 4887. Determine asphalt cement properties for the RAP material from asphalt cement recovered from the RAP according to AASHTO T 170.

(b) Asphalt Cement Additives - When required by the JMF, add antistripping additives meeting the requirements below and satisfying the Tensile Strength Ratio (TSR) specified in 00744.13.

Additives to prevent stripping or separation of asphalt coatings from aggregates, and admixtures used to aid in the mixing or use of asphalt mixes or for experimental purposes, shall be standard recognized products of known value for the intended purpose and approved for use on the basis of laboratory tests. They shall have no deleterious effect on the asphalt material and be completely miscible. Do not use silicones as an additive.

00744.12 Mix Type and Broadband Limits - Mix type and broadband limits shall meet the following:

(a) Mix Type - Furnish the type(s) of MHMAC shown or as directed. The broadband limits for each of the mix types are specified in (b) below. 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 Size	1/2" Dense Control Points (% passing by Weight)	
	Min.	Min.
1"		
3/4"	100	100
1/2"	90	90
3/8"	□	□
No. 4	□	□
No. 8	28	28
No. 200	2.0	2.0

00744.13 Job Mix Formula (JMF) Requirements - Provide a JMF for the Project meeting the following criteria and that was either developed or verified within one year of the date the Contract was advertised:

Level 2

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

The JMF shall have been developed according to the ODOT Contractor Mix Design Guidelines for Asphalt Concrete or verified 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.

00744.14 Tolerances and Limits - Produce and place MHMAC within the following JMF tolerances and limits:

Gradation Constituent	MHMAC Type 1/2"
1"	
3/4"	JMF ± 5% *
1/2"	90 - 100%
3/8"	□
No. 4	JMF ± 5%
No. 8	JMF ± 4%
No. 30	JMF ± 4%
No. 200	JMF ± 2.0%

* Maximum not to exceed 100%

Constituent of Mixture	MHMAC All Types
Asphalt Cement - ODOT TM 321 (Cold Feed/Meter)	JMF ± 0.20%
Asphalt Cement - AASHTO T 308 (Ignition) and ODOT TM 323	JMF ± 0.50%
RAP Content - ODOT TM 321	JMF ± 2.0%
Moisture content at time of discharge from the mixing plant - WAQTC TM 6	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).

00744.16 MHMAC Acceptance - The mixture will be accepted by visual inspection by the Engineer. If the mixture is considered suspect, the Engineer may verify that the mixture is within tolerances and limits of 00744.14. When requested, obtain samples according to appropriate procedures in the MFTP under the observation of the Engineer at a frequency established by the Engineer. The Engineer will test for gradation, asphalt content, moisture, and RAP content (if applicable) according to procedures specified in 00744.14 and the MFTP. Take corrective action when testing shows that MHMAC is not within the tolerances and limits of 00744.14.

Equipment

00744.24 Compactors - Provide self propelled rollers capable of reversing without backlash as follows:

(a) **Steel-Wheeled Rollers** - Steel-wheeled rollers shall have:

- A gross static weight of at least 8 ton.

If steel-wheeled rollers are used for finish rolling, they shall have:

- A gross static weight of at least 6 ton.

(b) Vibratory Rollers - Vibratory rollers shall be:

- Equipped with amplitude and frequency controls.
- Specifically designed to compact MHMAC.
- Capable of at least 2,000 vibrations per minute.
- Have a gross static weight of at least 8 ton.

Do not operate in vibratory mode for lifts thinner than two times the maximum aggregate size for the type of MHMAC being compacted.

Construction

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

Nominal Compacted Thickness of Individual Lifts and Courses as shown on the typical section of the plans	Surface Temperature*	All Courses From To Inclusive
Dense Graded Mixes		
Less than 2 inches	60 °F	All Year**
2 inches - 2 1/2 inches	50 °F	All Year**
Greater than 2 1/2 inches	40 °F	All Year**
Temporary	40 °F	All Year**

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

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

00744.43 MHMAC Mixing Temperatures - Produce MHMAC within the temperature ranges recommended by the asphalt cement supplier for the grade of asphalt being used on the Project.

00744.44 Tack Coat - Construct a tack coat prior to placing each lift of MHMAC according to Section 00730. A tack coat is not required prior to placing MHMAC on aggregate base.

00744.49 Compaction - Immediately after the MHMAC has been spread, struck off, and surface irregularities and other defects remedied, roll it uniformly with rollers meeting the requirements of 00744.24 until compacted as specified.

Perform breakdown and intermediate rolling until the entire surface has been compacted by at least six coverages of the roller(s). Complete breakdown and intermediate compaction before MHMAC temperature drops below 180 °F, unless otherwise directed. Perform additional coverages for finish rolling until all roller marks are eliminated.

Maintenance

00744.60 Correction of Defects - Correct all defects in materials and work, as directed, at no additional cost to the Owner, as follows:

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

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

(c) **Segregation** - Take immediate 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 the Surface** - Immediately correct surface damage from rollers with additional fresh mixture or by other means approved.

(e) **Longitudinal Joints** - Take immediate 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 MHMAC that:

- Is loose, broken, or mixed with dirt.
- Shows visually too much or too little asphalt.
- Is defective in any other way.

00744.61 Longitudinal Joints - At longitudinal joints, bond, compact and finish the new MHMAC equal to the MHMAC against which it is placed.

(a) **Location** - Place the MHMAC 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** - Longitudinal joints shall not occur within the width of a traffic lane. They shall be located at either skip lines or fog lines unless approved. On median lanes and on shoulder areas the joints shall occur only at lane lines or at points of change in the transverse slopes, as shown or directed.

(b) **Drop-offs:**

- Provide warning signs and markings according to Section 00225 where abrupt or sloped edge drop-offs 1 inch or more in height occur.
- Protect edges from being broken down.

If unable to complete the pavement without drop-offs according to 00744.61(c) do the following:

- Construct and maintain a wedge of MHMAC at a slope of 1V:10H 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 MHMAC Under Traffic - When placing MHMAC pavement under traffic, schedule work for the nominal thickness being laid as follows:

(1) More Than 2 Inches - Schedule work so at the end of each working shift the full width of the area being paved, including shoulders, is completed to the same elevation with no longitudinal drop-offs.

(2) Less Than or equal to 2 Inches - Schedule work so that at the end of each working shift one panel of new travel lane pavement does not extend beyond the adjoining panel of new travel lane pavement more than the distance normally covered by each shift. At the end of each workweek complete the full width of the area to be paved, including shoulders, to the same elevation with no longitudinal drop-offs.

00744.62 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 a 8 foot long wedge (1V:50H taper rate).
- For wedges that will be under traffic for 24 hours or longer, construct an 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 MHMAC 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) 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.

(4) 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 the specified surface tolerances.

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. 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 - Immediately 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 – MHMAC shall be considered incidental to the work and no separate measurement will be made.

Payment

00744.90 Payment – MHMAC, including furnishing and placing all materials, including tack coat, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified shall be considered incidental to the work in which it required and no additional payment will be made.

Section 00850 - Common Provisions for Pavement Markings

Description

00850.00 Scope - This work consists of furnishing, preparing, and installing all forms of pavement markings.

Materials

00850.10 Materials - Furnish the following materials from the QPL:

- Adhesive for Pavement Markers
- High Performance Pavement Markings
- Methyl Methacrylate
- Pavement Markers
- Reflective Elements*
- Marking Paint
- Marking Tape
- Thermoplastic

* Reflective elements used with materials other than marking paint are not required to be from the QPL. Use reflective elements according to the manufacturer's recommendations.

Equipment

00850.20 Equipment - Use equipment acceptable by the marking material manufacturer for the method specified and the following:

(a) Equipment for Pavement Legends and Bars - Use manual or automatic application equipment.

(b) Equipment for Longitudinal Lines - Use applicators, sprayers or extruders made specifically for applying the specified pavement marking material at a uniform width and thickness on the roadway surface.

Except for tape applications, use automatic bead applicators that place a uniform layer of beads on the line.

Use equipment capable of placing two parallel lines simultaneously with variable spacing between the two lines and capable of placing the entire width of a line in one pass.

Use a three-gun system for applying sprayed markings.

Hand units are allowed for tape applications only.

(c) Equipment for Inlaid/Grooved Markings - Use grinding equipment with diamond grinding heads and shot-blasting equipment to create a smooth, flat-bottomed cut of uniform depth.

Labor

00850.30 Manufacturer's Representative - For Sections referencing 00850.30, provide the services of a manufacturer's representative on-site during the installation, authorized to sign a warranty on behalf of the manufacturer.

00850.31 Manufacturer-Certified Installers - For Sections referencing 00850.31, provide installers certified by the marking materials manufacturer for the specified marking material and method. Do not begin installation prior to receiving the Engineer's approval.

Construction

00850.40 Projects Without Striping Plans - For projects without striping Supplemental Drawings, replace striping to match existing pavement markings in-kind.

00850.41 Projects With Striping Plans - For projects with striping Supplemental Drawings, install striping as shown.

00850.42 Pre-Striping Conference - Meet with the Engineer and striping subcontractor, if striping is done by a subcontractor, two weeks prior to beginning striping work to discuss methods and practices of accomplishing all required striping work. Submit the following in writing five calendar days before the pre-striping conference for approval:

- A striping schedule showing areas and timing of work, and placing of material.
- A list of materials proposed for use and the application method.
- A copy of the manufacturer's installation instructions and Material Safety Data Sheets (MSDS).
- Proof of installer's certification for those Sections referencing 00850.31.
- Equipment specifications.
- A spill recovery plan including:
 - Name, address, and phone number of the Contractor's contact with the DEQ.
 - Name, address, and phone number of the persons certified and on-call to do clean-up.

00850.43 Prepare and Prime Pavement - Prepare pavement surfaces according to the following:

- **Existing Pavement Surfaces** - When required by the pavement marking manufacturer, remove pavement markings from existing pavement surfaces that will adversely affect the bond of new pavement marking material to the roadway surface.

Remove all other contaminants from existing pavement surfaces that may adversely affect the installation of new pavement markings by sandblasting, shot-blasting, or sweeping. Air blast the pavement with a high-pressure system to remove extraneous or loose material.

- **New Asphalt Concrete Surfaces** - Remove contaminants from new AC surfaces that may adversely affect the installation of the pavement markings by sandblasting, shot-blasting, or sweeping. Air blast the pavement with a high-pressure system to remove extraneous or loose material. Apply materials to new asphalt concrete that is sufficiently cured according to the manufacturer's recommendations.
- **New Portland Cement Concrete Surfaces** - Remove curing compounds and laitance by an approved mechanical means. Air blast the pavement with a high-pressure system to remove extraneous or loose material. Apply materials to concrete that has reached a minimum compressive strength of 3,000 psi and that is sufficiently cured according to the manufacturer's recommendations.

After the pavement surface is clean and dry, apply primer as recommended by the manufacturer to the area receiving the pavement markings. Apply the primer in a continuous, solid film according to the recommendations of the primer manufacturer and the pavement markings manufacturer.

00850.44 Alignment Layout - Place control points for lines every 50 feet on tangent and every 25 feet on a curve. Using these control points, layout a continuous narrow guideline for each line, along one edge of, or uniformly offset from the intended permanent line location. Do not proceed with installation until the guidelines are approved by the Engineer.

For inlaid/grooved markings, indicate the exact grind-out location with a 4 inch wide line as the guideline. For broken lines, lane drop lines, and dotted lines, use 10 feet, 3 feet, and 2 feet long sections respectively, at the cycle length shown. For solid lines, use a continuous line. Use marking paint from the QPL applied at a thickness of 6 mils. Reflective elements are not required.

00850.45 Installation - Apply pavement marking materials to clean dry pavement surfaces and according the following:

- Place material according to the manufacture's recommendations.
- Place parallel double lines in one pass.
- Place the specified width of lines in one pass.
- The pavement surface shall not be visible in the striped areas.
- The top of pavement marking shall be smooth and uniform.
- Skip line ends shall be square and clean.
- Place pavement marking lines parallel and true to line.
- Place skip lines so that they are in cycle with at least one end of any adjacent project.
- Place markings in proper alignment with existing markings.
- Immediately clean up marking material dribbled beyond the cutoff.

For inlaid/grooved markings, grind the slot as shown. For each grinder operator and piece of equipment, obtain the Engineer's and manufacturer representative's approval of the slot within the first 150 feet for solid lines and within the first 300 feet for skip lines. Do not proceed with grinding until the slot is approved. Repeat this process for each new grinder operator or new piece of equipment used.

After grinding, obtain the Engineer's and manufacturer representative's approval before placing marking material. Clean the slot by shot blasting. Remove metal shot-blasting residue by magnetic sweeping, and clean the area with high pressure air immediately before placing the marking material.

00850.46 Placement Tolerance - Allowable tolerances for installation are:

- **Lateral location on roadway:** 1/2 inch on tangents; 1 inch on curves
- **40 foot skip cycle length:** ± 2 inches for skip length, ± 2 inches for gap length
- **12 foot skip cycle length:** ± 3/4 inch for skip length, ± 1 inches for gap length
- **8 foot skip cycle length:** ± 1/2 inch for skip length, ± 3/4 inches for gap length
- **Skip Cycle:** A tolerance of 1/10 of the skip line length on the first skip line of a run, but it shall be on cycle within one skip

Double lines: Parallel, with a gap tolerance of $\pm 1/2$ inch

- **Width of lines:** + 3/8 inch, - 1/16 inch
- **Thickness of lines:** + 5 mils, - 3 mils
- **Divergence of parallel double lines:** $\pm 3/8$ inch

00850.47 Quality Control - Record the following readings for each type and color of marking material and the locations where they were taken. Submit the results to the Agency within one day of taking the readings.

(a) Placement Tolerances - Measure the following at the time of installation or application:

- For inlaid/grooved markings, measure the depth of the slot every 300 feet.
- For surface applied markings, except paint and tape applications, measure the thickness of the lines, at 300 foot intervals. Thickness is measured from the top of the pavement marking to the top of the wearing surface. Marking material placed in a depression left by pavement line removal will not be included in measuring the thickness of the line.

(b) Curing of Material - Rate the line, markings, and pavement marker adhesive at the time of installation and 14 calendar days after placement to determine if the material has properly cured. Note any soft spots, abnormally darkened areas, or other indications that the line has not properly cured.

(c) Retroreflectivity - Use a retroreflectometer to measure the retroreflectivity within 48 hours of curing and 14 calendar days after placement, except for paint applications:

- At 300 foot intervals for longitudinal lines.
- At each pavement legend/bar. Take ten individual readings per pavement legend/bar. If the Project has more than ten pavement legend/bars, measure a minimum of ten legends/bars or 10% of the total number of legends/bars, whichever is greater. The legends to be measured will be selected by the Engineer.
- Estimate the bead embedment depth for longitudinal lines and pavement legends/bars at the same location as the retroreflectivity reading.

Temporary

00850.50 General - Protect all applied markings from traffic until sufficiently cured so as not to be damaged or tracked by traffic movements.

Finishing and Clean-up

00850.70 Disposal of Waste - Waste material becomes the property of the Contractor at the point of origin. This includes all grindings and all removed marking material. Dispose of waste according to 00290.20.

00850.71 Removal and Repair of Unacceptable Work - Remove unacceptable materials according to these Specifications. If more than one repair is required in a single 300 foot section, grind and repair the entire 300 foot section.

00850.75 Manufacturer's Warranty - For Sections referencing 00850.75, furnish a Warranty from the manufacture signed by the manufacture's representative.

The Warranty period will start on the date the Engineer accepts the work and authorizes final payment.

The Warranty shall recite that the manufacturer will repair or replace, at the discretion of the Engineer and at no additional cost to the Agency, all pavement markings that drop below the minimum required retroreflectivity, show insufficient color stability, or fail to bond, within 6 months of the Agency's request to do so.

Perform Warranty repair work when weather permits. At the discretion of the Agency, temporary pavement markings may be required, at the manufacturer's expense, to protect traffic until repairs can be made.

When the Agency makes a written request to the manufacturer for repair or replacement, the Warranty period will stop until the required repairs or replacements are made and accepted.

Section 00860 - Longitudinal Pavement Markings - Paint

Description

00860.00 Scope - In addition to the requirements of Section 00850, install painted longitudinal pavement markings according the following Specifications.

Construction

00860.45 Installation - Apply painted longitudinal pavement markings as follows:

- Apply two separate applications of painted longitudinal pavement markings. Retrace the second application directly over the first application, within 1/16 inch as follows:
 - Apply the second application after 2 hours but within 48 hours of the first application.
 - For yellow colored markings, apply the second application in the opposite direction of the first application. For white colored markings, apply the second application in the same direction of the first application.
- Apply each painted marking application at a thickness of 15 mils wet, equivalent to 17 gallons per mile for a 4 inch wide solid stripe.
- Apply reflective elements for each application at a minimum rate of 5 pounds per gallon of paint. Embed, by means of paint wicking, a minimum of 80% of the reflective elements in the paint to a minimum depth of 50% of their diameter.

Minimum initial retroreflectivity shall be the following:

- White - 250 mcd/m²/lx
- Yellow - 200 mcd/m²/lx

Measurement

00860.80 Measurement - Longitudinal Pavement Marking work shall be considered incidental to the work for which it is required and no measurement will be made.

Payment

00860.90 Payment - Longitudinal Pavement Marking work shall be considered incidental to the work for which it is required and no separate or additional payment will be made.

Section 00960 - Common Provisions for Electrical and Communication Systems

Description

00960.00 Scope - This work consists of furnishing and installing materials for electrical systems and for modifying existing systems.

00960.01 Regulations, Standards, and Codes - All electrical materials and workmanship shall conform to the following standards where applicable:

- American National Standards Institute (ANSI)
- International Municipal Signal Association (IMSA)
- Underwriter's Laboratories, Inc. (UL)
- National Electrical Manufacturers Association (NEMA)
- National Electrical Safety Code (NESC)
- National Electrical Code, Oregon Amended (NEC)
- Standards of the American Society for Testing and Materials (ASTM)
- Local laws

Wherever reference is made to any of the standards mentioned above, the reference means the code, order, or standard in effect on the date the Project is advertised.

Do not begin installations until all permits are obtained and copies are given to the Engineer and Agency.

00960.02 Equipment List and Drawings - Within 30 calendar days after execution of the Contract, submit at least six copies of:

- A list of materials the Contractor proposes to install. List all material shown or specified by manufacturer's name, size, and identity number of each item. Supplement the list with other data, including but not limited to, detailed scale drawings.
- Brochures, technical bulletins, parts lists, service instructions, working drawings and other technical information relative to products proposed for use on the Project.

All engineered details and drawings which are not prepared by the Agency, but are required in the Contract Documents, shall be submitted for review prior to fabrication.

Upon completion of the installation, submit six copies of all changes made from the original plans. The information furnished shall include all modifications made and shall represent the material installed and in operation. It shall be sufficiently detailed to enable maintenance forces to replace or repair any part of the Project under routine or emergency maintenance by direct reference.

Materials

00960.10 Materials - Furnish electrical materials meeting the requirements of Section 02920.

Labor

00960.30 Licensed Electricians - According to the Oregon Administrative Rule 918-282-0120(1), every person engaged in the installation of electrical equipment and wiring systems shall possess a valid Oregon Electrical Supervising or Journeyman's License, or be registered as an Electrical Apprentice. Every person who installs electrical systems on the Project shall submit a copy of his or her electrical license or apprentice registration to the Engineer prior to performing any work. Contractor shall obtain electrical permit and pay for all costs associated therewith.

Construction

00960.40 General - The Agency will continue normal maintenance and operations of the existing systems including the furnishing of electrical energy.

00960.41 Excavation:

(a) General - Remove and replace sidewalks, paved surfaces, and other materials as needed. Place the conduit under curbs without disturbing curbs. Replace and finish all surfaces to correspond with the existing surfaces. Restore all disturbed landscaping and underground systems to original condition. Use hand excavation if directed.

Excavate trenches to lines, grades and cross sections established or approved. Furnish, place, and remove any shoring required to prevent caving of walls.

When excavating in paved areas, cut with an approved pavement cutting saw to a depth of at least 2 inches along the neat boundaries of the area to be removed. Cut sharp and well-defined pavement edges with no evidence of cracking, delaminating, or stressing.

(b) Excavation, Backfill and Foundation for Concrete Junction Boxes - Excavate and backfill according to Section 00405. When specified, or as directed, remove unstable material that will not support the structure, excavate below grade and backfill with trench foundation stabilization material according to Section 00405. Make excavations for structures wide enough to provide a minimum of 12 inches between the structure surface and the sides of the excavation.

(c) Excavation for Conduit - Excavate and backfill conduits with 3 feet minimum cover or as required by permit.

(d) Conduit under Paved Surfaces - Install conduit under all paved surfaces by the open trench method.

(1) Width - Hold trench width to a practical minimum.

(2) Pavement Cuts - Cut the existing pavement as required in 00960.41(a).

(e) Disposition of Waste Materials - Dispose of all waste materials according to 00330.41(a-5).

(f) Backfill - Use an approved selected granular backfill meeting the requirements of 00330.14 as follows:

(1) Rigid Nonmetallic Conduit - For rigid nonmetallic conduit, provide bedding, cover, and backfill according to the following:

a. Bedding - Place 6 inches of 3/4"-0 in trench bottom before placing conduit.

b. Cover - Cover conduit with 6 inches of additional 3/4"-0.

c. Backfill - Backfill according to the following:

1. Existing Roadway and Shoulder - Backfill all conduit trenches with CLSM according to Section 00442. Place to an elevation 6 inches below the surface of the existing pavement or to the bottom of the existing pavement, whichever is lower.

2. Unpaved Areas - Place selected Class A backfill material in layers not greater than 6 inches thick. Compact the selected Class A backfill material according to 00405.46(c-1) to the top of trench, surrounding ground level or upper limit of excavation.

d. Pavement - Place and compact AC and PCC according to Sections 00744 and the following:

1. Existing Non-roadway Pavement - Match existing surfacing thickness.

2. Existing Roadway and Shoulder - Match existing surfacing thicknesses or provide a minimum surfacing thickness of 6 inches, whichever is greater.

3. Finish - Finish to a smooth riding surface.

00960.42 Conduit:

(a) General - Conduit runs shown on the plans are for bidding purposes only. Locations may be changed to avoid obstructions. Larger size conduit than specified may be used at the option and cost of the Contractor. Use the same size conduit for the entire length, outlet to outlet.

Use non-metallic conduit as shown or specified.

In areas to be paved or landscaped, place all conduit before paving or landscaping.

(b) Underground Conduit Installation - Make conduit runs continuous between any junction box. Do not cover conduit runs until inspected. Permanently mark all underground electrical and communication conduit runs by installing an underground marking tape directly over the pair of conduits.

The underground marking tape shall be:

- Placed 12 inches below the surface.
- Continuous between junction box locations.

(c) Elbows - Use a standard factory bend where a conduit bend is required that:

- Has a radius of at least six times the inside diameter of the conduit.
- Is bent without crimping or flattening.
- Is fiberglass conduit.

(d) Conduit Ends and Couplings - Ream the ends of all conduits to remove burrs and rough edges. Make cuts square and true so the ends will fit together for their full circumference. Slip joints or running threads will not be allowed for coupling conduit. Plug or cap all conduit ends until wiring is installed.

(1) Nonmetallic Conduit - Connect nonmetallic conduit with solvent welds. Use a nonmetallic female threaded connector to connect nonmetallic conduit to metallic conduit.

(e) Conduit Expansion Joints - Expansion joints shall be installed in conduit lengths of 300 feet or longer.

(f) Conduit in Junction Boxes:

(1) General - Install conduit in junction boxes according to the following:

- Enter through the side of boxes.
- Enter the box from the direction of the run.
- If shown, terminate conduit 1 inch inside the box wall when entering through the side walls.

(2) Concrete Junction Boxes - Install conduit entrances into concrete junction boxes according to the following:

- Locate conduits near the end walls to leave the major portion of the box clear.
- Orient conduit ends towards the top of the box so that conductors may be pulled out of the conduit from the top of the box without touching the side of the box or other conduits.

(g) Conduit Installed for Future Use – Insert a polyethylene pull line in the Electrical and Data conduits.

Include 3 feet of slack in the polyethylene pull line within the conduit and 3 feet outside the conduit.

(h) Conduit In or On Structures - Install conduit in or on structures as shown. Use expansion fittings at all expansion joints in or on a structure.

00960.43 Foundations:

(a) General - Construct foundations for junction boxes with 6 inches of compacted 3/4"-0 aggregate.

00960.44 Junction Boxes:

(a) General - Install junction boxes at the approximate locations shown on the Plans. The Contractor may, at no additional cost to the Agency, install additional junction boxes to facilitate the work.

The tops of junction boxes installed in the ground shall be flush with the surrounding grade.

00960.45 Mandreling of Conduits - Clean all new conduit with cylindrical mandrel of the proper size for that conduit and blow out with compressed air. Mechanical pulling methods may be used for conduit cleaning. The Engineer must be present to verify.

Section 01030 - Seeding

Description

01030.00 Scope - This work consists of seeding and associated tasks to develop plant growth for erosion control, environmental mitigation, and roadside development.

01030.02 Definitions:

Certified Seed - A grass or legume seed named variety that has been reviewed and accepted into the Oregon Certified Seed program. Currently certified seed is individually sold in bags with a blue-colored Oregon Certification Tag, thus the name commonly used for such seed is "blue tag stock".

Establishment Period - A period when planting work has been performed and initially accepted, and there is a Contract requirement to care for the planted areas in some way until the period ends.

Native Plant (existing) - A variety of plant species occurring in its natural habitat without direct or indirect human actions.

Noxious Weed - All weed designated by the Oregon State Weed Board as injurious to public health, agriculture, recreation, wildlife, or all public or private property. The Oregon Department of Agriculture (ODA) will be the authority in determination of noxious weed species.

Pure Live Seed (PLS) - The amount of living seed in the total quantity of seed when non-viable seed or non-seed material is excluded.

Riparian - Related to the bank, shore, or water-influenced areas of a watercourse or water body.

Sensitive Areas - Defined areas such as wetlands, natural water and riparian resources, special environmental zones, or where certain activities are restricted such as the use of chemicals.

Waters of the State - See ORS 468B.005 for "Waters of the State" definition.

Weed - A plant that is undesirable where it is growing.

Materials

01030.11 Topsoil – Contractor to refer to the requirements of 00405.48(b). If the Contractor elects to import topsoil, topsoil shall be furnished meeting the requirements of 01040.14.

01030.12 Soil Conditioners, Amendments, and Bio-Amendments - Furnish soil modifiers meeting the requirements of 01040.15, 01040.16, and 01040.17.

01030.13 Seed - Furnish seed meeting the following requirements:

(a) **Label** - Deliver all seed in standard, sealed containers. Label each container with the following:

- The kind and variety of each seed of 3% or more in a mixture, by weight. Be sure that seed mix labels include the words "mixture" or "mixed seed" when the seed is a mixture
- The country or state where the seed is grown
- The lot number or other lot identification
- The total percentage, by weight, of other crop seed
- The total percentage, by weight, of weed seed
- The total percentage, by weight, of inert matter

- Statement of "No Noxious (weed) Found"
- For each named seed:
 - Percentage of germination
 - Percentage of hard (non-living) seed, if more than 1%
- Percent of PLS for each kind of seed
- Percent and kind of other crop
- Month and year of seed test
- Net weight of contents
- Name and address of seed labeler or seller
- Origin for each seed (state or foreign country)
- If seed inoculant is used, the claimed date that inoculant effectiveness ends
- For treated seeds (if any):
 - Statement that the seeds have been treated
 - Name of all chemical used in the treatment
 - Description process used in the treatment
 - Warning statement for all residual chemicals used
- Net weight of each container
- For seeds listed as native, date and location of collection of source (first generation) seed
- For native seeds specified to be collected for direct use on a project, label containers with the date and location of collection sites for each seed species

Alternate label requirements may be identified in the Special Provisions for certain native plant seeds.

(b) Quality - Furnish seed meeting the following requirements:

- The seed and labeling complies with Oregon Seed Law and Federal Seed Act.
- The seed has been tested within 18 months of the planting date.
- The seed is not sprouted, moldy, or showing evidence of having been wet or otherwise damaged.
- The seed is labeled as "Oregon Certified Seed" or the equivalent from another state when identified in the Special Provisions. Information about certified seed is available from County Extension Offices, Oregon State University, and the Oregon Department of Agriculture.

(c) Pure Live Seed - Obtain the amount of seed to apply by using the purity and germination percentages from the label on actual bags of seed to be used on the Project.

To calculate the amount of seed to be applied:

- Obtain the PLS factor - Multiply the seed label germination percentage times the seed label purity percentage.
- Divide the specified PLS rate by the PLS factor.

Example: A PLS seeding rate of 10 pounds per acre is specified. The seed label shows a purity of 80% and germination is 90%. After converting percentages to decimals, 0.80×0.90 equals a factor of 0.72. The specified PLS rate, 10 pounds per acre, divided by the factor of 0.72 equals 13.88. In order to meet a PLS seeding rate of 10 pounds per acre, about 14 pounds of seed needs to be applied per acre. For a seed mix, make this calculation for every seed to obtain the total amount to be applied.

(d) Inspection - Each lot of seed is subject to inspection upon delivery to the Project. Seed that is not labeled or that does not conform to the Specifications will be rejected and shall be replaced at no additional cost to the Agency.

(e) Mixes - Furnish seed mixes that meet the labeling, quality and inspection requirements stated above. Submit all other proposed seed or seed mixes for consideration and receive written approval before seeding work begins. Replace rejected seed before planting.

(f) Types of Seed Mixes - Seed mixes, quantities, standards, seeding rates, and other information will be included in the Special Provisions for each type of seed mix.

The following are the functional categories of seed mixes that may be included on projects (a category may have multiple functions on a project site):

- **Temporary Seeding** - To provide short-term control of soil erosion until permanent seeding is performed or all potential for erosion is removed.
- **Permanent Seeding** - The final seeding, or only seeding performed for erosion control.
- **Lawn Seeding** - Seeding for areas where finished turf appearance is desired.

(g) Availability - Provide a list of seed sources for all specified seeds within 30 calendar days after execution of the Contract. Verify that all specified seed has been located and will be available for use on the Project.

01030.14 Fertilizer - Furnish standard, commercial grade fertilizer meeting the following requirements:

(a) General - Deliver fertilizers in separate or mixture containers that have the percentage of total nitrogen, available phosphoric acid, and water-soluble potash (NPK) in the amounts specified. Label each container with a quality compliance certificate that includes the container weight, the percentage of each ingredient, and the source of each component in the mixture. Ensure that each container is labeled with a quality compliance certificate that meets the applicable requirements of Section 00165.

Furnish fertilizer according to State and federal regulations. Fertilizer is subject to testing by the State Department of Agriculture.

(b) Type of Fertilizer - Provide the following fertilizer:

(1) West of the Cascades - Furnish 22-16-8 inorganic fertilizer analyzing 22% nitrogen, 16% phosphoric acid, 8% soluble potash, and including a minimum of 2% sulfur. Furnish fertilizer containing not less than 50% available water-insoluble, controlled-release nitrogen derived from one of the following sources:

- Urea formaldehyde (Nitroform)
- Isobutylidene Diurea (IBDU)
- Polymer coated urea (no sulfur)

(2) East of the Cascades - Furnish 22-10-5 inorganic fertilizer analyzing 22% nitrogen, 10% phosphoric acid, 5% soluble potash, and including a minimum of 10% sulfur. Furnish fertilizer containing not less than 50% available water-insoluble, controlled-release nitrogen derived from one of the three sources stated for West of the Cascades above.

(3) Statewide, Near Water - For application within 50 feet of open water, furnish 22-2-11 low-phosphorus fertilizer analyzing 22% nitrogen, 2% phosphorus, and 11% potassium which releases slowly over an eight to nine month period. Furnish fertilizer containing a minimum of 60%

available water-insoluble, controlled-release nitrogen derived from one of the three sources stated for west of the Cascades above. Furnish phosphorus and potassium that is coated to allow a minimum of 95% controlled-release.

01030.15 Mulch - Furnish mulch materials free of all weed or plant seeds and containing no substances detrimental to plant life. The kind of mulch material(s) acceptable for use will be shown on the plans, listed in the Special Provisions, or will be as approved. Furnish mulch meeting the following requirements:

(a) Hydromulch from Cellulose, Wood, or Straw Fiber - Furnish cellulose fiber produced from virgin wood, straw, or paper fiber product from the QPL. Furnish wood or straw mulch processed so the fibers remain uniformly suspended under agitation in water and the fibers have moisture-absorption and percolation properties. Ship hydromulch in packages of uniform weight, plus or minus 5%, and labeled with the manufacturer's name and air-dry weight.

(b) Straw - Unless otherwise specified, furnish straw mulch for non-hydroseeding applications from bentgrass, bluegrass, fescue or ryegrass singly or in combination. Cereal grain straw from barley, oat or wheat may be allowed upon approval of the Agency. Provide straw that is not moldy, caked, decayed or of otherwise low quality. Submit certification from the supplier that the straw is free of noxious weed seeds or plant parts. Acceptable documentation is any one of the following:

- The straw source is an "Oregon Certified Seed" field.
- The straw is certified by a recognized program accepted by the Oregon Department of Agriculture as being weed free.
- Seed lab test results of seed harvested from the straw meet minimum Oregon Certified Seed quality for weed seed content.

(c) Tracer - For hydromulch application, include enough green dye so applied mulch is easily visible.

01030.16 Tackifier - Furnish a commercial quality tackifier containing no agent toxic to plant life. Furnish tackifier of either a liquid stabilizing emulsion or a dry powder tackifier meeting the following requirements:

(a) Liquid Stabilizer Emulsion - Tackifier with a base material of liquid, polyvinyl acetate polymers, using emulsion resins and containing not less than 55% total solids by weight. Furnish tackifier containing no polyacrylates or polyvinyl acrylics. The emulsion shall, when diluted with water and upon drying, allow exchange of air and moisture to the seeds and have an effective life of one year or more.

(b) Dry Powder Tackifier - Tackifier base consisting of one or more active hydrocolloids from natural plant sources, which hydrates in water and blends with other slurry materials, and upon application and drying tacks the slurry particles to the soil surface, and exhibits no growth or germination inhibiting factors. Provide stabilizing emulsion in a dry powder form that may be re-emulsifiable, and consisting of a processed organic adhesive derivative of one of the following:

- Gumbinder derived from guar (*Cyamopsis tetragonoloba*)
- Gumbinder derived from plantain (*Plantago insularis*)

01030.17 Pesticides - Submit proposed pesticides and receive approval before using. Submit a copy of the manufacturer's federal registered label and, if requested, a Material Safety Data Sheet. The Agency reserves the right to restrict chemicals from being used on Sensitive Areas.

Construction

01030.40 General - Notify the Agency not less than 24 hours in advance of seeding operations. Do not begin seeding until prepared slopes in an area have been approved for seeding. Do not perform seeding during windy weather or when the ground is frozen, excessively wet, or otherwise not tillable.

Do not disturb or damage existing desirable vegetation to be left in place. Do not disturb areas previously seeded and mulched, with the exception of disturbances caused by stage construction. If previously seeded areas are disturbed, rework and reseed as directed, at no additional cost to the Agency.

Remove all non-approved plants resulting from the seed mixes provided for the Project at no additional cost to the Agency, including erosion protection required during reseeding.

01030.41 Area Preparation - Refer to 01040.48 for area preparation for the following kinds of seeding:

- Temporary Seeding - Method E
- Permanent Seeding - Method D
- Lawn Seeding - Method C

01030.43 Temporary and Permanent Seeding:

(a) Temporary Seeding - Temporarily seed disturbed soils and slopes that are not at finished grade and which will be exposed for two months or longer before being disturbed again. Provide fertilizer, mulch, water, and other amendments necessary to ensure establishment. Ensure that temporary seeding work achieves the coverage of live plants required by 01030.60 by the end of the next permanent seeding date stated in 01030.43(b). If this coverage is not achieved, or if the Agency determines that it is not effective in stabilizing the soil from erosion, stabilize the area with other temporary stabilization methods as described in 00280.42 at no additional cost to the Agency.

(b) Permanent Seeding - Perform this seeding during the permanent seeding dates shown below. If work done within the seeding dates does not provide coverage according to 01030.60, re-seed according to 01030.48 and as directed. The dates for permanent lawn seeding are as follows:

- **East of the Cascades** - October 1 through February 1. If new lawn areas are regularly watered, they can be seeded from March 1 through October 31.

Permanent seeding outside these dates requires written authorization from the Agency. Approval to seed outside these dates will only be given when physical completion of Project work is imminent and environmental conditions are conducive to satisfactory growth. For permanent seeding done outside the seeding dates, ensure that the coverage of live plants is achieved no later than three weeks into the next permanent seeding period. If this coverage is not achieved, re-seed and re-fertilize areas of insufficient coverage according to the permanent seeding requirements, at no additional cost to the Agency.

01030.44 Fertilizer:

(a) Inorganic - Apply 22-16-8 or 22-10-5 inorganic fertilizer at the rate of 400 pounds per acre.

(b) Low-Phosphorous - Apply 22-2-11 polymer coated urea low-phosphorus fertilizer at the rate of 200 pounds per acre.

01030.45 Soil Testing - Test soil according to 01040.13.

01030.46 Topsoil and Wetland Topsoil - Construct topsoil areas according to 01040.43 and 01040.44, as appropriate.

01030.47 Soil Amendments and Bio-Amendments - Incorporate soil amendments and bio-amendments into the seeding operation according to 01040.45 and 01040.46, as appropriate.

01030.48 Application - The following application methods are acceptable for both temporary and permanent seeding:

(a) Hydroseeding, Fertilizing, Hydromulching, and Tacking - Apply seed, fertilizer, mulch, and tackifier as follows:

Use hydraulic equipment that continuously mixes and agitates the slurry and applies the mixture uniformly through a pressure-spray system providing a continuous, non-fluctuating delivery. Ensure the equipment and application method provides a uniform distribution of the slurry. Place seed, fertilizer, mulch, and tackifier in the hydroseeder tank no more than 30 minutes prior to application.

(1) Hydroseeding Operation - Perform hydroseeding according to the following:

a. One-step Operation - Apply materials in one step only for the following situations:

- When seeding in conjunction with erosion control matting. Apply seed, fertilizer, and tracer before installing matting.
- When treating small areas according to 01030.48(e). Double the amount of seed to compensate for seed suspended above soil by the mulch.

b. Two-step Operation - Except for the one-step method situations in 01030.48(a-1-a), use the two-step method for all hydroseeding operations:

1. **Step 1** - Apply seed, fertilizer, and tracer. The seed and fertilizer may be applied separately or together. If hydromulch is used as a tracer, apply it at a rate of 500 pounds per acre.
2. **Step 2** - Apply mulch and tackifier. Hydromulch, if used as a tracer in Step 1, will be included as part of the specified hydromulch rate specified in 01030.48(a-3).

(2) Seed - Thoroughly mix seeds when more than one kind is to be used.

(3) Mulch - Apply hydromulch at the following rates based on dry fiber weight:

a. Slopes Flatter Than 1V:2H - Apply cellulose fiber that includes a tackifier at a rate of 2,000 pounds per acre.

b. Slopes 1V:2H or Steeper - Apply cellulose fiber that includes a tackifier at a rate of 3,000 pounds per acre.

(4) Tackifier for Cellulose Fiber Applications - Use one of the following:

a. Liquid Stabilizer Emulsion - Dilute the emulsion with water at a rate of one part emulsion to 30 parts water. Apply the diluted mixture at the rate of 865 gallons per acre unless the manufacturer recommends a greater rate of application.

b. Dry Powder Tackifier - Apply at the following rates unless the manufacturer recommends a greater rate of application:

1. **Slopes flatter Than 1V:2H** - 60 pounds per acre mixed with hydromulch fibers at the rate specified.
2. **Slopes of 1V:2H or Steeper** - 100 pounds per acre mixed with hydromulch fibers at the rate specified.

(b) Seeding, Fertilizing, Dry Mulching, and Tacking - Apply seed and fertilizer separately or together as the first step. Apply dry mulch as the second step. Tackify the mulch as the third step.

(1) Seed and Fertilizer - Apply seed and fertilizer at the specified rates. When fertilizer and seed are to be applied in dry condition, apply them separately. When applied from separate compartments, the application may be done in one operation. Apply seed and fertilizer by one of the following methods:

a. Blower - Blower equipment using air pressure and an adjustable spout that uniformly applies dry fertilizer and dry seed in separate and successive applications at constant measured rates.

b. Helicopter - Helicopter equipped with hoppers and adjustable disseminating mechanisms that separately and successively apply fertilizer and seed in uniform and prescribed quantities.

c. Mechanical Spreaders - Hand or machine operated mechanical spreaders that uniformly apply dry fertilizer and dry seed separately and successively in the prescribed quantities.

d. Hydroseeding - Uniformly apply at the rate specified. Add 500 pounds per acre of hydromulch fiber to the seed and fertilizer mixture to visibly aid uniform application at no additional cost to the Agency.

(2) Dry Mulch - Evenly apply straw mulch within 24 hours after seeding and fertilizing. In areas not accessible to heavy equipment or hose, apply straw mulch by hand or other approved method.

Place straw mulch approximately 2 inches deep, in loose condition, which requires approximately 2 1/2 tons per acre of dry mulch, depending on moisture content. Do not use straw mulch on slopes of 1V:1.5H or steeper.

(3) Tacking - Anchor straw mulch using one of the following methods:

a. Dry Powder Tackifier - Unless the manufacturer recommends a greater rate, apply dry powder tackifier at the rate of 80 pounds per acre mixed with 800 pounds per acre of hydromulch.

b. Mechanical Crimping - Mechanically incorporate the straw into the top 2 inches of the soil forming a uniform surface cover effective at preventing erosion by one of the following:

1. Crimping Disc - A heavy disk with flat scalloped discs approximately 1/4 inch thick, having dull edges and spaced no more than 9 inches apart.

2. Sheep's-Foot Roller - Modified sheep's foot roller equipped with straight studs, made of approximately 3/4 inch steel plate, placed approximately 8 inches apart and staggered. Ensure that the studs are not less than 6 inches long or more than 6 inches wide, and are rounded to prevent withdrawing the straw from the soil. Use a roller with enough weight to incorporate the straw sufficiently into the soil providing a uniform surface cover.

(c) Drill Seeder - Apply seed and fertilizer with a grass seed drill that works fertilizer into the soil and places seed under about a 1/4 inch soil cover.

(d) Seeding Over Mulched Areas - If an area has been previously mulched for erosion control or temporary seed and mulch is present on the soil surface, double the amount of each seed type used. Apply seed and fertilizer hydraulically and add a green dye to the mixture to visibly aid uniform application. Upon approval, fertilizer and seed may only be applied after mulching if one of the following conditions apply:

- Mulch is punched into the soil by mechanized means.
- It is necessary to hold down mulch with netting or like material.

- The slope is 1V:1.5H or steeper and a slurry mixture would tend to run down the slope.
- Mulch is removed prior to seeding.

(e) Optional Temporary or Permanent Seeding - Upon approval, the following may be used to stabilized disturbed areas that are 1,500 square feet or less and totaling no more than 0.5 acre:

(1) Seed - Seed the disturbed area with the seed mix at the rate of 2 pounds per 1,000 square feet. Seed may be spread by mechanical spreader according to 01030.48 (b-1-c).

(2) Cover - Cover seeded areas with one of the following:

- Straw mulch at a rate of 100 pounds per 1,000 square feet. Spread the mulch uniformly and apply commercial tackifier or netting to hold in place.
- Bark mulch spread uniformly at an approximate depth of 1/2 inch. Use well-decomposed mulch for seed mulching.
- Suitable open-weave, biodegradable erosion control matting installed according to manufacturer's instructions.
- Hydromulch applied in one step according to 01030.48(a).

(3) Fertilizer - Fertilize according to 01030.44.

01030.49 Work Quality:

(a) Drift - Prevent drift and displacement of seed and fertilizer regardless of equipment and methods used. Use protective covering on structures and objects where coverage and stains would be objectionable and when tacking agents are used with mulch. Protect vehicles and people from drifting spray. If equipment and methods of application result in wasting material, make corrections to prevent waste.

(b) Displacement - Prevent seed, fertilizer, and mulch from falling or drifting onto areas occupied by rock base, rock shoulders, plant beds, or other areas where grass is detrimental. Remove material that falls on plants, roadways, gravel shoulders, structures, and other surfaces where material is not specified.

(c) Damage - Prevent damage to prepared areas and to completed fertilizer, seed, and mulch work. Replace all material that becomes displaced before acceptance of the work.

Maintenance

01030.60 General - Ensure that each seeded area has a uniform, healthy and weed-free stand of grass or other seeded plants growing at the end of the establishment period. The minimum living plant coverage standards for acceptance of seeding in a planted area are as follows:

- **Temporary Seeding** - 70% coverage of ground surface.
- **Permanent Seeding** - 90% coverage of ground surface.

01030.61 Establishment Period - The seeding establishment period is as follows:

(a) Erosion Control Seeding - For temporary and permanent seeding done solely for erosion control, the establishment period begins upon acceptance of the initial seeding work and ends upon satisfactory plant growth and coverage of the seeded areas according to 01030.42 and 01030.60.

(b) All Other Seeding - Establishment periods for lawn and permanent seeding begins upon acceptance of the initial seeding work and ends as follows:

- The seeding establishment period will end 45 days after the beginning of the establishment period, if the area was seeded during the seeding season and all establishment responsibilities have been met.
- If the original seeding construction is completed and accepted outside the permanent seeding dates, the establishment period will end 45 calendar days after all necessary reseeding is completed and accepted during the following seeding season.

01030.62 Establishment Work:

(a) Erosion Control Seeding - Select and provide establishment work for erosion control seeding from 01030.62(b) necessary to provide performance described in 01030.60.

(b) All Other Seeding - Ensure the establishment of wildflower, lawn, plant, water quality, wetland, native plant, and permanent seeding by the following:

(1) Protection - Protect seeded areas from trespass and other hazards of damage. Use protective fences and signs at no additional cost to the Agency. Obtain approval of protective methods used.

(2) Fertilizing and Watering - Apply fertilizer according to 01030.44. Apply water according to good horticultural practice under the prevailing conditions, as required to promote a healthy stand of plants. Obtain water at no additional cost to the Agency.

(3) Weed Control - Remove Specified Weeds prior to plants going to seed and keep WMA's and seeded areas "Weed Free" throughout the establishment period.

(4) Mowing - Mowing is required for lawn seeding and water quality seeding. Do the first mowing of grass when soil is firm enough to prevent rutting and grass is about 3 inches tall. After mowing, leave grass that is approximately 2 inches tall. At each subsequent mowing, leave about 1 1/2 inches of growth. After the second mowing, grass clippings may be left in place upon written approval. The approval may be granted if:

- Mowing is done with a mulching blade.
- There are no weed seeds in the mulch.
- Mulch is not detrimental to the growth of grass.

(5) Repair and Restore - Repair and restore soil grades and re-seed damaged, settled, or unproductive areas to the specified conditions of this Section at no additional cost to the Agency.

Finishing and Clean Up

01030.70 Cleanup - Remove weeds, trash, debris, stones, and other extraneous matter from seeded areas as directed and dispose of according to 00290.20.

01030.71 Waste Disposal - Protective coverings used on structures and all waste materials associated with seeding, fertilizing, mulching, and associated activities become the property of the Contractor at the point of origin. Dispose of these waste materials according to 00290.20.

Measurement

01030.80 Measurement - The quantities of seeding and associated work performed under this Section will be measured according to the following:

- **Area Basis** - Area basis items will be measured on the ground surface.

Payment

01030.80 Measurement The work performed under this Section will be paid for under at the Contract unit price for the item "Hydroseeding."

When temporary seeding, applied according to 01030.43(a), is later accepted as permanent seeding according to 01030.43(b), payment will be made only one time under the permanent seeding pay item. No separate payment will be made for the initial seeding.

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:

- mobilization for application by blowers, mechanical spreaders, or hand spreading
- inspections or maintenance
- seeding mobilization if it is not included in the Contract Schedule of Items

Section 01040 - Planting

Description

01040.00 Scope - This work consists of planting and associated work as shown or directed.

01040.02 Definitions:

Native Plant (existing) - See 01030.02 for native plant definition.

Noxious Weed - See 01030.02 for noxious weed definition.

Plant Establishment Period - A period of time, that is part of the planting work, that ensures satisfactory growth and establishment of plants.

Weed - See 01030.02 for weed definition.

01040.03 General - Ensure that work meets the following requirements:

(a) Existing Vegetation - Do not disturb existing desirable vegetation that is to remain or is designated for protection, unless approved by the Agency prior to construction.

(b) Pesticide Applicators License and Chemical Registration - Furnish evidence to the Agency that each applicator is licensed for the specific class of chemical being applied. Also, furnish evidence that any chemical is registered for the proposed use by the Oregon Department of Agriculture according to ORS Chapters 452, 561, 570, and 634.

(c) Weather Conditions - Planting work will not be allowed during the following conditions, unless otherwise approved:

- **Cold weather** - When air or ground temperatures are expected to be below 32 °F.
- **Hot weather** - When air or ground temperatures are expected to be above 88 °F.
- **Wet weather** - When the ground reaches saturation, except as approved when planting wetland plants.
- **Windy weather** - When wind velocity exceeds 25 mph.

(d) Work Performed During Unacceptable Conditions - If any work occurs during unacceptable weather conditions, the Contractor may be required to provide the following services at no additional cost to the Agency:

(1) Expert Consultation - Consultation with a certified Arborist (for trees) or other expert as approved (for other plants) to determine what plant care measures are required to maintain the plants installed during the unacceptable weather conditions in a healthy and vigorous condition.

(2) Replacement - Replacement of all work performed during unacceptable weather conditions.

(3) Watering and Maintenance - Watering and maintenance of all plant materials installed during the unacceptable weather conditions and responsibility for all extra costs incurred.

01040.04 Coordination - Coordinate the following elements with the Agency prior to construction:

(a) Planting Work Plan (PWP) - Within 30 calendar days of award of the Contract, submit a PWP for approval. Include or describe the proposed methods for the following:

- Material submittals according to 01040.10
- Topsoil approvals according to 01040.14
- Plant installation and establishment

The following are included as part of the PWP, but are required only before the related planting work begins:

- Soil Fertility Test and Soil Amendment Report according to 01040.13.
- Soil Testing and Soil Bio-amendment Report according to 01040.13.

Proceed according to the approved PWP once written approval is received from the Agency. If any part of the PWP become unworkable at any time during construction, notify the Agency, then submit a revised plan. Do not proceed with the planting work until approved by the Agency.

(b) Notice for Inspections - Notify the Agency a minimum of 24 hours prior to each required inspection.

(c) Site Conditions - Ensure that the area is properly prepared prior to the start of the planting operation.

(d) Utility Locate - Coordinate all existing utility locations according to Section 00150.

(e) Utility Use - Provide required water and electricity for planting and plant establishment at no additional cost to the Agency unless an approved Agency source is available.

(f) Verification - Verify actual ground dimensions prior to construction. Notify the Agency of any discrepancies before beginning work.

Materials

01040.10 General - Submit a list of Project materials for approval according to 01040.04(a) before arranging for procurement of any materials. For materials not approved, submit a list of alternate materials for approval. Materials installed without approval will be subject to removal and replacement with acceptable material at no additional cost to the Agency.

Substitute materials may be allowed if proof of equivalent quality, suitable product specifications, manufacturer's literature and other detailed information is furnished to the Agency.

01040.12 Product Delivery, Storage, and Handling - Deliver manufactured products in original, unopened containers, each bearing the manufacturer's guaranteed analysis, name, trade name, and conformance with governing regulations and laws. Protect products against damage or dehydration. Remove unacceptable products as soon as possible from the Project site. If required or requested, provide any manufacturer's literature to the Agency.

01040.13 Soil Testing - Furnish the following kinds of soil testing and reports:

(a) Soil Fertility Test and Soil Amendment Report - Prior to planting, furnish a soil fertility analysis of imported soils performed by a certified testing lab. Prior to planting, adjust soil amendment and fertilizer applications as recommended by the soil amendment report and as approved by the Agency.

(1) Sampling - Take five samples per acre of each soil type. Mix the five samples into one test sample for each soil type. Furnish soil fertility test results that provide information on available

nutrient content and fertility status of the soil. Conduct sampling procedures according to the Oregon State University Extension Service handout EC 628, "How to Take a Soil Sample... and Why".

(2) Testing - The test may be performed by any qualified soils testing laboratory. A list of qualified soils testing laboratories is available from the Oregon State University Extension Service. Include testing for levels of acidity (pH), salinity, nitrates, ammonium, phosphates, potassium, calcium, magnesium, and any other tests necessary to determine appropriate fertilization and amendment needs for the type of plants being planted.

(3) Soil Amendment Report - Provide a report from the testing laboratory summarizing sampling locations and procedures with printed results, and which makes recommendations for fertilizers and soil amendments to effectively develop productive soil.

(b) Testing and Soil Bio-Amendment Report - Have soils tested prior to planting by an approved soil ecology lab. Provide information on soil foodweb structure and function, and include total and active bacterial biomass, total and active fungal biomass, protozoan numbers, nematodes, microarthropods, and mycorrhizal colonization. Adjust the kind and amount of soil conditioners, soil amendments, soil bio-amendments, and fertilizers (if any) as recommended by the soil bio-amendment report, and as approved by the Agency prior to construction.

(1) Sampling - Take five samples per acre of each soil type. Mix the five samples into one test sample for each soil type. Conduct sampling according to the standard procedures for soil organism assessment as recommended by the soil ecology lab.

(2) Testing - Perform the following soil ecology tests and furnish soil meeting these minimum soil organism biomass requirements:

Test	Minimum Requirements
Percent active bacterial and fungal biomass.....	between 5% and 25% activity
Total bacterial biomass.....	6×10^8 per gram of dry soil
Total fungal biomass	100 µg for grasslands 200 µg for shrubs or perennials 300 µg for forested areas
Protozoa	5000 per gram of soil
Beneficial nematodes	20 per gram of soil (No root-feeding nematodes)

Determine if anaerobic or compacted conditions are present, based on the assessment of total bacterial biomass, percent bacterial activity, and protozoan biomass.

If the soil contains biomass numbers lower than these levels, apply amendments and inoculates according to the soil ecology lab recommendations in the soil bio-amendment report in 01040.13(b-3).

(3) Soil Bio-Amendment Report - Provide a report summarizing sampling locations and procedures. Include the soil ecology lab report of the soil organism assessment and the recommendations for:

- Inoculation of missing organisms groups to the soil.
- Amendment with food resources for organism groups with too low of a biomass.
- Reduction of undesirable groups, or groups with the biomass too high for the optimal growth of the desired plants.
- Any adjustments to the bio-amendments required for the types of plants being planted.

01040.14 Topsoil - Furnish topsoil containing no substance detrimental to the growth of plants and that is free of plants designated by the Oregon Department of Agriculture as Type "A" or Type "B" weeds. Unsuitable topsoil, or topsoil placed by the Contractor without approval in areas to be planted, may be required to be replaced at no additional cost to the Agency.

20 days before furnishing any type of topsoil, do the following:

- Give the Agency notice of intent to use the source.
- Provide access to the source for Agency inspection.
- Provide one 20 pound representative soil sample of each topsoil type for testing of particle size range and organic matter by the Agency, unless otherwise specified.
- Obtain approval of the source before excavation of topsoil begins.

(a) Imported Topsoil - Furnish imported topsoil from non-Agency controlled lands that, when tested according to AASHTO T 88, meeting the following limits:

Standard Sieve Analysis

Particle Size Range	Percent Retained (by Weight)
Larger than 2"	0
2" - 3/4"	0 - 5
3/4" - No. 4	0 - 20
No. 4 or less	0 - 100

Of the fraction passing the No. 4 sieve, excluding organic material, furnish topsoil that conforms to the following limits:

Hydrometer Analysis

Particle Size Range	Percent (by Weight)
No. 4 - No. 200	5 - 70(Retained)
No. 200 - 2 µm	20 - 80(Retained)
Less than 2 µm	5 - 30 (Passing)

In addition, furnish topsoil that analyzes at least 2 percent organic matter according to ASTM D 2974.

01040.15 Soil Conditioners - Soil conditioners are for modifying soil structure and improving soil aeration characteristics, as distinguished from plant foods, mulch, and soil organism amendments. Furnish soil conditioners free of noxious weeds, living plants and rhizomes, and substances detrimental to plant life. Submit a 15 pound sample for approval by the Agency prior to construction. Provide soil conditioners that are free of weed seeds, excessive salts, chemicals detrimental to plant growth, and pest organisms. Soil conditioners proposed for use are subject to testing at any time or place the Agency deems appropriate.

Furnish one or more of the following soil conditioners:

(a) Mushroom Compost - The used bedding material from commercial mushroom production.

(b) Composted Yard Debris - Commercially manufactured material, made from dead plant material such as grass clippings, weeds, green and dead dry leaves, garden and vegetable material, and ground branches of trees and shrubs. Furnish a product that is composted under controlled aerobic decomposition, with the internal temperature reaching 135 °F for 15 days, without exceeding 155 °F.

Ensure that it contains a maximum of 10% bacteria and 10% fungus. Additional certification may be required in areas having a certification program.

(c) Peat Moss - Horticultural grade, natural peat moss in air-dry condition, free from woody substances, in bales or bags labeled for content and volume. Only peat moss used in combination with one of the above composts is acceptable.

01040.16 Soil Amendments - Soil amendments are intended to improve soil nutrition. Furnish soil amendments that are free of materials detrimental to plant life. Furnish manufacturer or supplier quality compliance certifications. Ensure that material testing methods meet the requirements of the Oregon Department of Agriculture appropriate to that material. Obtain approval for use before beginning work. Soil amendments may include the following:

- Lime
- Dolomite Lime
- Gypsum
- Rock, Diammonia, or other Phosphate
- Calcium or Potassium Nitrate
- Iron Sulfate

01040.17 Soil Bio-Amendments - Soil bio-amendments are intended to increase beneficial soil organism numbers or soil organic nutrient content. Furnish bio-amendment products or materials that are free of substances or life forms detrimental to plant life and receive approval prior to use on the Project. Furnish manufacturer or supplier quality compliance certification. Ensure that material testing methods meet the requirements of the Oregon Department of Agriculture appropriate to that material. The following are typical soil bio-amendments that may be identified in the soil bio-amendment report:

(a) Bacterial Food Amendments:

- Simple sugars such as brown sugar, brown syrups, or molasses
- Plant extracts of Yucca or Nettle, usually containing sap of the plant comprised of a combination of simple sugars, proteins, and carbohydrates
- Fulvic acids
- Yeast, including baker's yeast, brewer's yeast, and champagne yeast
- Kelp meal
- Rock dust

(b) Fungal Food Amendments:

- Cellulose
- Lignin
- Humic acids - brown to dark brown products (black is not acceptable)

(c) Protozoa Food Amendments:

- Bacteria
- Hay infusions - A method of growing protozoa for soil inoculation by using hay in water

(d) Nematode Food Resources - Nematodes come as four types: bacterial-feeders, fungal-feeders, root-feeders, and predatory nematodes. Predatory nematodes eat other nematodes, while the name of the other groups indicate what organisms they eat.

The primary source of material containing a wide diversity of beneficial nematodes is good compost. Provide certification that the compost contains beneficial nematodes and does not contain root-feeding or other detrimental nematodes.

(e) Mycorrhizal Inoculates - Commercially produced ectomycorrhizal and endomycorrhizal fungi that improve plant root absorption of soil nutrients.

(f) Microbes - Commercially produced product designed to enhance microbiological activity in the soil by the addition of beneficial and essential microbes. Commercial products may also contain vitamins, amino acids, plant growth hormones, micronutrients, and plant stress relievers.

(g) Earthworms - Common earthworms that are either "Red Wigglers" or "Night Crawlers" delivered in peat moss or other damp medium.

01040.18 Fertilizer - The soil amendment and bio-amendment reports will recommend fertilizer types and application rates. When identified in the report furnish commercial fertilizer meeting the requirements of 01030.14 and the following:

(a) Organic - Organic fertilizer 5-4-3, analyzing 5% nitrogen, 4% available phosphoric acid, and 3% soluble potash.

(b) Plant Bags and Tablets - Plant bags or tablets containing 20-10-5, or approved equal, may be used instead of granular fertilizer in pit planting.

Furnish plant bags or tablets that are controlled-release with a minimum one-year release period. Chemical formulation, rates and use will be approved by the Agency.

Construction

01040.40 General - Planting areas shown on the plans are approximate unless shown with dimensions. Be responsible for layout and staking for plant placement, subject to approval by the Agency before planting. The Agency will make only field measurements necessary to calculate and verify quantities for payment.

01040.42 Planting Season (East of the Cascades) - Perform all plant installation work from October 15 to November 30, unless otherwise specified. Container-grown materials located within irrigated areas may be planted at other times, depending upon written Agency approval.

01040.43 Topsoil:

(a) Subsoil Preparation - Grade and finish areas that are to receive topsoil, allowing for the specified amounts of topsoil. Scarify or till subsoil that is not loose and friable to a depth of 6 inches and obtain approval from the Agency before placing topsoil.

(b) Hauling and Spreading - Haul and spread material without compacting the topsoil or areas where it is placed. Protect from damage any surrounding objects, pavement, structures and areas that are traveled, crossed, or mounted by equipment.

Smoothly spread the topsoil over the specified areas to the thickness, grades, and slopes shown or directed. Avoid wasting topsoil and do not place material during wet conditions. Do not work saturated soils in any manner. Material placed contrary to Agency instructions or in undesignated places will not be paid for and removal may be required at the discretion of the Agency.

(c) Finishing and Cleaning Up - Finish areas covered with topsoil to proper grade, contour and cross section. Cultivate all topsoil not in a loose and friable condition to a depth of at least 4 inches. Bring the surface to a condition ready for planting operations.

01040.45 Soil Amendments - Incorporate soil amendments into the topsoil when required by the soil fertility test and soil amendment report. The application rate will be verified by checking settings on the spreading or application equipment.

01040.46 Soil Bio-Amendments - Incorporate the following soil bio-amendments into the topsoil of areas to be planted, according to the recommendations of the soil bio-amendment report, the supplier, or the following:

- Bacterial Food Amendments
- Fungal Food Amendments
- Protozoa Food Amendments
- Nematode Food Amendments
- Microbes and Biostimulants
- Earthworms - Add nine worms per cubic yard of topsoil (this roughly equates to three worms per 10 square feet of topsoil at 12 inches depth).
- Mycorrhizal inoculation - Incorporate into the planting hole quantities of mycorrhizia sufficient to correct the soil for the type of plants or grasses being grown.
- Mycorrhizal Inoculation (Injection) - Provide pre-measured packets containing live endomycorrhizal and ectomycorrhizal fungi.
- Mycorrhizal Inoculation (Root Dip) - Apply root dip material containing live endomycorrhizal and ectomycorrhizal fungi.

The application rate will be verified by visual inspection of application rates. A one-time application should be adequate, as long as pesticides, fertilizers or other toxic materials are not used at the same time. If it becomes necessary to apply pesticides that have non-target organism effects, or to apply fertilizer at rates greater than 13 pounds per acre, re-inoculate the organisms about one month after the pesticide or fertilizer was applied.

01040.47 Fertilizers - Incorporate fertilizer based upon recommendations of the soil amendment and soil bio-amendment reports.

01040.48 Planting Area Preparation - All planting areas shall be Weed Free before planting or seeding operations begin.

Prepare planting areas according to the following methods, or as otherwise specified:

(b) Method "C" (Sod Lawn and Seeded Lawn Areas) - Cultivate existing ground to a depth of 6 inches, achieving a loose and friable condition suitable for fine grading. Remove all vegetation, rocks larger than 2 inch diameter, clods, roots, sticks, debris, and other matter detrimental to the growth of sod.

Uniformly spread soil conditioners, soil amendments, soil bio-amendments, and fertilizer evenly over the area and thoroughly rototill into the soil to a depth of 4 inches. Apply at rates recommended by soil testing, or as follows:

Material	Rate (per 100 square yards)
Soil Conditioner	1/2 cubic yard
Fertilizer	10 pounds
Lime (Western Oregon only)	40 pounds

Fine grade and roll planting areas with a water-filled roller to provide a fine-textured, smooth, firm surface, free of undulations, irregularities or low areas that could create standing water. Grade areas

receiving sod to within 1/2 inch of the designed grades, and 1 inch below adjacent walks, curbs and pavement. Since sod thickness varies, adjust initial grades so the final sod soil level is slightly below adjacent hard surface grades. Ensure that final sod grade does not create a pedestrian tripping hazard.

Furnish the Agency with sod mixture information and a quality compliance certificate from the sod grower, certifying sod compliance with mixture requirements, according to 01040.10.

Prior to completion of any sodding and seeding, re-grade ruts, footprints, washouts, or any other irregularities, and re-seed or re-sod repaired areas as originally specified.

(b) Method "D" (Rough Areas Seeded for Revegetation or Erosion Control) - Remove any matter detrimental or toxic to the growth of plants, including weeds, clods, rocks or debris. On slopes 1V:3H or flatter, remove all debris larger than 2 inches in any dimension. On cut slopes 1V:1.5H or flatter, roughen the surface with furrows parallel with slope contours and loosen the soil to a depth between 3 inches and 6 inches.

01040.52 Placing Sod Lawn - Place sod only after approval of the Agency. Immediately before placing sod, water the soil bed to prevent drying of grass roots. Lay the first sod row in a straight line, then place subsequent rows parallel to and tightly against each other, staggering lateral joints. Do not stretch or overlap the sod. Tightly butt all joints. Do not use sod segments containing less than 2 square feet of surface area.

After placement, diagonally roll and thoroughly water the sod. Apply a second application of fertilizer (22-16-8) at the rate of 510 pounds per 100 square yards and thoroughly water.

01040.54 Water - Water all plants at intervals as required to maintain and promote healthy growth. Avoid excessive watering of shrub bed areas that may leach herbicide and damage adjacent lawns or desirable or protected vegetation. Repair all lawn vegetation damage at no additional cost to the Agency.

Plant Establishment

01040.70 General - The Contractor is responsible for the survival of all plant material until the end of a plant establishment period of one calendar year. The plant establishment period will begin when all the original planting is complete. The original planting is considered complete when all the plant material has been planted to the satisfaction of the Agency.

Establishment period work includes removing all plants that have reached their permanent wilting point, are dead, dying, or which do not meet Specifications, and replacing them with healthy plants. All plants in place after this replacement will be recognized as the original planting and will be subject to the establishment specifications.

01040.71 Plant Care and Success Criteria - During the plant establishment period, maintain plants in a vigorous growing condition by regularly doing the following:

- Watering and fertilizing sufficiently to promote growth.

01040.77 Plant Establishment - In addition to these plant establishment requirements, perform the following:

(a) Watering and Fertilizing - Water all plants at the required intervals using the installed permanent or temporary irrigation systems, or such means as has been established for the Project.

(b) Sod Lawn - Mow, cut and fertilize sod lawns as required to maintain a healthy and vigorous condition. A schedule of feeding, mowing, and general treatment, including thatching and aeration will

be listed in the Special Provisions. Final acceptance of sod lawn areas will depend on its health and condition. Keep sod lawns mowed to a height between 1 1/2 inches to 2 inches.

Do not perform the first mowing until the sod is firmly rooted and secure in place. Remove no more than one-third of the grass leaf during initial or subsequent cuttings.

01040.79 Final Inspection - After plant replacement work and any other required work has been completed, the Agency will make a final inspection.

Measurement

01040.80 Measurement – Plantings and associated work performed under this Section will be measured according to 01030.80.

Payment

01040.90 Payment - Plantings and associated work performed under this Section will be measured according to 01030.80.

No separate or additional payment will be made for:

- soil amendments
- lime, gypsum, or trace minerals
- soil bio-amendments
- fertilizer
- herbicides
- anti-transpirants
- game repellent
- browsing protectors
- pesticides
- water
- timed-released water
- corrective work during the plant establishment period

Section 01050 - Fences

Description

01050.00 Scope - This work consists of removing and rebuilding existing fences to perform the necessary construction activities.

01050.01 Definitions:

- (a) **Fences** - Fence, gates, gateways, and appurtenances, regardless of kinds and types.
- (b) **Gates** - Swinging units to provide an opening in the fence line.
 - (1) **Single Gate** - A unit of 16 feet or less.
 - (2) **Double Gate** - Two single gate units used together for an opening of more than 16 feet.
- (c) **Gateway** - Supported fence wire or fabric stretched between gate posts and fastened by bars, wire hinges and locking devices.
- (d) **Panel** - That portion of fence between adjacent posts.
- (e) **Run** - As used in this specification, run is defined as follows:
 - **Fences, gates, and gateways** - The length of fence between end posts, intermediate end posts, corner posts, and gate posts.

Materials

01050.10 Materials - Furnish materials meeting the following requirements:

Bar Reinforcement	02510.10
Barbed Wire	03010.10
Chain Link Fabric	03010.30
Commercial Grade Concrete	00440
Fence Gates.....	03010.60
Fence Grounding	03010.50(e) and (f)
Fence Posts, Braces, and Appurtenances.....	02110.30, 03010.50
Woven Wire.....	03010.20

Construction

01050.40 General - Construct the several kinds and types of fences including the assembly and erection of all component parts and materials complete in place at the locations shown or directed. Confine activities and operations to the area immediately adjacent to the project.

01050.41 Lines, Grades, and Preparation Work - Unless otherwise directed, set fences so the fence fabric and wires are to the original location prior to construction activities.

Fill or excavate ground surface irregularities which interfere with maintaining specified clearance above ground surface of the bottom wire of the fence. Limit the width as necessary to provide a clear way for the fence.

Excavate for concrete footings to reasonably neat lines, but not less than the specified dimensions in soil, or not less than 18 inches deep in rock. Prevent disturbance of original ground at the sides and bottom of the excavation.

Clear and grade gate openings to permit the gate to swing in a horizontal plane according to 01050.48.

Dispose of materials removed under these provisions, including excess excavation, in a satisfactory manner.

01050.42 Optional Posts - Use steel or wood posts in barbed, or barbed and woven wire fence construction according to one of the following options, to match existing fencing:

Option 1: Steel posts entirely in all types of fence.

Option 2: Treated wood posts entirely in:

- Type 1 fence
- Type 1-5W fence
- Type 2 fence
- Median fence on median areas exceeding 16 feet in width

Option 3: Steel line post in combination with treated wood end posts, intermediate end posts, corner posts and gate posts in:

- Type 1 fence
- Type 1-5W fence
- Type 2 fence
- Median fence on median areas exceeding 16 feet in width

01050.43 Installing Posts and Braces:

(a) General - Set all metal end posts, intermediate end posts, corner posts, gate posts, and chain link fence posts in concrete footings. Set all other posts firmly in the ground or in concrete footings as the Contractor elects.

Set posts to the depths shown. Reasonable variation in depths will be allowed and posts may be appropriately shortened or left slightly high, as approved by the Engineer, to:

- Avoid unnecessary penetration or excavation in rock or other unusually firm material.
- Obtain desired grades along the fence.

Set all posts vertical, except on curved alignment set posts slightly off vertical, as directed, to offset the pull of the fence fabric and wires.

(1) Driven Posts - Posts which are set by driving shall be free of damage when set. Remove and replace any driven posts which are split, twisted or bent, or have a badly misshapen tops.

(2) Dug Holes - Where rock is encountered, set the posts to depths of not less than 18 inches and backfill with fine granular material. Do not exceed the post height shown by more than 3 inches.

When posts are set in dug holes, backfill in 6 inch layers with each layer separately and thoroughly tamped and compacted.

(3) Concrete Footings - Dimensions of footings shall not be less than shown and shall fill the excavated areas. Place the concrete with contact against firm soil at the sides and bottom and tamp around the posts and brace ends after the posts and braces have been brought to and firmly held in proper position. Strike off, slope or crown and smooth the surface of the concrete at the ground level

to shed water. Allow to cure for at least five calendar days before subjecting the posts and braces to strain.

(b) End Posts - Set end posts:

- At the beginning and end of new fence construction that is not terminating at gate posts.
- At the end of the intersecting line of existing fences just outside the line of the new fence.

(c) Intermediate End Posts - Set intermediate end posts in the line of the new fence:

- At each summit and at each valley in the grade of the fence where the algebraic difference in the grades of adjoining panels of fence exceeds 30%.
- At other points located along the new fence line to break the fence construction into approximately equal runs not exceeding the applicable lengths of runs shown.

(d) Corner Posts - Set corner posts as follows:

(1) Barbed and Woven Wire Fences - At angle of deflection exceeding 5° for fences with steel line posts or 15° for fences with wood line posts. Changes in line where the angle of deflection does not exceed the above limitations will be considered alignment angles. The adjacent line posts at alignment angles shall be made fast to the angle post by means of diagonal tension wires.

(2) Chain Link Fences - At angle points in fence alignment where the alignment of adjoining panels of fence changes direction by 20° or more.

(e) Gate Posts - Set gate posts at the beginning or end of runs of fence to provide openings for gates or gateways.

(f) Line Posts - Set line posts along the line of fence, between end, intermediate end, corner, and gate posts, and at the spacings shown. Line posts may be set at spacings not exceeding 25% greater than specified or at closer spacings if approved. Set a line post in the new fence line at a point in alignment with each intersecting fence line approximately 1 foot from the end post of the intersecting fence line.

It is intended that the actual number of line posts will average to the number required for normal spacing.

(g) Braces - Construct braces before placing of fence fabric and wires on the posts.

(1) Metal Braces - Provide corner posts and intermediate end posts with two braces, one each direction from the post in the main fence lines. Provide end posts and gate posts with one brace in the line of the fence as shown.

Attach metal braces to the metal end, intermediate end, corner and gate posts and set in concrete footings.

(2) Wood Braces - Assemble and construct treated wood braces in conjunction with treated wood end posts, intermediate end posts, corner posts and gate posts to form units as shown. Fasten the wire brace guys to posts with three staples in each post. By means of a wood lever, twist together the four strands of wire between the posts until the entire assembly is taut and firm. Leave the lever in place. Drive the staples to provide contact with the wires without indentation of the posts.

01050.44 Barbed and Woven Wire Fence:

(a) Placing Fabric and Wire - Place fabric and wire on the face of the post which is away from the highway or as shown. On curved alignment, place the fabric and wire on the face of the post against which the normal pull of the fabric and wire will be exerted.

Attach fence fabric and barbed wire to each post according to recognized standard practice for fence construction and as shown or directed.

(b) Splicing Fabric and Wire - Splices of fabric and splices of separate lines of wire between posts will be allowed provided that not more than two fabric or separate wire splices, spaced at least 50 feet apart, occur in any one run of fence. Use wrap or telephone type splices for the longitudinal woven wire and barbed wire with each end wrapped around the other wire for not less than six complete turns.

(c) Stretching Fabric - Stretch the barbed wire and woven wire fabric. Use care in stretching woven wire fabric, so the pull is evenly distributed over the longitudinal wires and not more than one-half of the original depth of the tension curves is removed.

(d) Fastening Fabric and Wire:

(1) At End, Intermediate End, Corner, and Gate Posts - Terminate the fence fabric and barbed wire at each end, intermediate end, corner, and gate post in the new fence line. Wrap each line of barbed wire and each longitudinal wire of the fence fabric around the post and then itself with at least four turns.

(2) At Line Posts - Fasten woven wire fabric to the post at top and bottom and at intermediate points not exceeding 12 inches apart. Fasten each line of barbed wire to each line post. Use approved wire ties or clamps to fasten the wires to metal posts. Drive staples, for use with wood posts, crosswise with the grain of the wood and pointed slightly downward. Drive the staples just short of actual contact with the wires to permit free longitudinal movement of those wires and to prevent damage to the protective coating.

(3) At Intersection of New and Existing Fence - Where existing fences intersect the new fence, cut the existing fence materials, or splice basically in kind new materials as necessary, and fasten each longitudinal wire of the fabric and each line of barbed wire to the new end post according to 01050.44(d-1).

(e) Additional Panels at Depressions - If depressions in the ground surface leave unfenced openings greater than 12 inches in height beneath the bottom line of the fence, provide additional panels of fence fabric, barbed wire, or combinations between line posts, as approved, across the opening so no side or bottom openings exceeds 6 inches. If the bottom line of the fence leaves an unfenced opening beneath it of 12 inches or less, pull the fabric and wires down between posts and anchor with pins or posts driven at least 18 inches into the ground so there will be no bottom opening at any point along the fence greater than 6 inches in height.

(f) Stay Wires and Final Adjustments - Free the fabric and barbed wire in final position from warp and sag with stay wires placed approximately vertical to the grade of the fence. Appearance shall reflect first-class work. Retighten brace guys and leave the lever restrained against the fence fabric or fence wires.

01050.45 Chain Link Fence:

(a) Concrete Footings - Construct concrete footings according to 01050.43(a-3).

(b) Chain Link Fence Rails and Tension Wires - Place longitudinal rails and longitudinal tension wires along the line of chain link fence, except at gates.

(1) Rails - Attach rails to end, gate and corner posts by clamps and sockets, and thread through loop caps on the end of line posts. Provide expansion sleeves or couplings at spacings not exceeding 200 feet in longitudinal top and bottom rails.

(2) Tension Wire - Attach tension wire to end, gate and corner posts by bands and clamps. Either thread the top tension wire through line post loop caps or hold in open slots in a manner to limit vertical movement. Tie or attach the bottom tension wire to the bottom of line posts by ties or clamps in a manner that prevents vertical movement. Provide tension wires with one turnbuckle or one ratchet take-up in each run of fence.

(c) Chain Link Fence Fabric and Wire - Assemble and install chain link fence fabric and wire according to 01050.44 and the following:

(1) Splicing Fabric - Use spiral pickets of specified chain link fabric material for fabric splices. Use wrap or telephone type splices for tension wire and barbed wire with each end wrapped around the other wire for not less than six complete turns.

(2) Fastening Fabric - Fasten fabric to end, gate and corner posts and to gate frames as shown. Attach fabric to line posts with wire ties at top and bottom and at intermediate spacings not exceeding 18 inches. Fasten fabric to top and bottom rails and to longitudinal tension wires with metal bands or tie wires spaced as shown, but in no case greater than 24 inches apart.

(3) Screening Pickets - If shown, insert the screening pickets vertically in each diamond.

01050.47 Fence Grounding:

(a) General - Except for bridge protective fence, provide at least one "ground" for each run of fence and place at any post within the run according to 00960.50(b). Fence grounding for bridge protective fence is not required.

Fasten each line of barbed wire, alternate longitudinal wires of fence fabric, and the rails and tension wire of chain link fences to the ground wire by clamps. Clamp the ground wires to the grounding rods.

(b) At Electrical Lines - Ground the fence directly below the point of crossing at each location where an electric transmission, distribution or secondary line crosses over the fence.

Ground the fence at each end or gate post or at intervals not to exceed 500 feet when an electric transmission, distribution or secondary line runs parallel or nearly parallel to and within 100 feet of the fence.

01050.48 Gate Installation:

(a) Metal Gates - Install metal gates and fittings between gate posts previously set as specified. Firmly attach the fittings to the posts and gates. Hinge each single gate in a manner which will prevent removal of the gate without tools. Set the gate in an approximately horizontal plane to swing freely inward and outward, and so it can be fastened securely in its latch holder, or in the case of double gates, in its latch holder and gate stops. Set double gates on their respective hinge pintles to provide a common horizontal plane in which each single gate swings.

Gates shall swing open at least of 90° in each direction.

(b) Gateways - Construct gateways of the same material as the fence and as shown. Construct wire splices according to 01050.44(b). Provide a taut and well-aligned closure of the opening, capable of being readily opened and closed by hand.

01050.49 Removing and Rebuilding Fence - Remove and rebuild existing fences as shown or directed. Construct fences to approximately the same condition as the original fence. Salvage the materials in existing fences to be removed and rebuilt and incorporate in the rebuilt fences. Replace fence materials damaged beyond reuse at no additional cost to the Agency. Firmly reset posts to the staked alignment. Post spacing and the number of wires to be strung and stapled to the posts shall be the same as the original fence. Furnish and use new staples or clips to fasten the wires to the posts.

Measurement

01050.80 Measurement - Removing and rebuilding existing fences will be considered incidental to the Bid Item that the work is required for and no additional measurement will be made.

Payment

01050.90 Payment - Removing and rebuilding existing fences will be considered incidental to the Bid Item that the work is required for and no additional payment will be made.

New material necessary to complete the rebuilding of fence shall be included in the Bid Item that requires removing and rebuilding of the existing fence.

Section 01120 - Irrigation Systems

Description

01120.00 Scope - This work consists of repairing existing irrigation piping if caused by the Contractor's excavation operations. **Repairs shall be coordinated with the Agency and shall be performed the same day to allow irrigation operations by the Agency to continue.**

01120.01 Qualifications - In order to install certain kinds of equipment or systems, manufacturer's certifications may be required, if described in the Special Provisions.

Materials

01120.10 General - Furnish only commercial quality materials and equipment. All items proposed for use will be subject to testing to ensure compliance with the Specifications. Provide materials of the same function that are of the same type and the same manufacturer.

01120.11 Pipe, Tubing, and Fittings – Furnish PVC pipe that meets the following requirements:

(a) Polyvinyl Chloride Pipe and Fittings - Furnish PVC pipe and fittings of PVC compound Type 1, Grade 1, conforming to ASTM D 2241 and certified approved by the National Sanitation Foundation. Provide pipe and fittings free from defects caused by poor materials, low quality of work, or rough handling. Dimensional and quick burst tests of pipe and fittings may be required after arrival at the job site before materials will be accepted.

Furnish pipe and fittings as follows:

Used for	Class or Schedule
Main and lateral lines	Schedule 40 PVC
Caps	Schedule 40 PVC

Construction

01120.47 Flushing and Testing:

(a) General - Provide gauges used in the testing of water pressures that are certified correct by an independent testing laboratory immediately before use on the Project. Retest gauges when directed. Test automatic controllers by actual operation for a period of two weeks under normal operating conditions. If adjustments are required, adjust according to the manufacturer's direction and test until operation is accepted as satisfactory.

(b) Sprinkler Head Flushing - Flush all sprinkler heads as recommended by the manufacturer.

(c) Sprinkler Head Testing - Test for leaks in heads and connections and correct as required.

(d) Main Line Flushing - To remove debris that may have entered the line during construction, flush main supply lines twice with the supply valve fully open. Flush first before placing valves and again after placing valves and before pressure testing.

(e) Main Line Testing - Purge all main supply lines of air and test with static water pressure of at least 150 psi for 60 minutes without introduction of additional service or pumping pressure. Test with one pressure gauge installed on the line where directed. Install an additional pressure gauge at the pump when directed. Lines showing loss of pressure exceeding 5 psi at the end of the specified test period will be rejected. Correct rejected installations and retest for leaks.

(f) Lateral Line Flushing - Flush all lateral lines once with the supply valve fully open prior to placement of sprinkler heads, emitters and drain valves. Flush long enough to remove any debris that enters the lateral lines during construction.

(g) Lateral Line Testing - Purge all lateral lines of air and test under operating line pressures with risers capped and drain valves closed. Maintain operating line pressures for 30 minutes through open valves and pressure regulating devices. Lines showing leaks when visually inspected at the end of the specified test periods will be rejected. Correct and retest lateral line installations that have been rejected.

(h) Lateral Line Alternate Test Method - When conditions prevent effective visual inspection of lateral lines, the Engineer may require that the lines be tested by use of pressure gauges. In that event, maintain the static water pressure equal to the operating line pressure in the lines for 30 minutes, with valves closed and without introduction of additional service pressure. Lateral lines showing loss of pressure exceeding 5 psi at the end of the specified test period will be rejected. Correct and retest lateral line installations that have been rejected.

01120.48 Adjusting System - Before final inspection, adjust and balance all sprinklers to provide adequate and uniform coverage. Balance spray patterns by adjusting individual sprinkler heads with the adjustment screws or by replacing nozzles to produce a uniform pattern. Unless otherwise specified, water spray will not be allowed on pavement, walks or structures.

01120.49 Backfill - Do not start backfill until all piping has been inspected, tested and approved. Complete backfilling as soon as possible after approval. Ensure that backfill material placed within 6 inches of the pipe is free of rocks or other unsuitable material that might cut or otherwise damage the pipe. Backfill from the bottom of the trench to approximately 6 inches above the pipe with continuous compaction in a manner that will not damage the pipe or wiring, and proceed evenly on both sides of the pipe. Thoroughly compact the remainder of the backfill without using heavy equipment within 18 inches of any pipe. Ensure that the top 6 inches of the backfill is topsoil material or, if suitable, is the first 6 inches of material removed in the excavation.

Pipe bedding material conforming to 00405.12 may be authorized in quantities determined by the Engineer. When authorized to proceed, fill the bottom 2 inches of the trench with approved bedding before laying pipe. After the pipe is in position, add enough bedding material to bring the backfill height to 2 inches above the pipe. Continue backfilling as usual.

If sufficient suitable backfill material is not available from trench excavation or other sources on the Project, notify the Engineer. Provide an estimate of imported backfill required, if possible. Unless otherwise shown or specified, imported pipe bedding material will be authorized according to 00140.60.

Maintenance

01120.60 System Operation - Repair, flush and test all main and lateral lines that sustain a break or disruption of service. Upon restoration of the water service, bring the affected lines up to operating pressure. After pressurizing, conduct a thorough inspection of all sprinkler heads, emitters, and other fittings, located downstream of the break or disruption of service, and repair. This inspection is required to ensure that the entire irrigation system is operating properly.

Measurement

01120.80 Measurement - No measurement of quantities will be made for work performed done under this Section.

Payment

01120.90 Payment - Payment of repairs will be included in payment made for the appropriate items under which this work is required.

Section 01145 – Geothermal Pipe and Fittings

Description

01145.00 Scope - This work consists of constructing geothermal pipe and fittings 16 inches and smaller in diameter.

Materials

01145.10 Materials - Furnish materials meeting the following requirements:

Bolted, Sleeve-Type Couplings for Plain End Pipe.....	02475.40
Commercial Grade Concrete in Thrust Blocks.....	00440
Detectable Marking Tape and Wire.....	02470.30
Ductile Iron Pipe Fittings	02475.20
Ductile Iron Pipe.....	02470.20
Restrained Joints.....	02475.30

01145.11 Handling Pipe and Fittings - Handle pipe and fittings to prevent damage or contamination to the pipe, fitting, lining, or coating. Load and unload pipe and fittings using hoists and slings so as to avoid shock or damage, and under no circumstances allow them to be dropped, skidded, or rolled against other pipe or fittings. If any part of the coating or lining is damaged, repair in a manner satisfactory to the Engineer. Damaged or contaminated pipe and fittings will be rejected. Immediately separate all damaged or contaminated pipe and fittings and remove from the job site.

(a) Thread Protection - Protect threaded pipe ends with couplings or other means until laid. Inspect the pipe and fittings for defects.

(b) Temporary Storage - Store pipe on cradles to prevent entry of dirt, other foreign material, or contamination. Keep the pipe or pipe joint free of dirt, other foreign material, or contamination during handling or laying operations. Remove, clean, and relay any pipe or fitting that has been installed with dirt, foreign material, or contamination in it. At times when pipe laying is not in progress, close the open ends of pipe with watertight plugs or by other approved means to ensure cleanliness.

01145.12 Cutting Pipe:

(a) General - Use short lengths of pipe supplied by the manufacturer whenever possible to provide the proper spacing of valves, tees or special fittings.

(b) Cutting Operation - Cut pipe with abrasive saws or by special pipe cutters. Square all pipe ends with the longitudinal axis of the pipe. Ream and otherwise smooth the cut ends so that good connections can be made. Cut threads cleanly. Flame cutting of ductile iron pipe will not be allowed.

Construction

01145.40 Trench Work - Excavate trench, prepare bedding, install pipe zone material, backfill, and dispose of excavated material according to Section 00405.

01145.41 Laying Pipe:

(a) **General** - Lay pipe to the lines and grades shown and established.

(b) **Ductile Iron Pipe** - Install ductile iron pipe according to AWWA C600 and the manufacturer's recommendations.

(1) **Curves** - Lay long radius curves, either horizontal or vertical, with standard pipe by deflecting the joints. If the pipe is shown curved in the plans and no special fittings are shown, assume that the curves can be made by deflecting the joints with standard lengths of pipe. If shorter lengths are required, the plans will indicate maximum lengths that can be used. Do not exceed 80% of the manufacturer's printed recommendations for the amount of deflection at each pipe joint when pipe is laid on a horizontal or vertical curve. Where field conditions require deflection or curves not anticipated by the plans, the Engineer will determine the methods to be used.

(2) **Pipe Laying Procedure** - When ductile iron pipe is laid on a curve, join the pipe in a straight alignment and then deflect it to the curved alignment. On approval, make trenches wider on curves for this purpose.

01145.42 Jointing Pipe:

(a) **General** - Clean all parts of the pipe ends, couplings, fittings, and appurtenances to remove oil, grit, or other foreign matter from the joint. Keep the joint from contacting the ground. When assembling gasketed joints, apply an approved lubricant as specified by the pipe manufacturer.

Mark pipe not furnished with a depth mark before joint assembly.

01145.44 Thrust Restraint:

(a) **Concrete Thrust Blocks** - Place concrete thrust blocks as shown, at bends, tees, dead ends, and crosses. Pour concrete thrust blocks in place against solid, undisturbed earth at the sides and bottom of the trench excavation. Shape the blocks so as not to obstruct access to the joints of the pipe or fittings.

(b) **Restrained Joints** - Where indicated or approved by the Engineer, restrain joints at bends, tees, dead ends, crosses, and all pipe joints within the indicated or specified distance on each side of the bends, tees, dead ends, and crosses. Install joint restraint systems according to the manufacturer's recommendations.

01145.45 Marking Tape and Wire:

(a) **Installation** - Install marking tape and wire over all nonmetallic water lines, including service connections. Place a continuous solid copper wire along the top of all water pipe, including service lines. Secure to the top of the pipe at maximum 10 foot intervals using 6 inch strips of 2 inch wide duct tape. Tie all splices and make them electrically continuous and waterproof. Provide access to terminal ends of the wire at all valve boxes, meter boxes, fire hydrants, and vaults. The result of this installation shall be a continuous wire circuit electrically isolated from ground. Place the marking tape approximately one foot above the top of the pipe for its full length.

(b) Accessibility - Make ends of wire accessible in water meter boxes, valve boxes or casings, or outside the foundation of buildings where the pipe enters the building. Provide wire access at locations no more than 1,000 feet apart.

(c) Testing - Test for continuity and isolation from ground in the wire after all work has been completed on the test section. Perform intermediate testing after backfilling operations and prior to surface restoration work. Test continuity between access locations by use of a temporary wire connecting test points in-line with an ohmmeter. Measure resistance with an approved ohmmeter that has been properly calibrated. The continuity of a test section will be accepted if the resistance of the test section does not exceed 5 ohms for each 500 feet of location wire being tested. Measure isolation from ground with an approved 1000 volt Megger, applied for one minute. The isolation of a test section will be accepted if the isolation resistance of the test section is at least 10 megohms. Locate and repair all breaks or defects in the wire and re-test until specified results are obtained.

01145.47 Connections to Existing Mains - Make necessary arrangements with the Engineer in advance of connections to existing mains. Assemble all materials, equipment and labor necessary to properly complete the work before starting.

(a) Notification - If the connection to the existing system involves turning off the water, notify the residents affected by the shutoff. The Engineer will advise which property owners are to be notified.

(b) Permission - The work to perform the connection may need to be carried out during times other than normal working hours. Do not operate any valves on the existing system without specific permission of the Engineer.

(c) Connection Arrangements - Piping arrangements shown are suggestions. For connection by any other arrangement, furnish a detailed sketch for approval not less than two weeks prior to the expected construction.

(d) Uninterrupted Service - Once work is started on a connection, proceed continuously without interruption, and as rapidly as possible, until completed. Shutoff of mains will not be allowed overnight, over weekends, or on holidays.

(e) Cutting Main Lines - Cut existing mains according to 01140.12. Remove the portions of pipe to provide for the installation of the required fittings at the points of connection. Repair all damage to existing joints in piping to remain in-service. Determine the exact length of the existing main that is to be removed. Bevel pipe ends to prevent damage to the transition coupling gasket during installation of the coupling. Clean the exterior of the existing pipe end to a sound, smooth finish before installation of the coupling.

01145.49 Backfilling - After the pipe is installed and inspected, backfill the trench according to Section 00405.

Field Testing

01145.50 Filling and Flushing - Fill pipes slowly with potable water at a maximum velocity of 1 foot per second while venting all air. Take all required precautions to prevent entrapping air in the pipes.

(a) Flush and Disinfect - Flush sections of pipe to be tested and disinfect to remove any solids or contaminated material that may have become lodged in the pipe. Provide a tap large enough to develop a velocity of at least 2.5 feet per second in the main.

(b) Taps - Provide taps for temporary or permanent release of air, flushing, or chlorination.

(c) Disposal of Treated Water - Dispose of treated water flushed from mains. Neutralize the waste water for protection of aquatic life in the receiving water before disposal into any natural drainage

channel. Dispose of disinfecting solution to the satisfaction of the Engineer and local authorities. If approved by the Engineer and the Utility, disposal may be made to any available sanitary sewer provided the rate of disposal will not overload the sewer.

01145.51 Hydrostatic Testing:

(a) General - Test all mains and appurtenances in sections of convenient length under a hydrostatic pressure equal to one and one-half times the working pressure, but at least 150 psi, measured at the highest point of the test section. Furnish and operate all pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test. Provide certifications of accuracy for gauges used in the test from an approved laboratory.

(1) Backfill - Backfill the pipeline sufficiently to prevent movement of the pipe under pressure. Place all thrust blocks and allow time for the concrete to cure before testing. Where permanent blocking is not required, furnish and install temporary blocking and remove it after testing.

(2) Filling Pipe - Fill the mains with water and allow to stand under pressure a sufficient length of time to allow the escape of air and to allow the lining of the pipe to absorb water. The Agency will furnish the water necessary to fill the pipelines for testing, at a time of day when sufficient quantities of water are available for normal system operation.

(3) Time Test - Test by pumping the main up to the required pressure for at least two hours. Provide additional pumping during the test period to continuously maintain pressure within 5 psi of that required. During the test, observe the section being tested to detect any visible leakage. Use a clean container to hold water for pumping up pressure on the main being tested. Sterilize this makeup water by adding chlorine to a concentration of 25 ppm.

(4) Measure Quantity - Accurately determine the quantity of water required to maintain and restore the required pressure at the end of the test period by pumping through an approved positive displacement water meter.

(5) Loss Formula - The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{SD(P)^{3/4}}{148,000}$$

where:

- L = allowable leakage in gallons per hour
- S = length of pipeline tested in feet
- D = nominal diameter of the pipe in inches
- P = average test pressure during the leakage test in psi

(6) Pressure Loss - There shall be no appreciable or abrupt loss in pressure during the test period.

(7) Leakage - Correct all visible leakage regardless of the allowable leakage specified above. If the actual leakage exceeds the allowable amount, locate and repair the leaks and retest the pipeline.

(8) Test Section Length - Limit sections to be tested to 1,500 feet, unless longer test sections are approved. The Engineer may require that the first installed section of pipe installed by each crew, not less than 1,000 feet in length, be tested. Do not continue pipe laying more than an additional 1,000 feet until the first section has been tested successfully.

(9) Test Equipment Readiness - Prior to calling out the Engineer to witness the pressure test, set up all equipment completely ready for operation and successfully perform the test to ensure that the pipe is in a satisfactory condition.

(10) Defective Materials or Workmanship - Replace defective materials or workmanship discovered during hydrostatic field testing. Whenever it is necessary to replace defective material or correct the workmanship, repeat the hydrostatic test until a satisfactory test is obtained.

01145.52 Disinfecting:

(a) General - Before placing new mains in service, chlorinate new mains and repaired portions of, or extensions to, existing mains and obtain a satisfactory bacteriological report.

The initial chlorine content of the water shall be not less than 25 ppm. A chlorine residual of not less than 10 ppm shall remain in the water after standing 24 hours in the pipe.

(b) Chlorine Application - Apply chlorine by one of the following methods:

(1) Gaseous Chlorine - Apply a chlorine gas-water mixture by means of a solution-feed chlorinating device, or feed the dry gas directly through proper devices for regulating the rate of flow and providing effective diffusion of the gas into the water within the pipe being treated. Chlorinating devices for feeding solutions of the chlorine gas, or the gas itself, shall provide means for preventing the backflow of water into the chlorine.

(2) Calcium Hypochlorite - Apply a mixture of water and high-test calcium hypochlorite (65 - 70% Cl). First mix the dry powder as a paste and then thin to a 1% chlorine solution by adding water to give a total quantity of 7.5 gallons per pound (water to dry powder).

(3) Sodium Hypochlorite - Apply sodium hypochlorite, commercial grade (12.5% Cl) or in the form of liquid household bleach (5% - 6% Cl). This liquid chlorine compound may be used full strength or diluted with water.

(c) Point of Application - Apply the chlorinating agent at the beginning of the pipeline extension or any valved section of it, through a corporation stop inserted in the horizontal axis of the pipe. Supply the water injector for delivering the chlorine-bearing water into the pipe from a tap on the pressure side of the gate valve controlling the flow into the pipeline extension. Alternate points of applications may be used when approved.

(d) Rate of Application - Control water from the existing distribution system, or other source of supply, to flow very slowly into the newly laid pipeline during application of the chlorine. The rate of chlorine application shall be in such proportion to the rate of water entering the newly laid pipe that the initial chlorine content of the water will be at least 25 ppm.

(e) Cross Connection Control - Make no connections between the existing distribution system and non-disinfected pipelines constructed under this Contract, unless a State Health Division approved backflow preventer is installed in the connecting line.

(f) Retention Period - Retain chlorinated water in the pipe at least 24 hours. After this period, the residual chlorine at pipe extremities and at other representative points shall be at least 10 ppm.

(g) Chlorinating Connections to Existing Mains - Follow the chlorinating procedure specified in AWWA Standard C651. Liberally treat the trench and exterior of existing main with hypochlorites. Swab or spray the interior of all closure fittings with a one percent hypochlorite solution. Disinfect the existing main with a 100 ppm chlorine solution for 3 hours or a 300 ppm chlorine solution for 15 minutes and then thoroughly flush the line.

(h) Flushing and Testing - Following the retention period, flush all chlorinated water from the newly laid pipe until the replacement water throughout its length shows, upon test, an absence of chlorine or a residual no greater than that normally found in the source of supply.

(1) Sampling Tap - Install a sampling tap ahead of the flushing hose for convenient sanitary sampling.

(2) Service Resumption - Do not place the lines into service before a satisfactory report is received from the local or State health department on samples collected from representative points in the new system. Samples will be collected and bacteriological tests obtained by the Engineer.

(i) Repetition of Chlorinating and Testing - If the initial treatment results in a chlorine residual of less than 10 ppm at the end of the retention period or an unsatisfactory bacteriological test, repeat the original chlorination procedure until satisfactory results are obtained.

Measurement

01145.80 Measurement - The quantities of potable water pipe and fittings will be determined as follows:

(a) Pipe - The quantities of pipe for the type and size and backfill classes will be measured on the length basis and will be horizontal measurement along the top of the finished trench, with no deduction for fittings, valves, and couplings except the fittings, valves and couplings that are part of an assembly or detail paid for as a separate bid item will be deducted from the total length.

(b) Fittings and Couplers - The quantities of fittings will be measured on the unit basis, except fittings and couplers that are part of an assembly detail will not be measured.

(c) Connection to Existing Main - The connection to existing main will be measured as part of an assembly detail and will not be measured.

(d) Valves - The quantities of valves will be measured on the unit basis, except valves that are part of an assembly detail will not be measured.

Payment

01145.90 Payment - The accepted quantities of work performed under this Section will be paid for at the Contract unit price, for the size, type of pipe and backfill specified per unit of measurement as listed in the Bid Schedule.

Fittings and couplers will be paid for at the unit prices listed in the Bid Schedule except fittings and couplers that are part of an assembly detail and no separate or additional payment will be made.

The connection to existing main will be paid for an assembly detail as listed in the Bid Schedule and no separate or additional payment will be made.

Valves will be paid for according to 01150.90.

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:

- potholing
- trench excavation
- bedding
- pipe zone material
- backfill work

- trench resurfacing
- concrete thrust blocks
- marking tape and wire
- flushing, hydrostatic testing and disinfection, and water for testing
- exposing and cleaning existing mains, cutting and removing existing pipe, draining existing mains, disinfecting existing mains, and refilling existing mains

Installation under pavement by tunneling, jacking or boring methods will be paid for according to 00406.90.

Valves will be paid for according to 01150.90.

No separate or additional payment will be made for:

- trench excavation
- bedding
- pipe zone material
- backfill work
- polyethylene encasement
- concrete thrust blocks
- detectable marking tape and wire
- flushing, hydrostatic testing and disinfection, and water for testing
- exposing and cleaning existing mains, cutting and removing existing pipe, draining existing mains, disinfecting existing mains, and refilling existing mains

Section 01155 - Geothermal Valves

Description

01155.00 Scope - This work consists of furnishing and installing valves in geothermal systems at the locations shown or at other locations as directed.

Materials

01155.10 Materials - Furnish materials meeting the following requirements:

Commercial Grade concrete in Thrust Blocking	00440
Gate Valves.....	02495.20
Valve Boxes	02495.25
Valve Stem Extensions	02495.26

01155.11 Handling - Handle valves so as to prevent damage to the valve, lining or coating. Load and unload valves using hoists and slings so as to avoid shock or damage, and under no circumstances allow them to be dropped or skidded. Damaged valves will be rejected. If damage is confined to the coating or lining, it may be repaired in a manner satisfactory to the Engineer. Immediately place all damaged valves apart from the undamaged and remove the damaged valves from the site as soon as possible.

01155.12 Connecting Ends - Furnish valves with connecting ends as shown and as required for connection to pipe and fittings furnished.

Construction

01155.40 General - Install valves according to the plans and the manufacturer's recommendations. Join to the pipe accordingly for the type of connecting ends furnished. Thoroughly clean and repair joints prior to installation.

(a) Valve and Valve Box Installation - Set valves and valve boxes plumb. Install valve stem extensions when required. Center the valve box over the operating nut of the valve. Place valve boxes over the valve or valve operator so that the valve box does not transmit shock or stress to the valve. Install the lower casting of the unit first, supported by backfill or by a closed-cell foam collar not less than 2 inches in thickness. Do not allow the casting to rest directly on the body of the valve or on the water main.

(b) Valve Operator Extensions - Install a valve operator extension with rock guard on any valve that has the valve nut operator installed 4 feet or more below finish grade. Hot-dip galvanize extensions after fabrication.

(c) Backfilling - Backfill around valves according to Section 00405. Carefully tamp backfill around the valve box to a distance of 3 feet on all sides or to the undisturbed face of the trench, whichever is closer. Set the cast iron valve box cover flush with the roadbed or finished paved surface.

01155.50 Field Testing - After installation, operate valves from full open to full closed to make sure valves do not bind during operation. Correct all malfunctions in the operation of the valves. Verify the number of turns from full open to full closed and provide to the Engineer for the Agency's records.

01155.51 Hydrostatic Testing - Subject valves to hydrostatic testing according to 01145.51. Correct all defects in design, materials or workmanship to the satisfaction of the Engineer.

01155.52 Disinfecting - Disinfect valves according to 01145.52.

Measurement

01155.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

01155.90 Payment - The work performed under this Section will be paid for in the Bid Items listed in the Bid Schedule as follows:

- Install Connection Detail 4, Sheet C11
- Install Connection Detail 5, Sheet C11
- Install Connection Detail 6, Sheet C11

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 earthwork not covered under other pay items, jointing, blocking of valves, protective coatings, valve boxes, valve stem extensions, and hydrostatic testing.

Section 02001 - Structural Concrete

Description

02001.00 Scope - This Section includes the requirements for portland cement concrete (concrete) for structural applications.

02001.01 General - Produce concrete according to these Specifications and referenced Sections of ASTM C 94, Standard Specification for Ready-Mixed Concrete. Provide quality control according to Section 00165.

02001.02 Abbreviations and Definitions:

ASTV	-	Actual Strength Test Value - average of test cylinder compressive strengths
cm	-	Cementitious Materials
f'_c	-	Minimum Specified Compressive Strength at 28 days
f'_{cr}	-	Average Compressive Strength Over-design. The average strength required to assure that, with normal variations, the concrete will meet f'_c
GGBFS	-	Ground Granulated Blast Furnace Slag
HPC	-	High Performance Concrete
HRWRA	-	High-Range Water-Reducing Admixture (super-plasticizer)
PPCM	-	Precast prestressed concrete member
w	-	Water
WRA	-	Water Reducing Admixture

Cementitious Materials - Included but not limited to portland cement, fly ash, silica fume, ground granulated blast furnace slag, and metakaolin.

High Performance Concrete - Concrete designed for enhanced durability and performance characteristics. High performance concrete is identified on the Plans by the letters "HPC" in front of the concrete class designation (for example, HPC4000 - 3/4).

Moderate Exposure - Elevations below 1,000 feet.

Modifiers - Pozzolans, latex.

Pozzolans - Fly ash.

Severe Exposure - Elevations 1,000 feet and above.

02001.10 Materials - Furnish materials meeting the requirements of the following:

Admixtures	02040
Aggregates	02690
Cement.....	02010
Modifiers.....	02030
Water.....	02020

02001.20 Concrete Properties, Tolerances, and Limits - Provide concrete that is a workable mixture, uniform in composition and consistency, and having the following properties;

(a) **Strength** - Provide concrete with a minimum compressive strength of 3000 psi at 28 days, unless otherwise specified, and a nominal maximum size of aggregate of 3/4 inch.

(b) **Air Entrainment** - Provide all concrete with entrained air in the amounts of 5.5%. Field measured entrained air content shall be within $\pm 1.5\%$ of target air entrainment value.

(c) **Slump** - Provide concrete with a slump of 4 inches. Field measured slump shall be within ± 1 inch of target slump value.

(d) **Temperature** - Provide concrete, at time of placement, at a temperature between a minimum of 50 °F and a maximum of 90 °F.

Concrete Mix Designs

02001.30 Concrete Mix Design - Submit new or current mix designs, prepared by a CCT, for each required class of structural or paving concrete to the Engineer for review. Design mixes by the volumetric method in ACI 211.1 to achieve the properties of 02001.20. Do not proceed with concrete placement until the Engineer has determined that the mix design complies with the Specifications. Review of concrete mix designs does not relieve the Contractor of the responsibility to provide concrete meeting the Specification requirements.

02001.31 Concrete Constituents:

(a) **Portland Cement** - Use AASHTO M 85 or ASTM C 150, Type I or II cement for structural concrete.

(b) **Pozzolans** - Except for HPC, pozzolans or GGBFS may be used separately or in combinations up to 30% of the total cementitious materials content.

(c) **Modifiers** - Modifiers may be used separately or in combinations as approved by the Engineer.

(d) **Chemical Admixtures** - Use chemical admixtures according to the manufacturer's recommendations.

(e) **Aggregate** - If the nominal maximum size of the coarse aggregate is not included as a part of the class of concrete shown on the plans, use 3/4 inch nominal maximum size aggregate.

02001.34 Current Mix Designs - Mix designs that meet the requirements for the specified class of concrete and are currently being used or have been used within the past 12 months on any project, public or private may be submitted for review.

02001.35 Required Submittals for Mix Designs - Submit the following information for each concrete mix design:

(a) **Supplier's Unique Mix Design Identification Number**

(b) **Mix Design Constituent Proportions:**

- Weight per cubic yard (pounds per cubic yard) of cementitious material, modifiers, fine and coarse aggregates (SSD), and mix water.
- Absolute volumes of cementitious material, modifiers, fine aggregates and coarse aggregates (SSD), and mix water.
- Dosage rates for chemical admixtures.

(h) **Plastic Concrete Tests** - Report the temperature, slump, density, air content, yield, and w/cm ratio of the trial batch or the average of these values for the cylinder sets presented for evaluation of a current mix design.

(i) **Compressive Strength Test Results** - Report the individual test results and the ASTV of cylinders from the trial batch or the average for the cylinder sets presented for evaluation of a current mix design.

02001.36 Adjusting Concrete Proportions - After a mix design has been reviewed and accepted, submit any proposed adjustments to concrete proportions for review.

02001.60 Delivery Tickets - Send a concrete delivery ticket with each load of concrete supplied to the Project. Each delivery ticket shall include the following information:

- Concrete supplier's name, address and telephone number
- Address and telephone number of batch plant if different from above
- Date and time the concrete batch was produced
- ODOT mix design number
- Size of load batched
- Weights or volumes of constituents batched in the load
- Amount of water that can be added at the job site

Record the amount of water added at the job site on the delivery ticket.

Section 02010 - Portland Cement

Description

02010.00 Scope - This Section includes the requirements for portland cement and blended hydraulic cement.

Materials

02010.10 Portland Cement:

(a) **Types** - Furnish one or another of the following types as elected:

- Type I
- Type II
- Type III

Do not mix or alternately use differing brands or types of cement, or the same brand or type of cement from different mills without prior written approval.

(b) **Specifications** - Portland cement shall conform to the requirements of AASHTO M 85 for low alkali cement except as follows:

- Types I or III shall contain a maximum of 10% tricalcium aluminate.
- The time-of-setting tests will be by either the Gillmore test or the Vicat test.
- The maximum fineness (specific surface) as determined by the air permeability test shall be 430 m²/kg for any field-sampled check test. Results of field-sampled check tests will not be averaged.

02010.20 Blended Hydraulic Cement - Blended hydraulic cement shall be either Type IP portland-pozzolan cement or Type I (SM) slag-modified portland cement conforming to AASHTO M 240, modified as follows:

- The cement constituent of the blended cement shall conform to 02010.10.
- The pozzolan constituent of the blended cement shall be fly ash conforming to 02030.10 or ground granulated blast furnace slag (GGBFS) slag conforming to 02030.40.

Section 02020 - Water

Description

02020.00 Scope - This Section includes the requirements for water used in mixing concrete, mortar, grout, and other applications when specified or directed.

Materials

02020.10 Water - Water used in mixing or curing concrete, for mortar and grout, and in mixing cement-treated base shall be reasonably clean, and free of oil, sugar, organic matter or other substances injurious to the finished product.

Section 02030 - Modifiers

Description

02030.00 Scope - This Section includes the requirements for fly ash, silica fume, latex, and ground granulated blast furnace slag used in portland cement concrete.

Materials

02030.10 Fly Ash:

(a) Types - Fly ash shall be Class C, Class F, or Class N, and shall conform to AASHTO M 295, including Table 2, except that:

- Loss on Ignition (LOI) shall be 1.5% maximum.
- Moisture content shall be 1% maximum.
- Amount retained on the No. 325 sieve shall be 30% maximum.

(b) Acceptance - Fly ash will be accepted for immediate use if accompanied by a test results certificate according to 00165.35.

As a check on material conformance, fly ash may be sampled at the site of work for verification testing.

02030.20 Silica Fume:

(a) Types - Provide the silica fume admixture as a slurry containing silica fume, water, and a high range water reducer, or as a densified powder. The silica fume portion shall conform to AASHTO M 307, including Table 1a, Optional Chemical Requirements.

(b) Acceptance - Silica fume will be accepted for immediate use if accompanied by a test results certificate according to 00165.35. If the silica fume admixture is supplied as a slurry, the certificate shall indicate the silica fume content of the slurry as a percent by weight. If the silica fume is supplied as a densified powder, do not allow the packaging to enter the concrete mixture.

02030.40 Ground Granulated Blast Furnace Slag (GGBFS) - GGBFS shall meet the requirements of AASHTO M 302.

Section 02040 - Chemical Admixtures

Description

02040.00 Scope - This Section includes the requirements for air-entraining, water-reducing, retarding, and accelerating admixtures.

Materials

02040.10 Materials - Furnish admixtures as follows:

Chloride content of any admixture used in portland cement concrete in contact with embedded metals shall not exceed 0.5% by weight of the admixture when tested according to ODOT TM 505.

Admixtures shall conform to the following requirements:

Admixture	Specification
Air-entraining	AASHTO M 154 (ASTM C 260)
Water-reducing	AASHTO M 194 (ASTM C 494)
Retarding	AASHTO M 194 (ASTM C 494)
Accelerating	AASHTO M 194 (ASTM C 494)

Section 02050 - Curing Materials

Description

02050.00 Scope - This Section includes the requirements for liquid compounds, evaporation reducers, polyethylene films, and curing blankets used to cover concrete and other surfaces to retain moisture and to cure.

Materials

2050.10 Liquid Compounds - Furnish liquid membrane-forming curing compounds meeting the requirements of AASHTO M 148.

All compounds shall be class A. Solvent-based compounds shall be Type 1-D.

02050.20 Polyethylene Films - Furnish clear or white polyethylene films for curing concrete meeting the requirements of AASHTO M 171.

Section 02080 - Grout

Description

02080.00 Scope - This Section includes the requirements for epoxy, non-epoxy, keyway, and portland cement grout.

Materials

02080.10 Epoxy Grout - Furnish epoxy grout from ODOT's QPL.

02080.20 Non-Epoxy Grout - Furnish non-epoxy grout from ODOT's QPL.

02080.30 Keyway Grout - Furnish grout used in the keyways of precast prestressed concrete members that is non-shrink, nonferrous, non-epoxy grout with a minimum design strength of 5,000 psi in 28 calendar days. Furnish keyway grout from ODOT's QPL and use according to the manufacturer's recommendations.

02080.40 Portland Cement Grout - Furnish portland cement grout consisting of one part portland cement and three parts sand by weight, thoroughly mixed with a minimum amount of water to produce a thick, creamy consistency. Sand shall meet the requirements of 02690.30 and cement shall meet the requirements of Section 02010.

02080.50 Tendon Grout - Furnish tendon grout from the QPL that meets vertical rise requirements.

Section 02440 - Joint Materials

Description

02440.00 Scope - This Section includes the requirements for joint fillers, seals, gaskets and water stop for concrete pipe joints, manhole section joints, and miscellaneous concrete applications.

Materials

02440.10 Preformed Joint Fillers for Concrete - Furnish preformed joint fillers for concrete conforming to the requirements of AASHTO M 153 or AASHTO M 213. Fillers conforming to AASHTO M 213, except the binder, if other than bituminous material, may be used provided they otherwise meet this Specification and they have been demonstrated to be rot and vermin proof for a period of at least five years. Unless otherwise specified or indicated, the Contractor may elect to furnish either type specified in this subsection.

02440.15 Lubricant/Adhesive - Furnish a lubricant/adhesive that is recommended by the seal manufacturer.

02440.20 Preformed Joint Seals - Furnish compression joint seals conforming to the requirements of AASHTO M 297. Use strip seals conforming to ASTM D 5973.

02440.40 Gaskets for Precast Manhole Section Joints:

(a) **Preformed Flexible Joint Sealant** - Furnish materials for tongue and groove or key lock manhole joints conforming to the requirements of AASHTO M 198 (ASTM C 990).

(b) **Rubber Gaskets** - Furnish materials for O-ring manhole joints conforming to AASHTO M 315 (ASTM C 443).

02440.50 Joint Materials for Concrete Precast Manhole Section Joints:

(a) **Mortar** - Furnish mortar conforming to the requirements of ASTM C 387, or proportioned one part Type II portland cement to two parts clean, well-graded sand passing a No. 6 screen. Admixtures may be used not exceeding the following percentages by weight of cement:

Hydrated lime	10%
Diatomaceous earth or other inert materials	5%

The consistency of the mortar shall be such that it will readily adhere to the precast concrete if using the standard tongue-and-groove type joint.

(b) **Non-Epoxy (Non-Shrink) Grout** - Furnish a non-epoxy (non-shrink) grout from the QPL. Place or pack non-shrink grouts only with the use of a non-epoxy bonding agent from the QPL, applied to all cured concrete surfaces being grouted. Use a bonding agent compatible with the grout used.

02440.60 Plastic Compound for Precast Manhole Section Joints - Furnish a plastic compound that is specifically manufactured for the intended use and:

- Has a putty-like, preformed homogeneous blend of hydrocarbon resins and rubber or plasticizing materials with not more than 50% by weight of inert mineral filler.
- Is pliable at temperatures between 32 °F and 135 °F. A specimen at 77 °F and 1/2 inch square in cross section shall stretch at least 1 1/2 inches before rupture when tested with the apparatus described in ASTM D 113.

- Adheres firmly and cohesively to the precast manhole sections when the compound-sealed joint is flexed to its maximum extent.
- Includes a primer solution recommended by the compound manufacturer.
- Conforms with Federal Specification SS-S-00210 (GSA-FSS).

02440.70 Water Stop - Furnish either plastic or rubber water stop, as the Contractor elects, manufactured to the dimensions shown and meeting the following requirements:

(a) Plastic - Polyvinyl chloride water stop shall be manufactured from virgin polyvinyl chloride (PVC) compound. No reclaimed PVC will be allowed. The water stop shall have the following properties:

Test	ASTM Test Method	Specification (Minimum)
Tensile Strength, psi	D 412	1,800
Elongation, %	D 412	350
100% Modulus, psi	D 412	760
Low Brittle Temperature	D 746	- 50 °F
Cold Bend Test ¹		No Failures

¹ Samples maintained at -70 °F for two hours, then bent quickly around a 1/4 inch mandrel to 180 degrees.

(b) Rubber - Manufacture rubber water stop to the dimensions shown, in such a manner that the finished product has an integral cross section which will be dense, homogeneous, and free from porosity and other imperfections. The water stop shall have the following properties:

- **Hardness** - The Shore A Durometer hardness of 60 to 70 when tested according to ASTM D 2240.
- **Elongation** - Minimum of 450%.
- **Tensile Strength** - Minimum of 3,000 psi.
- **Water Absorption** - Maximum of 5% by weight after immersion in water for two days at 158 °F.
- **Tensile Strength after Aging** - The test specimen, after accelerated aging of seven days at 158 °F, shall retain not less than 80% of the original tensile strength. The tensile strength of the test specimen, after accelerated aging of 48 hours in oxygen at 158 °F and tensile stress of 300 psi, shall be not less than 80% of the original tensile strength.
- **Compression Set** - Not more than 30% when tested according to ASTM D 395, method B after 22 hours at 158 °F.
- **Specific Gravity** - 1.17 ± 0.03.
- **Defects** - Minor surface defects such as surface peel covering less than 1 square inch, surface cavities or bumps less than 1/4 inch in longest lateral dimensions and less than 1/16 inch deep will be acceptable.

02440.80 Acceptance - Acceptance of joint materials will be according to this Section.

Section 02450 - Manhole Materials

Descriptions

02450.00 Scope - This Section includes the requirements for precast manhole sump sections, metal frames, covers, grates, and ladders.

Materials

02450.10 Precast Concrete Manhole Sections - Furnish precast risers, cones, and cover slabs for precast concrete manholes conforming to the requirements of AASHTO M 199 (ASTM C 478).

02450.20 Precast Concrete Sump Sections - Furnish precast rings and lids for precast concrete sumps of portland cement concrete conforming to AASHTO M 199 (ASTM C 478).

02450.30 Metal Frames, Covers, Grates, and Ladders - Comply with the following:

Item	Projects on State Highways	
	AASHTO (ASTM) Designation	Grade
Manhole frames and covers	M 306	Class 35 B
Inlet frames and grates	M 306	Class 35 B
Manhole ladder rails	M 270 (A 709) A 36	36
	M 227 (A 663)	65

Item	All Other Projects	
	AASHTO (ASTM) Designation	Grade
Manhole frames and covers	M 105	Class 30 B
Inlet frames and grates	M 227 (A 663)	65
	M 270 (A 709) A 36	36
	M 103 (A 27)	65 - 35
Manhole ladder rails	M 270 (A 709) A 36	36
	M 227 (A 663)	65

Fabricate steps for manholes and rungs for manhole ladders from structural steel having a minimum yield strength of 28,000 psi and galvanized according to AASHTO M 111 (ASTM A 123).

As an alternate, steps for manholes may be steel-reinforced plastic conforming to AASHTO M 199 (ASTM C 478) and AASHTO T 280 (ASTM C 497). The steel shall be deformed reinforcing bar conforming to AASHTO M 31 (ASTM A 615) Grade 60, No. 4 minimum. The plastic material surrounding the reinforcing steel bar shall be injection molded, with a textured, non-slip surface and a minimum thickness over the steel of 1/16 inch. Voids in the plastic will be cause for rejection of the step.

Welding shall conform to AWS D1.1. Frames, covers and grates for use one with another shall have even and uniform bearings. Miscellaneous metal items and hardware shall conform to the appropriate requirements of Section 00560.

02450.40 Damaged Zinc or Aluminum Coating - Repair damaged zinc or aluminum coating according to 02420.10(d).

02450.50 Acceptance - Acceptance of manholes and inlets will be according to this Section.

Section 02470 - Geothermal Pipe Materials

Description

02470.00 Scope - This Section includes the requirements for ductile iron, pipe 16 inches in diameter and smaller, for geothermal systems.

Materials

02470.10 General - Clearly mark all pipe with the type, class, thickness, and manufacturer's name, as applicable. Lettering shall be legible and permanent under normal conditions of handling and storage. All materials in contact with potable water shall conform to ANSI/NSF Standard 61, Drinking Water System Components - Health Effects, or equivalent.

02470.20 Ductile Iron Pipe:

(a) General - Use centrifugally cast ductile iron pipe meeting the requirements of AWWA C151. Ductile iron pipe shall contain a double internal cement-mortar lining without sealcoat in accordance with AWWA C104. Cement shall be ASTM C150, Type II or V, low alkali, containing less than 0.60 percent alkalis. Ductile iron pipe to be joined using bolted flanged joints shall be Standard Thickness Class 53. All other ductile iron pipe shall be Standard Thickness Class 50.

(b) Nonrestrained Joints - Nonrestrained joints shall be rubber gasket, push-on type, or mechanical type meeting the requirements of AWWA C111. The sealing gaskets shall be EPDM rubber compound rated at 250°F. Restrained joints shall conform to 02475.50.

02470.30 Marking Tape and Wire:

(a) Marking Tape - Marking tape shall consist of inert polyethylene plastic impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. The width of the tape shall be as recommended by the manufacturer for the depth of installation. The tape shall be blue and imprinted continuously over its entire length in permanent black ink with the words "Caution - Water".

(b) Detectable Marking Wire - Detectable marking wire shall be No. 12 AWG, minimum, solid copper with blue colored polyethylene insulation. Joints or splices in wire shall be waterproof.

02470.40 Acceptance - Ductile iron pipe will be accepted according to this Section.

Section 02475 – Geothermal Fitting Materials

Description

02475.00 Scope - This Section includes the requirements for fittings, restrained joints, and couplings for ductile iron pipe for geothermal piping systems.

Materials

02475.10 General - Bolts, nuts and washers used for securing fittings shall be of similar materials. Steel bolts shall meet the requirements of ASTM A 307 for carbon steel, or ASTM F 593 for stainless steel. Nuts shall meet the requirements of ASTM A 563 for carbon steel and ASTM F 594 for stainless steel. Iron bolts and nuts shall meet the requirements of ASTM A 536, grade 65-45-12.

All materials in contact with potable water shall conform to ANSI/NSF Standard 61, Drinking Water System Components - Health Effects, or equivalent.

02475.20 Ductile Iron Pipe Fittings - Fittings for ductile iron pipe shall meet the requirements of AWWA C110 or AWWA C153, and shall have a minimum working pressure rating of 250 psi. Joints shall meet the requirements of AWWA C111. Fittings shall be cement mortar lined and without sealcoat, meeting the requirements of AWWA C104. Gaskets for flat faced or raised faced flanges shall be 1/8 inch thick neoprene having a Durometer reading of 60-70. The type, material and identification mark for bolts and nuts shall be provided.

02475.30 Restrained Joints - Restrain pipe, fittings, and valves by using an approved bolted or boltless system. Design the restraint system to operate at a working pressure equal to the hydrostatic test pressure identified in 01140.51(a) or as shown. No device utilizing round point set screws will be allowed. Restraint systems provided for pipe bells shall be certified for use by the pipe manufacturer.

02475.40 Bolted, Sleeve-Type Couplings for Plain-End Pipe - Bolted, sleeve type couplings, reducing or transition couplings, and flanged coupling adapters used to join plain end pipe shall meet the requirements of AWWA C219. Buried couplings to connect ductile iron, gray cast iron or PVC pipe shall be ductile iron.

02475.50 Acceptance - Acceptance of fittings, restrained joints and couplings will be according to this Section.

Section 02495 - Geothermal Valve Materials

Description

02495.00 Scope - This Section includes the requirements for gate valves, valve boxes, and valve stem extensions for geothermal systems.

Materials

02495.10 General - Provide valves with a standard 2 inch operating nut.

02495.20 Gate Valves:

- (a) **Minimum Pressure** - Gate valves shall be iron bodied, resilient seat wedge type with non-rising stems, and shall open when rotated counterclockwise. Gate valves shall meet or exceed AWWA Standard C509. All valves shall be epoxy lined. Gate valves and gaskets shall be rated to work at temperatures up to 225° F with a working pressure of 250 psi. Gate valves shall have EPDM rubber seat bonded to wedge / disc.
- (b) All integral working parts shall be in accordance with AWWA C509.
- (c) Valve ends shall be mechanical joint, flanged or a combination thereof in accordance with AWWA C509, as shown on plans.
- (d) Gate valves shall be manufactured by Water Technology Resources, Waterous Company, Kennedy Valve Company, or an approved equal.

02495.25 Valve Boxes - Install valve boxes on all buried valves. Boxes shall be of cast iron, two-piece, slip type standard design with a base corresponding to the size of the valve. Boxes shall be coal-tar painted by the manufacturer using its standard. The cover shall have the word "GEO" cast in it.

02495.26 Valve Stem Extensions - Valve stem extensions shall have a 2 inch square operating nut and self-centering rockplate support. Valves with an operating nut more than 4 feet below grade shall have a valve stem extension to raise the operating nut to within 3 feet of the ground surface.

02495.30 Acceptance - Valves and appurtenances will be accepted according to this Section.

Section 02510 - Reinforcement

Description

02510.00 Scope - This Section includes the requirements for bars, dowels, and strand reinforcement and tendon ducts.

Materials

02510.10 Deformed Bar Reinforcement - Deformed bar reinforcement shall conform to the requirements of ASTM A 706 or AASHTO M 31 (ASTM A 615). Unless otherwise specified or shown, all reinforcing bars shall be Grade 420 (Grade 60).

02510.20 Mechanical Splices - Mechanical splices for reinforcing bars are systems which connect the bars without raising their temperature above 1,300 °F.

- Provide mechanical splices that develop at least 135% of the specified minimum yield strength of the reinforcing bars in tension. Where bars of different sizes or strengths are connected, the governing strength shall be the strength of the smaller or weaker bar.
- The total slip of reinforcing bars within a splice sleeve shall not exceed 0.040 inch, measured between gauge points clear of the splice sleeve, when the reinforcing bars are loaded in tension to 67% of the specified minimum yield strength of the reinforcing bar.

02510.40 Welded Wire Fabric - Welded wire fabric shall conform to the requirements of AASHTO M 55 (ASTM A 185). Deformed welded wire fabric shall comply with AASHTO M 221 (ASTM A 497).

02510.50 Dowels - Dowels shall conform to the requirements of AASHTO M 31 (ASTM A 615), for Grades 40 and 60, or AASHTO M 227 (ASTM A 663) for Grades 70, 75, and 80.

02510.60 Wire Reinforcement - Wire reinforcement shall conform to the requirements of AASHTO M 32 (ASTM A 82). Deformed wire shall conform to the requirements of AASHTO M 225 (ASTM A 496).

02510.70 Acceptance - Acceptance of reinforcement will be according to this Section.

Section 02630 - Aggregate

Description

02630.00 Scope - This Section includes the requirements for aggregates except PCC Aggregates.

Materials

02630.10 Dense-Graded Aggregate:

(a) **Grading** - Dense-graded base aggregate shall be crushed rock, including sand. Uniformly grade the aggregates from coarse to fine. Sieve analysis shall be determined according to AASHTO T 27. The aggregates shall conform to one of the grading requirements of Table 02630-1 as identified in the Special Provisions or indicated by the pay item(s) in the Contract Schedule of Items.

Table 02630-1

Grading Requirements for Dense-Graded Aggregate

Separated Sizes

Sieve Size	2 1/2" - 0	2" - 0	1 1/2" - 0	1" - 0	3/4" - 0
Percent Passing (by Weight)					
3"	100				
2 1/2"	95 - 100	100			
2"	-	95 - 100	100		
1 1/2"	-	-	95 - 100		
1 1/4"	55 - 75	-	-	-	
1"	-	55 - 75	-	90 - 100	100
3/4"	-	-	55 - 75	-	90 - 100
1/2"	-	-	-	55 - 75	-
3/8"	-	-	-	-	55 - 75
1/4"	30 - 45	30 - 45	35 - 50	40 - 55	40 - 60
No. 10	¹	¹	¹	¹	¹

¹ Of the fraction passing the 1/4 inch sieve, 40% to 60% shall pass the No. 10 sieve

(b) **Fracture Of Rounded Rock** - Fracture of rounded rock shall be determined according to AASHTO TP 61. Provide at least one fractured face based on the following percentage of particles retained on the 1/4 inch sieve for the designated size:

Minimum Percent of Fractured Particles (by Weight of Material)

Designated Size	Retained on 1/4 inch Sieve
1 1/2" - 0 and larger	50
Smaller than 1 1/2" - 0	70

(c) **Durability** - Dense-graded aggregate shall meet the following durability requirements:

Test	Test Method	Requirements
Abrasion	AASHTO T 96	35.0% maximum
Degradation (coarse aggregate) Passing No. 20 sieve	ODOT TM 208	30.0% maximum
Sediment Height	ODOT TM 208	3.0" maximum

(d) **Sand Equivalent** - Dense-graded aggregate shall be tested according to AASHTO T 176, and shall have a sand equivalent of not less than 30.

02630.11 Open-Graded Aggregate:

(a) **Grading** - Open-graded aggregate shall conform to the following grading requirements:

Table 02630-2

Aggregate Gradation for Open-Graded Aggregate

Sieve Size	Percent Passing (by Weight)
1"	100
3/4"	80 - 98
1/2"	60 - 85
3/8"	30 - 65
No. 10	5 - 20
No. 40	0 - 6
No. 100	0 - 3 (Dry Sieve)

(b) **Fracture of Rounded Rock** - Fracture of rounded rock shall be determined according to AASHTO TP 61. Open-graded aggregate fracture requirements shall conform to the following:

Percentage of Fracture (by Weight)

Material Retained on 3/4", 1/2", and 1/4" Sieves (two fractured faces)	90
Material Retained on No. 10 Sieve (one fractured face)	75

(c) **Durability** - Open-graded aggregate shall meet the durability requirements of 02630.10(c).

Section 02640 - Shoulder Aggregate

Description

02640.00 Scope - This Section includes the requirements for shoulder aggregate.

Materials

02640.10 Aggregate:

(a) Grading - Shoulder aggregate shall be crushed rock, including sand. Sieve analysis shall be determined according to AASHTO T 27. Uniformly grade the aggregates from coarse to fine. The aggregates shall conform to one of the grading requirements of Table 02640-1 as identified in the plans..

**Table 02640-1
Grading Requirements - Shoulder Aggregates**

Sieve Size	Separated Sizes	
	1" - 0	3/4" - 0
	Percent Passing (by Weight)	
1 1/2"	100	
1"	90 - 100	100
3/4"	-	90 - 100
1/4"	40 - 55	40 - 60

(b) Fracture of Rounded Rock - Fracture of rounded rock shall be determined according to AASHTO TP 61. Provide at least one fractured face based on the following percentage of particles retained on the 1/4 inch sieve for the designated size:

**Minimum Percent of Fractured Particles
(by Weight of Material)**

Designated Size	Retained on 1/4" Sieve
1 1/2" - 0 and larger	50
Smaller than 1 1/2" - 0	50

(c) Durability - The produced aggregates shall meet the following requirements:

Test	Test Method	Requirements
Abrasion	AASHTO T 96	35.0% maximum
Degradation (coarse aggregate)		
Passing No. 20 sieve	ODOT TM 208	30.0% maximum
Sediment Height	ODOT TM 208	3.0" maximum

(d) Sand Equivalent - Shoulder aggregate shall be tested according to AASHTO T 176, and shall have a sand equivalent of not less than 25.

Section 02690 - PCC Aggregates

Description

02690.00 Scope - This Section includes the requirements for coarse and fine aggregates for portland cement concrete.

Materials

02690.10 Materials - The Contractor may request approval to produce coarse and fine aggregates in sizes other than those stated in 02690.20 and 02690.30. The request shall be in writing, and shall state the proposed target value and specified tolerances for each of the individual sieve sizes of the materials the Contractor proposes to produce.

02690.20 Coarse Aggregate:

(a) **General Requirements** - Coarse aggregate shall consist of rock, or other approved inert material of similar characteristics having hard, strong, durable pieces free from adherent coatings.

(b) **Harmful Substances** - Harmful substances shall not exceed the following limits:

Test	Test Method		Percent (by Weight)
	ODOT	AASHTO	
Lightweight Pieces		T 113	1.0
Material passing No. 200 sieve		T 11	1.0 ¹
Wood Particles	TM 225		0.05

¹ For crushed aggregates, if the material finer than the No. 200 sieve consists of fracture dust, essentially free of clay or shale and is non-plastic, the percentage may be increased to 1.5%.

The materials shall be reasonably free from all other deleterious substances.

(c) **Soundness** - Coarse aggregates for concrete shall be tested for soundness using sodium sulfate salt, according to AASHTO T104. The weighted percentage loss shall not exceed 12% by weight.

(d) **Durability** - Coarse aggregates shall meet the following durability requirements:

Test	Test Method		Requirements
	ODOT	AASHTO	
Abrasion		T 96	30.0% Max.
Oregon Air Aggregate Degradation: Passing No. 20 sieve	TM 208		30.0% Max.
Sediment Height	TM 208		3.0" Max.

(e) **PCC Paving Aggregate** - In addition to requirements above, comply with the following:

(1) **Fracture** - Provide aggregate with at least two fractured faces on at least 50% of the particles retained on the 3/8 inch, 1/2 inch, 3/4 inch, 1 inch, and 1 1/2 inch sieves, as determined by AASHTO TP 61.

(2) **Elongated Pieces** - Provide aggregate with elongated pieces not exceeding 10% by weight of the material retained on the No. 4 sieve when tested according to ODOT TM 229 with the proportional caliper device set at a ratio of 5:1.

(f) Grading and Separation by Sizes for Prestressed Concrete - Sampling shall be according to AASHTO T 2 and sieve analysis shall be determined according to AASHTO T 27 and AASHTO T 11. PCC coarse aggregate shall conform to grading and separated sizes as follows:

(1) Where indicated in Table 02690-1, the coarse aggregate shall be separated into two sizes and each separated size shall be measured into the batch in the quantity determined by the mix design.

For each of the indicated maximum sizes of coarse aggregates, the separated sizes shall be as indicated in Table 02690-2:

Table 02690-1

Maximum Nominal Size of Aggregates	Separated Sizes
1"	1" - No. 4
3/4"	3/4" - No. 4
3/4"	3/4" - 1/2" and 1/2" - No. 4
3/4"	3/4" - 3/8" and 3/8" - No. 4

(2) The grading of each of the specified separated sizes of coarse aggregate shall conform to the following:

Table 02690-2

Sieve Size	Separated Sizes					
	1" - No. 4	3/4" - No. 4	3/4" - 1/2"	3/4" - 3/8"	1/2" - No. 4	3/8" - No. 4
Percent Passing (by Weight)						
1 1/2"	100					
1"	90 - 100	100	100	100		
3/4"	50 - 80	90 - 100	85 - 100	85 - 100	100	100
1/2"	—	—	0 - 15	—	85 - 100	—
3/8"	15 - 40	20 - 50	—	0 - 15	35 - 65	85 - 100
No. 4	0 - 10	0 - 10	—	—	0 - 15	0 - 15
No. 200	¹	¹	¹	¹	¹	¹

¹ See 02690.20(b)

(g) Grading and Separation by Sizes for Other Concrete - Sampling shall be according to AASHTO T 2. Sieve analysis shall be according to AASHTO T 27 and AASHTO T 11. Provide aggregates meeting the gradation requirements of Tables 02690-3 and 02690-4 for structural concrete on projects with more than 100 cubic yards of concrete. Provide a CAgT to perform sampling and testing when required.

**Table 02690-3
Gradation of Coarse Aggregates**

Sieve Size	Combined ¹ Sizes	Separated Sizes	Separated	Separated
	1 1/2" - No. 4	1 1/2" - 3/4"	Sizes	Sizes
Percent Passing (by Weight)				
2"	100	100		
1 1/2"	95 - 100	90 - 100	100	
1"	-	20 - 55	95 - 100	100
3/4"	35 - 70	0 - 15	-	85 - 100
1/2"	-	-	25 - 60	0 - 15
3/8"	10 - 30	0 - 5	-	-
No. 4	0 - 5	-	0 - 10	-
No. 8	-	-	0 - 5	-

¹ For 1 1/2 inch coarse aggregate use two or more separated sizes which when combined shall meet the gradation limits for 1 1/2" - No. 4

**Table 02690-4
Gradation of Coarse Aggregates**

Sieve Size	Separated	Separated or	Separated	Separated
	Sizes	Combined Sizes	Sizes	Sizes
Percent Passing (by Weight)				
		3/4" - No. 4		3/8" - No. 8
1"	100	100		
3/4"	90 - 100	90 - 100	100	
1/2"	20 - 55	-	90 - 100	100
3/8"	0 - 15	20 - 55	40 - 70	85 - 100
No. 4	0 - 5	0 - 10	0 - 15	10 - 30
No. 8	-	0 - 5	0 - 5	0 - 10
No. 16	-	-	-	0 - 5

02690.30 Fine Aggregates:

(a) General Requirements - Fine aggregate shall consist of natural or crushed aggregates or other inert material consisting of hard, strong, durable particles and conforming to a specified grading.

(b) Different Sources - Do not mix fine aggregates from different sources of supply, or store in the same pile. Do not use alternately in the same class of mix, without prior approval.

(c) Harmful Substances - The amount of harmful substances shall not exceed the following limits:

Test	Test Method (AASHTO)	Percent (by Weight)
Lightweight Pieces	T 113	2.0%
Material passing No. 200 Sieve ¹	T 11	4.0% ¹

¹ If this material consists of fracture dust, essentially free of clay and non-plastic, the percentage may be increased to 6.0%.

The material shall also be reasonably free from all other harmful substances, such as shale, alkali, mica, coated grains, and soft and flaky particles.

(d) Soundness - Fine aggregate shall be tested for soundness using sodium sulfate salt, according to AASHTO T 104. The weighted percentage loss shall not exceed 10% by weight.

(e) Organic Impurities - All fine aggregate shall meet the requirements of AASHTO M 6 for organic impurities.

(f) Sand Equivalent - Fine aggregate shall be tested according to AASHTO T 176 and shall have a sand equivalent of not less than 68.

(g) Sand For Mortar - Sand for mortar shall conform to the requirements of this Section.

(h) Grading - Sampling shall be according to AASHTO T 2. Sieve analysis shall be determined according to AASHTO T 27 and AASHTO T 11. Provide aggregates meeting the gradation requirements of Table 02690-5 for structural concrete on projects with more than 100 cubic yards of concrete, and all prestressed concrete. Provide a CAgT to perform sampling and testing when required.

Table 02690-5
Gradation of Fine Aggregate ¹

Sieve Size	Percent Passing (by Weight)
3/8"	100
No. 4	90 - 100
No. 8	70 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	5 - 30
No. 100	0 - 10
No. 200	0.0 - 4.0 ²

¹ Determine the fineness modulus according to AASHTO T 27 and AASHTO T 11. Maintain the fine aggregate fineness modulus within plus or minus 0.20 from the fineness modulus used in the Contractor's mix design. Fine aggregates in which the fineness modulus varies by more than 0.20 from the mix design target shall be rejected unless an adjustment in the aggregate proportions is performed by a CCT according to the provisions of ACI 211.

² For manufactured sand, where the material passing No. 200 is non-plastic rock dust crusher fines, the specification limits may be increased to 6%.

Section 02920 - Common Electrical and Communication Materials

Description

02920.00 Scope - This Section includes the requirements for common electrical systems.

Materials

02920.10 Nonmetallic Conduit - Furnish nonmetallic conduit meeting the following requirements:

- **Rigid Nonmetallic Conduit** - Heavy wall, extruded, rigid polyvinyl chloride (PVC) conforming to UL 651, Schedule 40 Rigid PVC conduit as shown.

02920.11 Conduit Fittings - Furnish conduit fittings meeting the following requirements:

- **Nonmetallic Bushings** - PVC push on end bell style.

02920.12 Underground Marking Tape

- Provide electrical underground marking tape 12 inches below the finish grade surface that is red polyethylene film, 3 inches wide, 4 mils thick minimum, and imprinted with the following or similar legend:

"CAUTION CAUTION CAUTION BURIED ELECTRIC LINE"

- Provide communications underground marking tape 12 inches above conduit that is orange polyethylene film, 3 inches wide, 4 mils thick minimum, and imprinted with the following or similar legend:

"CAUTION CAUTION CAUTION BURIED COMMUNICATIONS LINE"

02920.13 Concrete Junction Box:

- Concrete junction boxes shall be 444-LA precast concrete vault with No. 44-332P Top as manufactured by Oldcastle Precast, or approved equal. Covers shall have a single spring assisted galvanized diamond plate door with a skid-resistant surface. Cover shall have a locking hatch with bolt to the junction box with recessed stainless steel hex-head bolts.

Section 03010 - Fencing Materials

Description

03010.00 Scope - This Section includes the requirements for repairing existing barbed wire, woven wire and chain link fabric, metal posts, braces, hardware, and gates that are disturbed during construction activities.

Materials

03010.10 Barbed Wire - The barbed wire shall be two-strand and either 12 1/2 gauge or 15 1/2 gauge with four-point barbs spaced at 5 inch intervals conforming to the requirements of AASHTO M 280 (ASTM A 121). Galvanizing shall be Class 3.

All barbed wire installed on the Project shall be new or like new, and the same diameter unless otherwise approved.

03010.20 Woven Wire Fabric - The woven wire fabric shall be 12 1/2 gauge galvanized steel wire conforming to the requirements of AASHTO M 279 (ASTM A 116), Class 3 coating or 11 gauge or 12 1/2 gauge aluminum coated steel wire conforming to the applicable requirements of ASTM A 116. The 12 1/2 gauge aluminum coated steel wire shall have the same coating thickness required for 11 gauge steel wire in Table 2 of ASTM A 116.

03010.30 Chain Link Fabric, Ties, and Tension Wire - Chain link fabric, ties, and tension wire shall conform to the requirements of AASHTO M 181 supplemented and modified as follows:

- Fabric may be zinc-coated steel meeting Type I, Class D coating requirement, aluminum-coated steel, or aluminum alloy. Use only one type on the Project.
- Wire fabric ties, wire ties, and hog rings may be zinc-coated steel wire, aluminum-coated steel, or aluminum alloy as elected, regardless of the type of wire fabric used.
- Use ductile, zinc-coated steel meeting the coating requirements of ASTM A 641, Class 1 for wire fabric ties, wire ties, and hog rings. Aluminum-coated steel wire fabric ties, wire ties and hog rings shall be coated with at least 0.30 ounce per square foot.
- Tension wire shall have a Class 2 coating.
- Fabric for the fence to be installed with pickets shall be 9 gauge wire woven in 3 1/2 inch by 5 1/2 inch diamond mesh. Top and bottom selvage shall be knuckled finish.

03010.31 Pickets - Pickets shall be either standard Grade A redwood or cedar pickets, 3/8 inch x 2 1/2 inch x 6 feet, or industry standard metal, or plastic pickets as shown or approved.

03010.40 Vinyl Clad Fabric - Vinyl clad chain link fabric shall conform to AASHTO M 181, Type IV. The color of the PVC coating shall be either medium or dark green.

03010.50 Metal Fence Posts, Braces, and Appurtenances - Metal fence posts, braces and appurtenances shall conform to the requirements indicated on the plans and the following:

(a) **Painted Metal Posts** - All painted metal posts shall be of the same kind and color.

(b) **Posts, Braces, and Appurtenances for Chain Link Fence** - Posts, braces, and appurtenances for chain link fence shall conform to the requirements of AASHTO M 181.

Posts for bridge protective fence shall be galvanized and conform to the requirements of ASTM A 53, Grade B. Braces and appurtenances for bridge protective fence shall conform to the requirements of AASHTO M 181.

(c) Posts, Braces, and Appurtenances for Barbed Wire and Woven Wire Fence:

(1) Tubular Steel Posts - Tubular steel posts, braces and appurtenances shall conform to the requirements of AASHTO M 181. Tubular posts shall be fitted with a snug-fitting, galvanized metal cap.

(2) Other Shapes - Metal posts and braces, other than tubular shape, for barbed wire and woven wire fences, shall conform to AASHTO M 281 (ASTM A 702), except that galvanizing may conform to the requirements of AASHTO M 111 (ASTM A 123). The posts and braces may be either galvanized or painted, as elected. Wire fasteners shall meet the coating requirements of ASTM A 641, Class 1.

(3) Fence Stays, Brace Guys, and Wire Loops - Metal fence stays, brace guy wires, wire loops for gateways and other miscellaneous wire used in barbed and woven wire fences shall be furnished with Class 1 coating as required by ASTM A 641. Either 9 1/2 gauge or 10 gauge wire is acceptable for fence stays.

(d) Concrete In Footings - Concrete for footings shall conform to Section 00440.

(e) Grounding Rod - 5/8 inch by 8 feet, nonrusting, copper covered steel rod with a bronze grounding wire clamp.

(f) Grounding Wire - AWG 4/0 Solid Copper or No. 6 bare aluminum wire with clamps.

03010.60 Fence Gates:

(a) General - Tubular steel gate frames shall conform to AASHTO M 181. Fabric in gates used with chain link fence shall be chain link of the same gauge and conforming to applicable requirements of 03010.30. Fabric in gates used with woven wire fence shall be woven wire fabric conforming to 03010.20 or chain link fabric conforming to the applicable requirements of 03010.30, except that the zinc coating may be either Class C or Class D.

(b) Hardware - All fence and gate hardware shall conform to the requirements of AASHTO M 181, except that the thickness of galvanizing shall be according to AASHTO M 232 (ASTM A 153).

03010.75 Protective Fence Materials, On and Off Structures - Provide certification according to the requirements of 00165.35 that the anchor system selected conforms to requirements shown on the plans.

- **Resin Bonded Anchor System** - The resin bonded anchor system used to install the fence post anchor rods in the concrete bridge rail shall be from the QPL and be installed according to the manufacturer's recommendations.
- **Posts** - Modify posts to attach to the structure as shown.
- **Steel Plates, Angles, and Bolts** - Steel plates, angles, and bolts shall meet the applicable requirements of Section 02530 and galvanized according to 02530.70.
- **Chain Link Fabric, Ties, and Tension Wire** - Chain link fabric, ties, and tension wire shall conform to the requirements of 03010.30.
- **Pickets** - Pickets shall meet the requirements of 03010.31.

03010.80 Acceptance - Acceptance of fencing materials will be according to this Section.

OREGON UNIVERSITY SYSTEM
GENERAL CONDITIONS
FOR PUBLIC IMPROVEMENT CONTRACTS

February 1, 2011

INSTRUCTIONS: The attached **Oregon University System General Conditions for Public Improvement Contracts ("OUS General Conditions")** apply to all designated public improvement contracts. Changes to the OUS General Conditions (including any additions, deletions or substitutions) should only be made by attaching Supplemental General Conditions. The text of these OUS General Conditions should not otherwise be altered. These OUS General Conditions have been reviewed as to form by the Oregon Department of Justice. The legal sufficiency and approval requirements of ORS 291.047 remain applicable to individual OUS procurements, unless an exemption has been granted pursuant to that statute and Department of Justice administrative rules at OAR Chapter 137, Division 45.

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**OREGON UNIVERSITY SYSTEM
GENERAL CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS
("OUS General Conditions")**

**SECTION A
GENERAL PROVISIONS**

A.1 DEFINITION OF TERMS

In the Contract Documents the following terms shall be as defined below:

ARCHITECT/ENGINEER, means the Person appointed by the Owner to make drawings and specifications and, to provide contract administration of the Work contemplated by the Contract to the extent provided herein or by supplemental instruction of Owner (under which Owner may delegate responsibilities of the Owner's Authorized Representative to the Architect/Engineer), in accordance with ORS Chapter 671 (Architects) or ORS Chapter 672 (Engineers) and administrative rules adopted thereunder.

CHANGE ORDER, means a written order issued by the Owner's Authorized Representative to the Contractor requiring a change in the Work within the general scope of the Contract Documents, issued under the changes provisions of Section D, including Owner's written change directives as well as changes reflected in a writing executed by the parties to this Contract and, if applicable, establishing a Contract Price or Contract Time adjustment for the changed Work.

CLAIM, means a demand by Contractor pursuant to Section D.3 for review of the denial of Contractor's initial request for an adjustment of Contract terms, payment of money, extension of Contract Time or other relief, submitted in accordance with the requirements and within the time limits established for review of Claims in these OUS General Conditions.

CONSTRUCTION CHANGE DIRECTIVE, means a written order by the Owner's Authorized Representative to the Contractor requiring a change in the Work within the general scope of the Contract Documents, issued under the changes provisions of Section D.

CONTRACT, means the written agreement between the Owner and the Contractor comprised of the Contract Documents which describe the Work to be done and the obligations between the parties.

CONTRACT DOCUMENTS, means the Solicitation Document and addenda thereto, Instructions to Offerors, Supplemental Instructions to Offerors, the OUS Public Improvement Agreement Form, OUS General Conditions, Supplemental General Conditions, if any, the accepted Offer, Plans, Specifications, amendments, Change Orders and Construction Change Directives .

CONTRACT PERIOD, as set forth in the Contract Documents, means the total period of time beginning with the issuance of the Notice to Proceed and concluding upon Final Completion.

CONTRACT PRICE, means the total of the awarded Offer amount, as increased or decreased by the price of approved alternates and Change Orders.

CONTRACT TIME, means any incremental period of time allowed under the Contract to complete any portion of the Work as reflected in the project schedule.

CONTRACTOR, means the Person awarded the Contract for the Work contemplated.

DAYS, are calendar days, including weekdays, weekends and holidays, unless otherwise specified.

DIRECT COSTS, means, unless otherwise provided in the Contract Documents, the cost of materials, including sales tax, cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits required by agreement or custom; worker's compensation insurance; project specific insurance (including, without limitation, Builder's Risk Insurance and Builder's Risk Installation Floater); bond premiums, rental cost of equipment, and machinery required for execution of the work; and the additional costs of field personnel directly attributable to the Work.

FINAL COMPLETION, means the final completion of all requirements under the Contract, including Contract Closeout as described in Section K but excluding Warranty Work as described in Section I.2, and the final payment and release of all retainage, if any, released.

FORCE MAJEURE, means an act, event or occurrence caused by fire, riot, war, acts of God, nature, sovereign, or public enemy, strikes, freight embargoes or any other act, event or occurrence that is beyond the control of the party to this Contract who is asserting Force Majeure.

MWESB REPORT, means an accurate report by the Contractor to the Owner identifying all Minority, Women and Emerging Small Business (MWESB) enterprises, as those terms are defined in ORS 200.005, receiving contracts throughout the course of the Work. An initial MWESB report is required (see Section E.2.9) and MWESB Reports are required annually (see Section E.2.9) and as a condition of final payment (see Section K.1). The initial report shall include the total number of contracts and subcontracts awarded to MWESB enterprises and the dollar value of their respective contracts and subcontracts. The annual reports shall include the total number of contracts and subcontracts awarded to MWESB enterprises, the dollar value of each, and the expenditure toward each contract and subcontract during the previous twelve (12) months. The final report shall include the total number of contracts and subcontracts awarded to MWESB enterprises and the dollar value of their respective contracts and subcontracts including all Change Orders incorporated during the course of the project. The reports shall only include enterprises certified with the State of Oregon as MWESB enterprises and shall include individual identification of each enterprise as a Minority business enterprise, a Women business enterprise, and/or an Emerging Small Business Enterprise, as applicable.

NOTICE TO PROCEED, means the official written notice from the Owner stating that the Contractor is to proceed with the Work defined in the Contract Documents. Notwithstanding the Notice to Proceed, Contractor shall not be authorized to proceed with the Work until all initial Contract requirements, including the Contract, performance bond and payment bond, and certificates of insurance, have been fully executed and submitted to Owner in a suitable form.

OFFER, means a bid in connection with Instructions to Bidders and a proposal in connection with a Request for Proposals.

OFFEROR, means a bidder in connection with Instructions to Bidders and a proposer in connection with a Request for Proposals.

OVERHEAD, means those items which may be included in the Contractor's markup (general and administrative expense and profit) and that shall not be charged as Direct Cost of the Work, including without limitation such Overhead expenses as wages or salary of personnel above the level of foreman (i.e., superintendents and project managers), expenses of Contractor's offices at the job site (e.g. job trailer) including expenses of personnel staffing the job site

office, and Commercial General Liability Insurance and Automobile Liability Insurance.

OWNER, means the State of Oregon acting by and through the Oregon State Board of Higher Education, in its own right or on behalf of one of its institutions as identified in the Solicitation Document, also known as the Oregon University System (OUS).

OWNER'S AUTHORIZED REPRESENTATIVE, means those individuals identified in writing by the Owner to act on behalf of the Owner for this project. Owner may elect, by written notice to Contractor, to delegate certain duties of the Owner's Authorized Representative to more than one party, including without limitation, to an Architect/Engineer. However, nothing in these OUS General Conditions is intended to abrogate the separate design professional responsibilities of Architects under ORS Chapter 671 or of Engineers under ORS Chapter 672.

PERSON, means an entity doing business as a sole proprietorship, a partnership, a joint venture, a corporation, a limited liability company or partnership, or any other entity possessing the legal capacity to contract.

PLANS, means the drawings which show the location, type, dimensions, and details of the Work to be done under the Contract.

PUNCHLIST, means the list of Work yet to be completed or deficiencies which need to be corrected in order to achieve Final Completion of the Contract.

RECORD DOCUMENT, means the as-built Plans, Specifications, testing and inspection records, product data, samples, manufacturer and distributor/supplier warranties evidencing transfer to Owner, operational and maintenance manuals, shop drawings, Change Orders, Construction Change Directives, MWESB Reports, correspondence, certificate(s) of occupancy, and other documents listed in Subsection B.9.1 of these OUS General Conditions, recording all Services performed.

SOLICITATION DOCUMENT, means Instructions to Bidders or Offerors or a Request for Proposal or a Request for Quotes.

SPECIFICATION, means any description of the physical or functional characteristics of the Work, or of the nature of a supply, service or construction item. Specifications may include a description of any requirement for inspecting, testing or preparing a supply, service or construction item for delivery and the quantities or qualities of materials to be furnished under the Contract. Specifications generally will state the results or products to be obtained and may, on occasion, describe the method and manner of doing the work to be performed. Specifications may be incorporated by reference and/or may be attached to the Contract.

SUBCONTRACTOR, means a Person having a direct contract with the Contractor, or another Subcontractor, to perform one or more items of the Work.

SUBSTANTIAL COMPLETION, means the date when the Owner accepts in writing the construction, alteration or repair of the improvement to real property or any designated portion thereof as having reached that state of completion when it may be used or occupied for its intended purpose. Substantial Completion of facilities with operating systems occurs only after thirty (30) continuous Days of successful, trouble-free operation of the operating systems as provided in Section K.4.2.

SUBSTITUTIONS, means items that in function, performance, reliability, quality, and general configuration are the same or better than the product(s) specified. Approval of any substitute item shall be solely determined by the Owner's Authorized Representative. The decision of the Owner's Authorized Representative is final.

SUPPLEMENTAL GENERAL CONDITIONS, means those conditions that remove from, add to, or modify these OUS General Conditions. Supplemental General Conditions may be included in the Solicitation Document or may be a separate attachment to the Contract.

WORK, means the furnishing of all materials, equipment, labor, transportation, services and incidentals necessary to successfully complete any individual item or the entire Contract and the carrying out of duties and obligations imposed by the Contract Documents.

A.2 SCOPE OF WORK

The Work contemplated under this Contract includes all labor, materials, transportation, equipment and services for, and incidental to, the completion of all construction work in connection with the project described in the Contract Documents. The Contractor shall perform all Work necessary so that the project can be legally occupied and fully used for the intended use as set forth in the Contract Documents.

A.3 INTERPRETATION OF CONTRACT DOCUMENTS

A.3.1 Unless otherwise specifically defined in the Contract Documents, words which have well-known technical meanings or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Contract Documents are intended to be complementary. Whatever is called for in one, is interpreted to be called for in all. However, in the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following descending order of precedence:

- (a) Contract amendments, Change Orders and Construction Change Directives, with those of later date having precedence over those of an earlier date;
- (b) The Supplemental General Conditions;
- (c) The OUS Public Improvement Agreement Form;
- (d) The OUS General Conditions;
- (e) Division One (General Requirements) of the Specifications;
- (f) Detailed Schedules of finishes, equipment and other items included in the Specifications;
- (g) Plans and Specifications (other than Division One and the Detailed Schedules to the Specifications);
- (h) Large-scale drawings on Plans;
- (i) Small-scale drawings on Plans;
- (j) Dimension numbers written on Plans which shall prevail and take precedence over dimensions scaled from Plans;
- (k) The Solicitation Document, including Instructions to Offerors and Supplemental Instructions to Offerors, and any addenda thereto;
- (l) The accepted Offer.

A.3.2 In the case of an inconsistency between Plans and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Owner or Owner's Authorized Representative's interpretation in writing.

A.3.3 If the Contractor finds discrepancies in, or omissions from the Contract Documents, or if the Contractor is in doubt as to their meaning, the Contractor shall at once notify the Owner or Owner's Authorized Representative. Matters concerning and interpretation of requirements of, the Contract Documents will

be decided by the Owner's Authorized Representative, who may delegate that duty in some instances to the Architect/Engineer. Responses to Contractor's requests for interpretation of Contract Documents will be made in writing by Owner's Authorized Representative (or the Architect/Engineer) within any time limits agreed upon or otherwise with reasonable promptness. Interpretations and decisions of the Owner's Authorized Representative (or Architect/Engineer) will be consistent with the intent of and reasonably inferable from the Contract Documents. Contractor shall not proceed without direction in writing from the Owner's Authorized Representative (or Architect/Engineer).

- A.3.4 References to standard specifications, manuals, codes of any technical society, organization or association, to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, laws or regulations in effect in the jurisdiction where the project is occurring on the first published date of the Solicitation Document, except as may be otherwise specifically stated.

A.4 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE

- A.4.1 It is understood that the Contractor, before submitting an Offer, has made a careful examination of the Contract Documents; has become fully informed as to the quality and quantity of materials and the character of the Work required; and has made a careful examination of the location and conditions of the Work and the sources of supply for materials. The Owner will in no case be responsible for any loss or for any unanticipated costs that may be suffered by the Contractor as a result of the Contractor's failure to acquire full information in advance in regard to all conditions pertaining to the Work. No oral agreement or conversation with any officer, agent, or personnel of the Owner, or with the Architect/Engineer either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.
- A.4.2 Should the Plans or Specifications fail to particularly describe the materials, kind of goods, or details of construction of any aspect of the Work, Contractor shall have the duty to make inquiry of the Owner and Architect/Engineer as to what is required prior to performance of the Work. Absent Specifications to the contrary, the materials or processes that would normally be used to produce first quality finished Work shall be considered a part of the Contract requirements.
- A.4.3 Any design errors or omissions noted by the Contractor shall be reported promptly to the Owner's Authorized Representative, including without limitation, any nonconformity with applicable laws, statutes, ordinances, building codes, rules and regulations.
- A.4.4 If the Contractor believes that additional cost or Contract Time is involved because of clarifications or instructions issued by the Owner's Authorized Representative (or Architect/Engineer) in response to the Contractor's notices or requests for information, the Contractor must submit a written request to the Owner's Authorized Representative, setting forth the nature and specific extent of the request, including all time and cost impacts against the Contract as soon as possible, but no later than thirty (30) Days after receipt by Contractor of the clarifications or instructions issued. If the Owner's Authorized Representative denies Contractor's request for additional compensation, additional Contract Time, or other relief that Contractor believes results from the clarifications or instructions, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process. If the Contractor fails to perform the obligations of Sections A.4.1 to A.4.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations.

A.5 INDEPENDENT CONTRACTOR STATUS

The service or services to be performed under this Contract are those of an independent contractor as defined in ORS 670.600. Contractor represents and warrants that it is not an officer, employee or agent of the Owner as those terms are used in ORS 30.265.

A.6 RETIREMENT SYSTEM STATUS AND TAXES

Contractor represents and warrants that it is not a contributing member of the Public Employees' Retirement System and will be responsible for any federal or state taxes applicable to payment received under this Contract. Contractor will not be eligible for any benefits from these Contract payments of federal Social Security, employment insurance, workers' compensation or the Public Employees' Retirement System, except as a self-employed individual. Unless the Contractor is subject to backup withholding, Owner will not withhold from such payments any amount(s) to cover Contractor's federal or state tax obligations.

A.7 GOVERNMENT EMPLOYMENT STATUS

- A.7.1 If this payment is to be charged against federal funds, Contractor represents and warrants that it is not currently employed by the Federal Government. This does not preclude the Contractor from holding another contract with the Federal Government.
- A.7.2 Contractor represents and warrants that Contractor is not an employee of the State of Oregon for purposes of performing Work under this Contract

**SECTION B
ADMINISTRATION OF THE CONTRACT**

B.1 OWNER'S ADMINISTRATION OF THE CONTRACT

- B.1.1 The Owner's Authorized Representative will provide administration of the Contract as described in the Contract Documents (1) during construction (2) until final payment is due and (3) during the one-year period for correction of Work. The Owner's Authorized Representative will act on behalf of the Owner to the extent provided in the Contract Documents, unless modified in writing in accordance with other provisions of the Contract. In performing these tasks, the Owner's Authorized Representative may rely on the Architect/Engineer or other consultants to perform some or all of these tasks.
- B.1.2 The Owner's Authorized Representative will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. The Owner's Authorized Representative will not make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Owner's Authorized Representative will neither have control over or charge of, nor be responsible for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work.
- B.1.3 Except as otherwise provided in the Contract Documents or when direct communications have been specifically authorized, the Owner and Contractor shall endeavor to communicate with each other through the Owner's Authorized Representative or designee about matters arising out of or relating to the Contract. Communications by and with the Architect/Engineer's consultants shall be through the Architect/Engineer. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by

and with separate contractors shall be through the Owner's Authorized Representative.

- B.1.4 Based upon the Architect/Engineer's evaluations of the Contractor's Application for Payment, or unless otherwise stipulated by the Owner's Authorized Representative, the Architect/Engineer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

B.2 CONTRACTOR'S MEANS AND METHODS; MITIGATION OF IMPACTS

- B.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures.
- B.2.2 The Contractor is responsible to protect and maintain the Work during the course of construction and to mitigate any adverse impacts to the project, including those caused by authorized changes, which may affect cost, schedule, or quality.
- B.2.3 The Contractor is responsible for the actions of all its personnel, laborers, suppliers, and Subcontractors on the project. The Contractor shall enforce strict discipline and good order among Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of persons who are unfit or unskilled for the tasks assigned to them.

B.3 MATERIALS AND WORKMANSHIP

- B.3.1 The intent of the Contract Documents is to provide for the construction and completion in every detail of the Work described. All Work shall be performed in a professional manner and unless the means or methods of performing a task are specified elsewhere in the Contract Documents, Contractor shall employ methods that are generally accepted and used by the industry, in accordance with industry standards.
- B.3.2 The Contractor is responsible to perform the Work as required by the Contract Documents. Defective Work shall be corrected at the Contractor's expense.
- B.3.3 Work done and materials furnished shall be subject to inspection and/or observation and testing by the Owner's Authorized Representative to determine if they conform to the Contract Documents. Inspection of the Work by the Owner's Authorized Representative does not relieve the Contractor of responsibility for the Work in accordance with the Contract Documents.
- B.3.4 Contractor shall furnish adequate facilities, as required, for the Owner's Authorized Representative to have safe access to the Work including without limitation walkways, railings, ladders, tunnels, and platforms. Producers, suppliers, and fabricators shall also provide proper facilities and access to their facilities.
- B.3.5 The Contractor shall furnish Samples of materials for testing by the Owner's Authorized Representative and include the cost of the Samples in the Contract Price.

B.4 PERMITS

Contractor shall obtain and pay for all necessary permits and licenses, except for those specifically excluded in the Supplemental

General Conditions, for the construction of the Work, for temporary obstructions, enclosures, opening of streets for pipes, walls, utilities, environmental Work, etc., as required for the project. Contractor shall be responsible for all violations of the law, in connection with the construction or caused by obstructing streets, sidewalks or otherwise. Contractor shall give all requisite notices to public authorities. The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent or other proprietary rights and save harmless and blameless from loss, on account thereof, the State of Oregon, and its departments, divisions, members and employees.

B.5 COMPLIANCE WITH GOVERNMENT REGULATIONS

- B.5.1 Contractor shall comply with all federal, state and local laws, codes, regulations and ordinances applicable to the Work and the Contract. Failure to comply with such requirements shall constitute a breach of Contract and shall be grounds for Contract termination. Without limiting the generality of the foregoing, Contractor expressly agrees to comply with the following, as applicable:
- (i) Title VI and VII of Civil Rights Act of 1964, as amended; (ii) Section 503 and 504 of the Rehabilitation Act of 1973, as amended; (iii) the Health Insurance Portability and Accountability Act of 1996; (iv) the Americans with Disabilities Act of 1990, as amended; (v) ORS Chapter 659A; as amended; (vi) all regulations and administrative rules established pursuant to the foregoing laws; and (vii) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations.
- B.5.2 Contractor shall comply with all applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations, and
- (a) Contractor shall not discriminate against Disadvantaged, Minority, Women or Emerging Small Business enterprises, as those terms are defined in ORS 200.005, or a business enterprise that is owned or controlled by or that employs a disabled veteran, as that term is defined in ORS 408.225, in the awarding of subcontracts.
 - (b) Contractor shall maintain, in current and valid form, all licenses and certificates required by law, regulation, or this Contract when performing the Work.
- B.5.3 Unless contrary to federal law, Contractor shall certify that it shall not accept a bid from Subcontractors to perform Work as described in ORS 701.005 under this Contract unless such Subcontractors are registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 at the time they submit their bids to the Contractor.
- B.5.4 Unless contrary to federal law, Contractor shall certify that each landscape contractor, as defined in ORS 671.520(2), performing Work under this Contract holds a valid landscape contractor's license issued pursuant to ORS 671.560.
- B.5.5 The following notice is applicable to Contractors who perform excavation Work. ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center at (503)232-1987.
- B.5.6 Failure to comply with any or all of the requirements of B.5.1 through B.5.5 shall be a breach of Contract and constitute grounds for Contract termination. Damages or costs resulting from such noncompliance shall be the responsibility of Contractor.

B.6 SUPERINTENDENCE

Contractor shall keep on the site, during the progress of the Work, a competent superintendent and any necessary assistants who shall be satisfactory to the Owner and who shall represent the Contractor on the site. Directions given to the superintendent by the Owner's Authorized Representative shall be confirmed in writing to the Contractor.

B.7 INSPECTION

- B.7.1 Owner's Authorized Representative shall have access to the Work at all times.
- B.7.2 Inspection of the Work will be made by the Owner's Authorized Representative at its discretion. The Owner's Authorized Representative will have authority to reject Work that does not conform to the Contract Documents. Any Work found to be not in conformance with the Contract Documents, in the discretion of the Owner's Authorized Representative, shall be removed and replaced at the Contractor's expense.
- B.7.3 Contractor shall make or obtain at the appropriate time all tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work. The Contractor shall give the Owner's Authorized Representative timely notice of when and where tests and inspections are to be made so that the Owner's Authorized Representative may be present for such procedures. Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Owner's Authorized Representative.
- B.7.4 As required by the Contract Documents, Work done or material used without inspection or testing by the Owner's Authorized Representative may be ordered removed at the Contractor's expense.
- B.7.5 If directed to do so any time before the Work is accepted, the Contractor shall uncover portions of the completed Work for inspection. After inspection, the Contractor shall restore such portions of Work to the standard required by the Contract. If the Work uncovered is unacceptable or was done without sufficient notice to the Owner's Authorized Representative, the uncovering and restoration shall be done at the Contractor's expense. If the Work uncovered is acceptable and was done with sufficient notice to the Owner's Authorized Representative, the uncovering and restoration will be paid for as a Change Order.
- B.7.6 If any testing or inspection reveals failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Owner's Authorized Representative's and Architect/Engineer's services and expenses, shall be at the Contractor's expense.
- B.7.7 When the United States government participates in the cost of the Work, or the Owner has an agreement with other public or private organizations, or if any portion of the Work is being performed for a third party or in close proximity to third party facilities, representatives of these organizations have the right to inspect the Work affecting their interests or property. Their right to inspect shall not make them a party to the Contract and shall not interfere with the rights of the parties of the Contract. Instructions or orders of such parties shall be transmitted to the Contractor, through the Owner's Authorized Representative.

B.8 SEVERABILITY

If any provision of this Contract is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular provision held to be invalid.

B.9 ACCESS TO RECORDS

- B.9.1 Contractor shall keep, at all times on the Work site, one record copy of the complete Contract Documents, including the Plans, Specifications, Change Orders, Construction Change Directives and addenda, in good order and marked currently to record field changes and selections made during construction, and one record copy of Shop Drawings, Product Data, Samples and similar submittals, and shall at all times give the Owner's Authorized Representative access thereto.
- B.9.2 Contractor shall retain and the Owner and its duly authorized representatives shall have access, for a period not less than ten (10) years, to all Record Documents, financial and accounting records, and other books, documents, papers and records of Contractor which are pertinent to the Contract, including records pertaining to Overhead and indirect costs, for the purpose of making audit, examination, excerpts and transcripts. If for any reason, any part of the Contract is involved in litigation, Contractor shall retain all such records until all litigation is resolved. The Owner and/or its agents shall continue to be provided full access to the records during litigation.

B.10 WAIVER

Failure of the Owner to enforce any provision of this Contract shall not constitute a waiver or relinquishment by the Owner of the right to such performance in the future nor of the right to enforce any other provision of this Contract.

B.11 SUBCONTRACTS AND ASSIGNMENT

- B.11.1 Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound by the terms and conditions of these OUS General Conditions, and to assume toward the Contractor all of the obligations and responsibilities which the Contractor assumes toward the Owner thereunder, unless (1) the same are clearly inapplicable to the subcontract at issue because of legal requirements or industry practices, or (2) specific exceptions are requested by Contractor and approved in writing by Owner. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with sub-subcontractors at any level.
- B.11.2 At Owner's request, Contractor shall submit to Owner prior to their execution either Contractor's form of subcontract, or the subcontract to be executed with any particular Subcontractor. If Owner disapproves such form, Contractor shall not execute the form until the matters disapproved are resolved to Owner's satisfaction. Owner's review, comment upon or approval of any such form shall not relieve Contractor of its obligations under this Agreement or be deemed a waiver of such obligations of Contractor.
- B.11.3 Contractor shall not assign, sell, or transfer its rights, or delegate its responsibilities under this Contract, in whole or in part, without the prior written approval of the Owner. No such written approval shall relieve Contractor of any obligations of this Contract, and any transferee shall be considered the agent of the Contractor and bound to perform in accordance with the Contract Documents. Contractor shall remain liable as between the original parties to the Contract as if no assignment had occurred.

B.12 SUCCESSORS IN INTEREST

The provisions of this Contract shall be binding upon and shall accrue to the benefit of the parties to the Contract and their respective permitted successors and assigns.

B.13 OWNER'S RIGHT TO DO WORK

Owner reserves the right to perform other or additional work at or near the project site with other forces than those of the Contractor. If such work takes place within or next to the project site, Contractor will coordinate work with the other contractors or forces, cooperate with all other contractors or forces, carry out the Work in a way that will minimize interference and delay for all forces involved, place and dispose of materials being used so as not to interfere with the operations of another, and join the Work with the work of the others in an acceptable manner and perform it in proper sequence to that of the others. The Owner's Authorized Representative will resolve any disagreements that may arise between or among Contractor and the other contractors over the method or order of doing all work (including the Work). In case of unavoidable interference, the Owner's Authorized Representative will establish work priority (including the Work) which generally will be in the sequence that the contracts were awarded.

B.14 OTHER CONTRACTS

In all cases and at any time, the Owner has the right to execute other contracts related to or unrelated to the Work of this Contract. The Contractor of this Contract will fully cooperate with any and all other contractors without additional cost to the Owner in the manner described in section B.13.

B.15 GOVERNING LAW

This Contract shall be governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflict of laws.

B.16 LITIGATION

Any Claim between Owner and Contractor that arises from or relates to this Contract and that is not resolved through the Claims Review Process in Section D.3 shall be brought and conducted solely and exclusively within the Circuit Court of Marion County for the State of Oregon; provided, however, if a Claim must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. In no event shall this section be construed as a waiver by the State of Oregon on any form of defense or immunity, whether sovereign immunity, governmental immunity, immunity based on the Eleventh Amendment to the Constitution of the United States or otherwise, from any claim or from the jurisdiction of any court. CONTRACTOR BY EXECUTION OF THIS CONTRACT HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF THE COURTS REFERENCED IN THIS SECTION B.16.

B.17 ALLOWANCES

B.17.1 The Contractor shall include in the Contract Price all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct.

B.17.2 Unless otherwise provided in the Contract Documents:

- (a) when finally reconciled, allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

- (b) Contractor's costs for unloading and handling at the site, labor, installation costs, Overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Price but not in the allowances;

- (c) whenever costs are more than or less than allowances, the Contract Price shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (i) the difference between actual costs and the allowances under Section B.17.2(a) and (2) changes in Contractor's costs under Section B.17.2(b).

- (d) Unless Owner requests otherwise, Contractor shall provide to Owner a proposed fixed price for any allowance work prior to its performance.

B.18 SUBMITTALS, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

B.18.1 The Contractor shall prepare and keep current, for the Architect's/Engineer's approval (or for the approval of Owner's Authorized Representative if approval authority has not been delegated to the Architect/Engineer), a schedule and list of submittals which is coordinated with the Contractor's construction schedule and allows the Architect/Engineer reasonable time to review submittals. Owner reserves the right to finally approve the schedule and list of submittals. Submittals include, without limitation, Shop Drawings, Product Data, and Samples which are described below:

- (a) Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor (including any sub-subcontractor), manufacturer, supplier or distributor to illustrate some portion of the Work.

- (b) Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

- (c) Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

B.18.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review of submittals by the Architect/Engineer is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, or for approval of safety precautions or, unless otherwise specifically stated by the Architect/Engineer, of any construction means, methods, techniques, sequences or procedures, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect/Engineer's review of the Contractor's submittals shall not relieve the Contractor of its obligations under the Contract Documents. The Architect/Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component. Informational submittals upon which the Architect/Engineer is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect/Engineer without action.

B.18.3 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect/Engineer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect/Engineer without action.

B.18.4 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

B.18.5 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect/Engineer.

B.18.6 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect/Engineer's review or approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect/Engineer in writing of such deviation at the time of submittal and (i) the Architect/Engineer has given written approval to the specific deviation as a minor change in the Work, or (ii) a Change Order or Construction Change Directive has been executed by Owner authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect/Engineer's review or approval thereof.

B.18.7 In the event that Owner elects not to have the obligations and duties described under this Section B.18 performed by the Architect/Engineer, or in the event no Architect/Engineer is employed by Owner on the project, all obligations and duties assigned to the Architect/Engineer hereunder shall be performed by the Owner's Authorized Representative.

B.19 SUBSTITUTIONS

The Contractor may make Substitutions only with the consent of the Owner, after evaluation by the Owner's Authorized Representative and only in accordance with a Change Order or Construction Change Directive. Substitutions shall be subject to the requirements of the bid documents. By making requests for Substitutions, the Contractor: represents that the Contractor has personally investigated the proposed substitute product; represents that the Contractor will provide the same warranty for the Substitution that the Contractor would for the product originally specified unless approved otherwise; certifies that the cost data presented is complete and includes all related costs under this Contract including redesign costs, and waives all claims for additional costs related to the Substitution which subsequently become apparent; and will coordinate the installation of the accepted Substitution, making such changes as may be required for the Work to be completed in all respects.

B.20 USE OF PLANS AND SPECIFICATIONS

Plans, Specifications and related Contract Documents furnished to Contractor by Owner or Owner's Architect/Engineer shall be used solely for the performance of the Work under this Contract. Contractor and its Subcontractors and suppliers are authorized to use and reproduce applicable portions of such documents appropriate to the execution of the Work, but shall not claim any ownership or other

interest in them beyond the scope of this Contract, and no such interest shall attach. Unless otherwise indicated, all common law, statutory and other reserved rights, in addition to copyrights, are retained by Owner.

B.21 FUNDS AVAILABLE AND AUTHORIZED

Owner reasonably believes at the time of entering into this Contract that sufficient funds are available and authorized for expenditure to finance the cost of this Contract within the Owner's appropriation or limitation. Contractor understands and agrees that, to the extent that sufficient funds are not available and authorized for expenditure to finance the cost of this Contract, Owner's payment of amounts under this Contract attributable to Services performed after the last day of the current biennium is contingent on Owner receiving from the Oregon Legislative Assembly appropriations, limitations or other expenditure authority sufficient to allow Owner, in the exercise of its reasonable administrative discretion, to continue to make payments under this Contract.

B.22 NO THIRD PARTY BENEFICIARIES

Owner and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this Contract gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Contract.

SECTION C WAGES AND LABOR

C.1 MINIMUM WAGE RATES ON PUBLIC WORKS

Contractor shall comply fully with the provisions of ORS 279C.800 through 279C.870. Documents establishing those conditions, as determined by the Commissioner of the Bureau of Labor and Industries (BOLI), are included as attachments to or are incorporated by reference in the Contract Documents. Contractor shall pay workers at not less than the specified minimum hourly rate of wage, and shall include that requirement in all subcontracts.

C.2 PAYROLL CERTIFICATION AND FEE REQUIREMENTS

C.2.1 In accordance with ORS 279C.845, the Contractor and every Subcontractor shall submit written certified statements to the Owner's Authorized Representative, on the form prescribed by the Commissioner of the Bureau of Labor and Industries, certifying the hourly rate of wage paid each worker which the Contractor or the Subcontractor has employed on the project and further certifying that no worker employed on the project has been paid less than the prevailing rate of wage or less than the minimum hourly rate of wage specified in the Contract, which certificate and statement shall be verified by the oath of the Contractor or the Subcontractor that the Contractor or Subcontractor has read the certified statement, that the Contractor or Subcontractor knows the contents of the certified statement, and, that to the Contractor's or Subcontractor's best knowledge and belief, the certified statement is true. The certified statements shall set out accurately and completely the payroll records for the prior week, including the name and address of each worker, the worker's correct classification, rate of pay, daily and weekly number of hours worked, deductions made, and actual wages paid. Certified statements for each week during which the Contractor or Subcontractor has employed a worker on the project shall be submitted once a month, by the fifth business day of the following month. The Contractor and Subcontractors shall preserve the certified

statements for a period of ten (10) years from the date of completion of the Contract.

- C.2.2 Pursuant to ORS 279C.845(7), the Owner shall retain 25 percent of any amount earned by the Contractor on this public works project until the Contractor has filed the certified statements required by section C.2.1. The Owner shall pay to the Contractor the amount retained under this subsection within 14 days after the Contractor files the required certified statements, regardless of whether a Subcontractor has failed to file certified statements.
- C.2.3 Pursuant to ORS 279C.845(8), the Contractor shall retain 25 percent of any amount earned by a first-tier Subcontractor on this public works project until the first-tier Subcontractor has filed with the Owner the certified statements required by C.2.1. Before paying any amount retained under this subsection, the Contractor shall verify that the first-tier Subcontractor has filed the certified statement. Within 14 days after the first-tier Subcontractor files the required certified statement the Contractor shall pay the first-tier Subcontractor any amount retained under this subsection.
- C.2.4 In accordance with statutory requirements and administrative rules promulgated by the Commissioner of the Bureau of Labor and Industries, the fee required by ORS 279C.825(1) will be paid by Owner to the Commissioner.

C.3 PROMPT PAYMENT AND CONTRACT CONDITIONS

- C.3.1 As a condition to Owner's performance hereunder, the Contractor shall:
- C.3.1.1 Make payment promptly, as due, to all persons supplying to Contractor labor or materials for the prosecution of the Work provided for in this Contract.
- C.3.1.2 Pay all contributions or amounts due the State Industrial Accident Fund from such Contractor or Subcontractor incurred in the performance of the Contract.
- C.3.1.3 Not permit any lien or claim to be filed or prosecuted against the Owner on account of any labor or material furnished. Contractor will not assign any claims that Contractor has against Owner, or assign any sums due by Owner, to Subcontractors, suppliers, or manufacturers, and will not make any agreement or act in any way to give Subcontractors a claim or standing to make a claim against the Owner.
- C.3.1.4 Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.
- C.3.2 As a condition to Owner's performance hereunder, if Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the Contractor of a Subcontractor by any person in connection with the project as such claim becomes due, the proper officer(s) representing the Owner may pay the claim and charge the amount of the payment against funds due or to become due Contractor under this Contract. Payment of claims in this manner shall not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.
- C.3.3 Contractor shall include in each subcontract for property or services entered into by the Contractor and a first-tier subcontractor, including a material supplier, for the purpose of performing a construction contract, a payment clause that obligates the Contractor to pay the first-tier Subcontractor for satisfactory performance under its subcontract within ten (10)

Days out of such amounts as are paid to the Contractor by the public contracting agency under such contract.

- C.3.4 All employers, including Contractor, that employ subject workers who work under this contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its Subcontractors complies with these requirements.

C.4 PAYMENT FOR MEDICAL CARE

As a condition to Owner's performance hereunder, Contractor shall promptly, as due, make payment to any person, partnership, association or corporation furnishing medical, surgical, and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, all sums of which the Contractor agrees to pay for such services and all moneys and sums which the Contractor has collected or deducted from the wages of personnel pursuant to any law, contract or agreement for the purpose of providing or paying for such services.

C.5 HOURS OF LABOR

As a condition to Owner's performance hereunder, no person shall be employed to perform Work under this Contract for more than ten (10) hours in any one day or forty (40) hours in any one week, except in cases of necessity, emergency or where public policy absolutely requires it. In such instances, Contractor shall pay the employee at least time and a half pay:

- (a) For all overtime in excess of eight (8) hours a day or forty (40) hours in any one week when the work week is five consecutive Days, Monday through Friday; or
- (b) For all overtime in excess of ten (10) hours a day or forty (40) hours in any one week when the work week is four consecutive Days, Monday through Friday; and
- (c) For all Work performed on Saturday and on any legal holiday specified in ORS 279C.540.

This section C.5 will not apply to Contractor's Work under this Contract if Contractor is currently a party to a collective bargaining agreement with any labor organization.

This Section C.5 shall not excuse Contractor from completion of the Work within the time required under this Contract.

SECTION D CHANGES IN THE WORK

D.1 CHANGES IN WORK

- D.1.1 The terms of this Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever, without prior written approval of the Owner's Authorized Representative, and then only in a manner consistent with the Change Order provisions of this Section D.1 and after any necessary approvals required by public contracting laws have been obtained. Otherwise, a formal contract amendment is required, which shall not be effective until its execution by the parties to this Contract and all approvals required by public contracting laws have been obtained.
- D.1.2 It is mutually agreed that changes in Plans, quantities, or details of construction are inherent in the nature of construction and may be necessary or desirable during the course of construction. Within the general scope of this Contract, the Owner's Authorized Representative may at any time, without notice to the sureties and without impairing the Contract, require changes consistent with this Section D.1. All Change Order Work shall

be executed under the conditions of the Contract Documents. Such changes may include, but are not limited to:

- (a) Modification of specifications and design.
- (b) Increases or decreases in quantities.
- (c) Increases or decreases to the amount of Work.
- (d) Addition or elimination of any Work item.
- (e) Change in the duration of the project.
- (f) Acceleration or delay in performance of Work.
- (g) Deductive changes.

Deductive changes are those that reduce the scope of the Work, and shall be made by mutual agreement whenever feasible. In cases of suspension or partial termination under Section J, Owner reserves the right to unilaterally impose a deductive change and to self perform such Work, for which the provisions of B.13 (Owner's Right to Do Work) shall then apply. Adjustments in compensation shall be made under the provisions of D.1.3, in which costs for deductive changes shall be based upon a Direct Costs adjustment together with the related percentage markup specified for profit, Overhead and other indirect costs, unless otherwise agreed to by Owner.

D.1.3 The Owner and Contractor agree that Change Order Work shall be administered and compensated according to the following:

- (a) Unit pricing may be utilized at the Owner's option when unit prices or solicitation alternates were provided that established the cost for additional Work, and a binding obligation exists under the Contract on the parties covering the terms and conditions of the additional Work.
- (b) If the Owner elects not to utilize unit pricing, or in the event that unit pricing is not available or appropriate, fixed pricing may be used for Change Order Work. In fixed pricing the basis of payments or total price shall be agreed upon in writing between the parties to the Contract, and shall be established before the Work is done whenever feasible. The mark-ups set forth in D.1.3(c) shall be utilized by the parties as a guide in establishing fixed pricing, and will not be exceeded by Owner without adequate justification. Cost and price data relating to Change Orders shall be supplied by Contractor to Owner upon request, but Owner shall be under no obligation to make such requests.
- (c) In the event that unit pricing and fixed pricing are not utilized, then Change Order Work shall be performed on a cost reimbursement basis for Direct Costs. Such Work shall be compensated on the basis of the actual, reasonable and allowable cost of labor, equipment, and material furnished on the Work performed. In addition, the following markups shall be added to the Contractor's or Subcontractor's Direct Costs as full compensation for profit, Overhead and other indirect costs for Work directly performed with the Contractor's or Subcontractor's own forces:

On Labor.....	15%
On Equipment.....	10%
On Materials.....	10%

When Change Order Work under D.1.3(c) is invoiced by an authorized Subcontractor at any level, each ascending tier Subcontractor or Contractor will be allowed a supplemental mark-up on each piece of subcontract Work covered by such Change Order as follows:

\$0.00 - \$5,000.00	10%, and then
Over \$5,000.00	5%

Payments made to the Contractor shall be complete compensation for Overhead, profit, and all costs that were

incurred by the Contractor or by other forces furnished by the Contractor, including Subcontractors, for Change Order Work. Owner may establish a maximum cost for Change Order Work under this Section D.1.3(c), which shall not be exceeded for reimbursement without additional written authorization from Owner. Contractor shall not be required to complete such Change Order Work without additional authorization.

D.1.4 Any necessary adjustment of Contract Time that may be required as a result of a Change Order must be agreed upon by the parties before the start of the Change Order Work unless Owner's Authorized Representative authorizes Contractor to start the Work before agreement on Contract Time adjustment. Contractor shall submit any request for additional compensation (and additional Contract Time if Contractor was authorized to start Work before an adjustment of Contract Time was approved) as soon as possible but no later than thirty (30) Days after receipt of the Change Order. If Contractor's request for additional compensation or adjustment of Contract Time is not made within the thirty (30) Day time limit, Contractor's requests pertaining to that Change Order are barred. The thirty (30) Day time limit for making requests shall not be extended for any reason, including without limitation Contractor's claimed inability to determine the amount of additional compensation or adjustment of Contract Time, unless an extension is granted in writing by Owner. If the Owner's Authorized Representative denies Contractor's request for additional compensation or adjustment of Contract Time, Contractor may proceed to file a Claim under Section D.3, Claims Review Process. No other reimbursement, compensation, or payment will be made, except as provided in Section D.1.5 for impact claims.

D.1.5 If any Change Order Work under Section D.1.3 causes an increase or decrease in the Contractor's cost of, or the Contract Time required for the performance of any other part of the Work under this Contract, the Contractor must submit a written request to the Owner's Authorized Representative, setting forth the nature and specific extent of the request, including all time and cost impacts against the Contract as soon as possible, but no later than thirty (30) Days after receipt of the Change Order by Contractor.

The thirty (30) Day time limit applies to claims of Subcontractors, suppliers, or manufacturers who may be affected by the Change Order and who request additional compensation or an extension of Contract Time to perform; Contractor has responsibility for contacting its Subcontractors, suppliers, or manufacturers within the thirty (30) Day time limit, and including their requests with Contractor's requests. If the request involves Work to be completed by Subcontractors, or materials to be furnished by suppliers or manufacturers, such requests shall be submitted to the Contractor in writing with full analysis and justification for the compensation and additional Contract Time requested. The Contractor will analyze and evaluate the merits of the requests submitted by Subcontractors, suppliers, and manufacturers to Contractor prior to including those requests and Contractor's analysis and evaluation of those requests with Contractor's requests for additional compensation or Contract Time that Contractor submits to the Owner's Authorized Representative. Failure of Subcontractors, suppliers, manufacturers or others to submit their requests to Contractor for inclusion with Contractor's requests submitted to Owner's Authorized Representative within the time period and by the means described in this section shall constitute a waiver of these Subcontractor claims. The Owner's Authorized Representative and the Owner will not consider direct requests or claims from Subcontractors, suppliers, manufacturers or others not a party to this Contract. The consideration of such requests and claims under this section does not give any person, not a party to the Contract the right to bring a claim against the State of Oregon, whether in this claims process, in litigation, or in any dispute resolution process.

If the Owner's Authorized Representative denies the Contractor's request for additional compensation or an extension of Contract Time, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

D.1.6 No request or Claim by the Contractor for additional costs or an adjustment of Contract Time shall be allowed if made after receipt of final payment application under this Contract. Final payment application must be made by Contractor within the time required under Section E.6.4.

D.1.7 It is understood that changes in the Work are inherent in construction of this type. The number of changes, the scope of those changes, and the effect they have on the progress of the original Work cannot be defined at this time. The Contractor is notified that numerous changes may be required and that there will be no compensation made to the Contractor directly related to the number of changes. Each change will be evaluated for extension of Contract Time and increase or decrease in compensation based on its own merit.

D.2 DELAYS

D.2.1 Delays in construction include "Avoidable Delays", which are defined in Section D.2.1.1, and "Unavoidable Delays", which are defined in Section D.2.1.2. The effect of Avoidable Delays is described in Section D.2.2 and the effect of Unavoidable Delays is described in Section D.2.3.

D.2.1.1 Avoidable Delays include any delays other than Unavoidable Delays, and include delays that otherwise would be considered Unavoidable Delays but that:

- (a) Could have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its Subcontractors.
- (b) Affect only a portion of the Work and do not necessarily prevent or delay the prosecution of neither other parts of the Work nor the completion of the whole Work within the Contract Time.
- (c) Do not impact activities on the accepted critical path schedule.
- (d) Are associated with the reasonable interference of other contractors employed by the Owner that do not necessarily prevent the completion of the whole Work within the Contract Time.

D.2.1.2 Unavoidable Delays include delays other than Avoidable Delays that are:

- (a) Caused by any actions of the Owner, Owner's Authorized Representative, or any other employee or agent of the Owner, or by separate contractor employed by the Owner.
- (b) Caused by any site conditions which differ materially from what was represented in the Contract Documents or from conditions that would normally be expected to exist and be inherent to the construction activities defined in the Contract Documents. The Contractor shall notify the Owner's Authorized Representative immediately of differing site conditions before the area has been disturbed. The Owner's Authorized Representative will investigate the area and make a determination as to whether or not the conditions differ materially from either the conditions stated in the Contract Documents or those which could reasonably be expected in execution of this particular Contract. If Contractor and the Owner's Authorized Representative agree that a differing site condition exists, any additional compensation or additional Contract Time will be determined based on the process set forth in Section

D.1.5 for Change Order Work. If the Owner's Authorized Representative disagrees that a differing site condition exists and denies Contractor's request for additional compensation or Contract Time, Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

- (c) Caused by Force Majeure acts, events or occurrences that could not have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its Subcontractors.
- (d) Caused by adverse weather conditions. Any adverse weather conditions must be substantiated by documentary evidence that weather conditions were abnormal for the specific time period claimed, could not have been anticipated by the Contractor, and adversely impacted the project in a manner that could not be avoided by rescheduling the Work or by implementing measures to protect against the weather so that the Work could proceed. A rain, windstorm, high water, or other natural phenomenon for the specific locality of the Work, which might reasonably have been anticipated from the previous 10-year historical records of the general locality of the Work, shall not be construed as abnormal. The parties agree that rainfall greater than the following levels cannot be reasonably anticipated:

- (i) Daily rainfall equal to, or greater than, 0.50 inch during a month when the monthly rainfall exceeds the normal monthly average by twenty-five percent (25 %) or more.
- (ii) daily rainfall equal to, or greater than, 0.75 inch at any time.

The Office of the Environmental Data Service of the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce nearest the project site shall be considered the official agency of record for weather information.

D.2.2 Contractor shall not be entitled to additional compensation or additional Contract Time for Avoidable Delays.

D.2.3 In the event of Unavoidable Delays, based on principles of equitable adjustment, Contractor may be entitled to the following:

- (a) Contractor may be entitled to additional compensation or additional Contract Time, or both, for Unavoidable Delays described in Section D.2.1.2 (a) and (b).
- (b) Contractor may be entitled to additional Contract Time for Unavoidable Delays described in Section D.2.1.2(c) and (d).

In the event of any requests for additional compensation or additional Contract Time, or both, as applicable, arising under this Section D.2.3 for Unavoidable Delays, other than requests for additional compensation or additional Contract Time for differing site conditions for which a review process is established under Section D.2.1.2 (b), Contractor shall submit a written notification of the delay to the Owner's Authorized Representative within two (2) Days of the occurrence of the cause of the delay. This written notification shall state the cause of the potential delay, the project components impacted by the delay, and the anticipated additional Contract Time extension or the additional compensation, or both, as applicable, resulting from the delay. Within seven (7) Days after the cause of the delay has been mitigated, or in no case more than thirty (30) Days after the initial written notification, the Contractor shall submit to the Owner's Authorized Representative, a complete and detailed request for additional compensation or additional Contract Time, or both, as applicable, resulting from the delay.

If the Owner's Authorized Representative denies Contractor's request for additional compensation or adjustment of Contract Time, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

If Contractor does not timely submit the notices required under this Section D.2, then unless otherwise prohibited by law, Contractor's Claim shall be barred.

D.3 CLAIMS REVIEW PROCESS

- D.3.1 All Contractor Claims shall be referred to the Owner's Authorized Representative for review. Contractor's Claims, including Claims for additional compensation or additional Contract Time, shall be submitted in writing by Contractor to the Owner's Authorized Representative within five (5) Days after a denial of Contractor's initial request for an adjustment of Contract terms, payment of money, extension of Contract Time or other relief, provided that such initial request has been submitted in accordance with the requirements and within the time limits established in these OUS General Conditions. Within thirty (30) Days after the initial Claim, Contractor shall submit to the Owner's Authorized Representative a complete and detailed description of the Claim (the "Detailed Notice") that includes all information required by Section D.3.2. Unless the Claim is made in accordance with these time requirements, it shall be waived.
- D.3.2 The Detailed Notice of the Claim shall be submitted in writing by Contractor and shall include a detailed, factual statement of the basis of the Claim, pertinent dates, Contract provisions which support or allow the Claim, reference to or copies of any documents which support the Claim, the dollar value of the Claim, and the Contract Time extension requested for the Claim. If the Claim involves Work to be completed by Subcontractors, the Contractor will analyze and evaluate the merits of the Subcontractor claim prior to forwarding it and that analysis and evaluation to the Owner's Authorized Representative. The Owner's Authorized Representative and the Owner will not consider direct claims from Subcontractors, suppliers, manufacturers, or others not a party to this Contract. Contractor agrees that it will make no agreement, covenant, or assignment, nor will it commit any other act that will permit or assist any Subcontractor, supplier, manufacturer, or other to directly or indirectly make a claim against Owner.
- D.3.3 The Owner's Authorized Representative will review all Claims and take one or more of the following preliminary actions within ten (10) Days of receipt of the Detailed Notice of a Claim: (1) request additional supporting information from the Contractor; (2) inform the Contractor and Owner in writing of the time required for adequate review and response; (3) reject the Claim in whole or in part and identify the reasons for rejection; (4) based on principles of equitable adjustment, recommend approval of all or part of the Claim; or (5) propose an alternate resolution.
- D.3.4 The Owner's Authorized Representative's decision shall be final and binding on the Contractor unless appealed by written notice to the Owner within fifteen (15) Days of receipt of the decision. The Contractor must present written documentation supporting the Claim within fifteen (15) Days of the notice of appeal. After receiving the appeal documentation, the Owner shall review the materials and render a decision within thirty (30) Days after receiving the appeal documents.
- D.3.5 The decision of the Owner shall be final and binding unless the Contractor delivers to the Owner its request for mediation, which shall be a non-binding process, within fifteen (15) Days of the date of the Owner's decision. The mediation process will be considered to have commenced as of the date the Contractor delivers the request. Both parties acknowledge and agree that participation in mediation is a prerequisite to commencement of litigation of any disputes relating to the Contract. Both parties further agree to exercise their best efforts in good faith to resolve all disputes within sixty (60) Days of the commencement of the mediation through the mediation process set forth herein.
- In the event that a lawsuit must be filed within this sixty (60) Day period in order to preserve a cause of action, the parties agree that notwithstanding the filing, they shall proceed diligently with the mediation to its conclusion prior to actively prosecuting the lawsuit, and shall seek from the Court in which the lawsuit is pending such stays or extensions, including the filing of an answer, as may be necessary to facilitate the mediation process. Further, in the event settlements are reached on any issues through mediation, the parties agree to promptly submit the appropriate motions and orders documenting the settlement to the Court for its signature and filing.
- D.3.6 Should the parties arrive at an impasse regarding any Claims or disputed Claims, it is agreed that the parties shall participate in mediation as specified in Section D.3.5. The mediation process will be considered to have been commenced as of the date one party delivers to the other its request in writing to mediate. The mediator shall be an individual mutually acceptable to both parties, but in the absence of agreement each party shall select a temporary mediator and the temporary mediators shall jointly select the permanent mediator. Each party shall pay its own costs for the time and effort involved in mediation. The cost of the mediator shall be split equally between the two parties. Both parties agree to exercise their best effort in good faith to resolve all disputes in mediation. Participation in mediation is a mandatory requirement of both the Owner and the Contractor. The schedule, time and place for mediation will be mutually acceptable, or, failing mutual agreement, shall be as established by the mediator. The parties agree to comply with Owner's administrative rules governing the confidentiality of mediation, if any, and shall execute all necessary documents to give effect to such confidentiality rules. In any event, the parties shall not subpoena the mediator or otherwise require the mediator to produce records, notes or work product, or to testify in any future proceedings as to information disclosed or representations made in the course of mediation, except to the extent disclosure is required by law.
- D.3.7 Owner may at any time and at its discretion issue a Construction Change Directive adding to, modifying or reducing the scope of Work. Contractor and Owner shall negotiate the need for any adjustment to compensation or additional Contract Time related to the change, subject to the procedures for submitting requests or Claims for additional compensation or additional Contract Time established in this Section D. Unless otherwise directed by Owner's Authorized Representative, Contractor shall proceed with the Work while any request or Claim for additional compensation or additional Contract Time resulting from Work under a Change Order or Construction Change Directive is pending. Regardless of the review period or the final decision of the Owner's Authorized Representative, the Contractor shall continue to diligently pursue the Work as identified in the Contract Documents. In no case is the Contractor justified or allowed to cease Work without a written stop work order from the Owner or Owner's Authorized Representative.

SECTION E PAYMENTS

E.1 SCHEDULE OF VALUES

The Contractor shall submit, at least ten (10) Days prior to submission of its first application for progress payment, a schedule of values ("Schedule of Values") for the contracted Work. This schedule will provide a breakdown of values for the contracted Work and will be the basis for progress payments. The breakdown will demonstrate reasonable, identifiable, and measurable components of the Work.

Unless objected to by the Owner's Authorized Representative, this schedule shall be used as the basis for reviewing Contractor's applications for payment. If objected to by Owner's Authorized Representative, Contractor shall revise the schedule of values and resubmit the same for approval of Owner's Authorized Representative.

E.2 APPLICATIONS FOR PAYMENT

E.2.1 Owner shall make progress payments on the Contract monthly as Work progresses. Payments shall be based upon estimates of Work completed and the Schedule of Values. All payments shall be approved by the Owner's Authorized Representative. A progress payment shall not be considered acceptance or approval of any Work or waiver of any defects therein. Owner shall pay to Contractor interest for over due claims at the rate of two-thirds of one percent per month on the progress payment, not including retainage, due the Contractor. Over due claims will be those that have not been paid within forty five (45) days from the latest of:

- (a) The date of the receipt of the accurate invoice;
- (b) The date of the initial billing statement if no invoice is received;
- (c) The date all goods have been received; or
- (d) The date the claim is made certain by agreement of the parties or by operation of law.

Notwithstanding the foregoing, in instances when an application for payment is filled out incorrectly, or when there is any defect or impropriety in any submitted application or when there is a good faith dispute, Owner shall so notify the Contractor within fifteen (15) Days stating the reason or reasons the application for payment is defective or improper or the reasons for the dispute. A defective or improper application for payment, if corrected by the Contractor within seven (7) Days of being notified by the Owner, shall not cause a payment to be made later than specified in this section unless interest is also paid. Payment of interest will be postponed when payment on the principal is delayed because of disagreement between the Owner and the Contractor.

Owner reserves the right, instead of requiring the Contractor to correct or resubmit a defective or improper application for payment, to reject the defective or improper portion of the application for payment and pay the remainder of the application for payment that is correct and proper.

Owner, upon written notice to the Contractor, may elect to make payments to the Contractor only by means of Electronic Funds Transfers (EFT) through Automated Clearing House (ACH) payments. If Owner makes this election, the Contractor will be required to arrange for receipt of the EFT/ACH payments.

E.2.2 Contractor shall submit to the Owner's Authorized Representative an application for each payment and, if required, receipts or other vouchers showing payments for materials and labor including payments to Subcontractors. Contractor shall include in its application for payment a schedule of the percentages of the various parts of the Work completed, based on the Schedule of Values which shall aggregate to the payment application total, and shall include, on the face of each copy thereof, a certificate in substantially the following form:

"I, the undersigned, hereby certify that the above bill is true and correct, and the payment therefore, has not been received.

Signed: _____

E.2.3 Generally, applications for payment will be accepted only for materials that have been installed. Under special conditions,

applications for payment for stored materials will be accepted at Owner's sole discretion. Such a payment, if made, will be subject to the following conditions:

- (a) The request for stored material shall be submitted at least thirty (30) Days in advance of the application for payment on which it appears. Applications for payment shall be entertained for major equipment, components or expenditures only.
- (b) The Contractor shall submit applications for payment showing the quantity and cost of the material stored.
- (c) The material shall be stored in a bonded warehouse and Owner's Authorized Representative shall be granted the right to access the material for the purpose of removal or inspection at any time during the Contract Period.
- (d) The Contractor shall name the Owner as co-insured on the insurance policy covering the full value of the property while in the care and custody of the Contractor until it is installed. A certificate noting this coverage shall be issued to the Owner.
- (e) Payments shall be made for materials only. The submitted amount of the application for payment shall be reduced by the cost of transportation and for the cost of an inspector to check the delivery at out of town storage sites. The cost of said inspection shall be borne solely by the Contractor.
- (f) Within sixty (60) Days of the application for payment, the Contractor shall submit evidence of payment covering the material stored.
- (g) Payment for stored materials shall in no way indicate acceptance of the materials or waive any rights under this Contract for the rejection of the Work or materials not in conformance with the Contract Documents.
- (h) All required documentation must be submitted with the respective application for payment.

E.2.4 The Owner reserves the right to withhold all or part of a payment, or may nullify in whole or part any payment previously made, to such extent as may be necessary in the Owner's opinion to protect the Owner from loss because of:

- (a) Work that is defective and not remedied, or that has been demonstrated or identified as failing to conform with the Contract Documents,
- (b) third party claims filed or evidence reasonably indicating that such claims will likely be filed unless security acceptable to the Owner is provided by the Contractor;
- (c) failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment (in which case Owner may issue checks made payable jointly to Contractor and such unpaid persons under this provision, or directly to Subcontractors and suppliers at any level under Section C.3.2.1);
- (d) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Price;
- (e) damage to the Owner or another contractor;
- (f) reasonable evidence that the Work will not be completed within the Contract Time required by the Contract, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- (g) failure to carry out the Work in accordance with the Contract Documents; or

- (h) assessment of liquidated damages, when withholding is made for offset purposes.

E.2.5 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- (a) Take that portion of the Contract Price properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Price allocated to that portion of the Work in the Schedule of Values, less retainage as provided in Section E.5. Pending final determination of cost to the Owner of changes in the Work, no amounts for changes in the Work can be included in applications for payment until the Contract Price has been adjusted by Change Order;
- (b) Add that portion of the Contract Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner pursuant to Section E.2.3, suitably stored off the site at a location agreed upon in writing), less retainage as provided in Section E.5;
- (c) Subtract the aggregate of previous payments made by the Owner; and
- (d) Subtract any amounts for which the Owner's Authorized Representative has withheld or nullified payment as provided in the Contract Documents.

E.2.6 Contractor's applications for payment may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier.

E.2.7 The Contractor warrants to Owner that title to all Work covered by an application for payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an application for payment all Work for which payments are received from the Owner shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

E.2.8 If Contractor disputes any determination by Owner's Authorized Representative with regard to any application for payment, Contractor nevertheless shall continue to prosecute expeditiously the Work. No payment made hereunder shall be or be construed to be final acceptance or approval of that portion of the Work to which such partial payment relates or shall relieve Contractor of any of its obligations hereunder.

E.2.9 Contractor shall submit its initial MWESB Report within ten (10) Days of Contractor's execution of the Contract, or if there will be a Guaranteed Maximum Price (GMP) Amendment, then within ten (10) Days of Contractor's execution of the GMP Amendment. Contractor shall submit annual MWESB Reports on June 30 of each year the Contract is active. Contracts (or GMP Amendments) first executed by Contractor within ninety (90) Days before June 30 of the year of execution by Contractor may at the discretion of Owner be exempt from submitting the annual MWESB Report otherwise due on that June 30. The final MWESB Report shall be filed with the application for final payment. Timely receipt of MWESB Reports by Owner's Authorized Representative shall be a condition of any progress payments or final payment otherwise due.

E.3 PAYROLL CERTIFICATION REQUIREMENT

Payroll certification is required before payments are made on the Contract. Refer to Section C.2 for this information.

E.4 DUAL PAYMENT SOURCES

Contractor shall not be compensated for Work performed under this Contract from any state agency other than the agency that is a party to this Contract.

E.5 RETAINAGE

E.5.1 Retainage shall be withheld and released in accordance with OAR 580-063-0045.

E.5.1.1 Owner may reserve as retainage from any progress payment an amount not to exceed five percent of the payment. As Work progresses, Owner may reduce the amount of retainage on or may eliminate retainage on any remaining monthly Contract payments after 50 percent of the Work under the Contract is completed if, in the Owner's opinion, such Work is progressing satisfactorily. Elimination or reduction of retainage shall be allowed only upon written application by the Contractor, which application shall include written approval of Contractor's surety; except that when the Work is 97-1/2 percent completed the Owner may, at its discretion and without application by the Contractor, reduce the retained amount to 100 percent of the value of the Work remaining to be done. Upon receipt of written application by the Contractor, Owner shall respond in writing within a reasonable time.

E.5.1.2 Contractor may request in writing:

- (a) to be paid amounts which would otherwise have been retained from progress payments where Contractor has deposited acceptable bonds and securities of equal value with Owner or in a custodial account or other mutually-agreed account satisfactory to Owner, with an approved bank or trust company to be held in lieu of the cash retainage for the benefit of Owner;
- (b) for construction projects over \$1,000,000, that retainage be deposited in an interest bearing account, established through the State Treasurer for state agencies, in a bank, savings bank, trust company or savings association for the benefit of Owner, with earnings from such account accruing to the Contractor; or
- (c) that the Owner allow Contractor to deposit a surety bond for the benefit of Owner, in a form acceptable to Owner, in lieu of all or a portion of funds retained, or to be retained. Such bond and any proceeds therefrom shall be made subject to all claims in the manner and priority as set forth for retainage.

When the Owner has accepted the Contractor's election of option (a) or (b), Owner may recover from Contractor any additional costs incurred through such election by reducing Contractor's final payment. Where the Owner has agreed to Contractor's request for option (c), Contractor shall accept like bonds from Subcontractors and suppliers on the project from which Contractor has required retainages.

E. 5.1.3 The retainage held by Owner shall be included in and paid to the Contractor as part of the final payment of the Contract Price. The Owner shall pay to Contractor interest at the rate of two-thirds of one percent per month on the final payment due Contractor, interest to commence forty five (45) Days after the Work under the Contract has been completed and accepted and to run until the date when final payment is tendered to Contractor. The Contractor shall notify Owner in writing when the Contractor considers the Work complete and Owner shall, within fifteen (15) Days after receiving the written notice, either accept the Work or notify the Contractor of Work yet to be performed on the Contract. If Owner does not within the time allowed notify the Contractor of Work yet to be performed to

fulfill contractual obligations, the interest provided by this subsection shall commence to run forty five (45) Days after the end of the 15-Day period.

- E.5.1.4 Owner will reduce the amount of the retainage if the Contractor notifies the controller of the Owner that the Contractor has deposited in an escrow account with a bank or trust company, in a manner authorized by the Owner's Authorized Representative, bonds and securities of equal value of a kind approved by the Owner's Authorized Representative.
- E.5.1.5 Contractor agrees that if Contractor elects to reserve a retainage from any progress payment due to any Subcontractor or supplier, such retainage shall not exceed five percent of the payment, and such retainage withheld from Subcontractors and suppliers shall be subject to the same terms and conditions stated in Subsection E.5 as apply to Owner's retainage from any progress payment due to Contractor.
- E.5.2 As provided in subsections C.2.2 and C.2.3, additional retainage in the amount of 25% of amounts earned shall be withheld and released in accordance with ORS 279C.845(7) when the Contractor fails to file certified statements as required by section C.2.1.

E.6 FINAL PAYMENT

- E.6.1 Upon completion of all the Work under this Contract, the Contractor shall notify the Owner's Authorized Representative, in writing, that Contractor has completed Contractor's part of the Contract and shall request final payment. Upon receipt of such notice the Owner's Authorized Representative will inspect the Work, and if acceptable, submit to the Owner a recommendation as to acceptance of the completed Work and the final estimate of the amount due the Contractor. If the Work is not acceptable, Owner will notify Contractor within fifteen (15) Days of Contractor's request for final payment. Upon approval of this final estimate by the Owner and compliance by the Contractor with provisions in Section K, AFFIDAVIT/RELEASE OF LIENS AND CLAIMS, and other provisions as may be applicable, the Owner shall pay to the Contractor all monies due under the provisions of these Contract Documents.
- E.6.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner's Authorized Representative (1) a notarized affidavit/release of liens and claims in a form satisfactory to Owner that states that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) Days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.
- E.6.3 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that

payee except those previously made in writing and identified by that payee as unsettled at the time of final application for payment.

- E.6.4 Contractor agrees to submit its final payment application within ninety (90) Days after Substantial Completion, unless written extension is granted by Owner. Contractor shall not delay final payment application for any reason, including without limitation nonpayment of Subcontractors, suppliers, manufacturers or others not a party to this Contract, or lack of resolution of a dispute with Owner or any other person of matters arising out of or relating to the Contract. If Contractor fails to submit its final payment application within ninety (90) Days after Substantial Completion, and Contractor has not obtained written extension by Owner, all requests or Claims for additional costs or an extension of Contract Time shall be waived.

SECTION F JOB SITE CONDITIONS

F.1 USE OF PREMISES

Contractor shall confine equipment, storage of materials and operation of Work to the limits indicated by Contract Documents, law, ordinances, permits or directions of the Owner's Authorized Representative. Contractor shall follow the Owner's Authorized Representative's instructions regarding use of premises, if any.

F.2 PROTECTION OF WORKERS, PROPERTY AND THE PUBLIC

- F.2.1 Contractor shall maintain continuous and adequate protection of all of the Work from damage and shall protect the Owner's Authorized Representative, workers and property from injury or loss arising in connection with this Contract. Contractor shall remedy acceptably to the Owner any damage, injury, or loss, except such as may be directly due to errors in the Contract Documents or caused by authorized representatives or personnel of the Owner. Contractor shall adequately protect adjacent property as provided by law and the Contract Documents.
- F.2.2 Contractor shall take all necessary precautions for the safety of all personnel on the job site and shall comply with the Contract Documents and all applicable provisions of federal, state and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for protection of workers and the public against any hazards created by construction. Contractor shall designate a responsible employee or associate on the Work site, whose duty shall be the prevention of accidents. The name and position of the person designated shall be reported to the Owner's Authorized Representative. The Owner's Authorized Representative has no responsibility for Work site safety. Work site safety is the responsibility of the Contractor.
- F.2.3 Contractor shall not enter upon private property without first obtaining permission from the property owner or its duly authorized representative. Contractor shall be responsible for the preservation of all public and private property along and adjacent to the Work contemplated under the Contract and shall use every precaution necessary to prevent damage thereto. In the event the Contractor damages any property, the Contractor shall at once notify the property owner and make, or arrange to make, full restitution. Contractor shall, immediately and in writing, report to the Owner's Authorized Representative, all pertinent facts relating to such property damage and the ultimate disposition of the claim for damage.
- F.2.4 Contractor is responsible for protection of adjacent work areas including impacts brought about by activities, equipment, labor, utilities, and materials on the site.

F.2.5 Contractor shall at all times direct its activities in such a manner as to minimize adverse effects on the environment. Handling of all materials will be conducted so no release will occur that may pollute or become hazardous.

F.2.6 In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor, without special instruction or authorization from the Owner's Authorized Representative, shall act reasonably to prevent threatened loss or injury, and shall so act, without appeal, if instructed by the Owner's Authorized Representative. Any compensation claimed by the Contractor on account of emergency work shall be determined in accordance with section D.

F.3 CUTTING AND PATCHING

F.3.1 Contractor shall be responsible for coordinating all cutting, fitting, or patching of the Work to make its several parts come together properly and fit to receive or be received by work of other contractors or Subcontractors shown upon, or reasonably implied by, the Contract Documents.

F.3.2 Contractor shall be responsible for restoring all cut, fitted, or patched surfaces to an original condition; provided, however, that if a different condition is specified in the Contract Documents, then Contractor shall be responsible for restoring such surfaces to the condition specified in the Contract Documents.

F.4 CLEANING UP

From time to time as may be ordered by the Owner and, in any event, immediately after completion of the Work, the Contractor shall, at its own expense, clean up and remove all refuse and unused materials of any kind resulting from the Work. If Contractor fails to do so within twenty-four hours after notification by the Owner the work may be done by others and the cost charged to the Contractor and deducted from payment due the Contractor.

F.5 ENVIRONMENTAL CONTAMINATION

F.5.1. Contractor will be held responsible for and shall indemnify, defend (with counsel of Owner's choice), and hold harmless Owner from and against any costs, expenses, damages, claims, and causes of action, (including attorney fees), or any of them, resulting from all spills, releases, discharges, leaks and disposal of environmental pollution, including storage, transportation, and handling during the performance of the Contract which occur as a result of, or are contributed by, the negligence or actions of Contractor or its personnel, agents, or Subcontractors or any failure to perform in accordance with the Contract Documents (except to the extent otherwise void under ORS 30.140). Nothing in this section F.5.1 shall limit Contractor's responsibility for obtaining insurance coverages required under Section G.3 of this Contract, and Contractor shall take no action that would void or impair such coverages.

F.5.1.1 Contractor agrees to promptly dispose of such spills, releases, discharge or leaks to the satisfaction of Owner and proper regulatory agencies in a manner that complies with applicable federal, state, and local laws and regulations. Cleanup shall be at no cost to the Owner and be performed by properly qualified personnel.

F.5.1.2 Contractor shall obtain the Owner's written consent prior to bringing onto the Work site any (i) environmental pollutants or (ii) hazardous substances or materials, as the same or reasonably similar terms are used in any applicable federal, state, or local statutes, rules or ordinances. Notwithstanding

such written consent from the Owner, the Contractor, at all times, shall:

- (a) properly handle, use and dispose of all environmental pollutants and hazardous substances or materials brought onto the Work site, in accordance with all applicable federal, state, or local statutes, rules, or ordinances;
- (b) be responsible for any and all spills, releases, discharges, or leaks of (or from) environmental pollutants or hazardous substances or materials which Contractor has brought onto the Work site; and
- (c) promptly clean up, without cost to the Owner, such spills, releases, discharges, or leaks to the Owner's satisfaction and in compliance with all applicable federal, state, or local statutes, rules or ordinances.

F.5.2 Contractor shall report all reportable quantity releases to applicable federal, state, and local regulatory and emergency response agencies. Reportable quantities are found in 40 CFR Part 302, Table 302.4 for hazardous substances and in OAR 340-142-0050 for all products addressed therein. Upon discovery, regardless of quantity, Contractor must telephonically report all releases to the Owner. A written follow-up report shall be submitted to Owner within 48 hours of the telephonic report. Such written report shall contain, as a minimum:

- (a) Description of items released (identity, quantity, manifest no., and all other documentation required by law.)
- (b) Whether amount of items released is EPA/DEQ reportable, and, if so, when it was reported.
- (c) Exact time and location of release, including a description of the area involved.
- (d) Containment procedures initiated.
- (e) Summary of communications about the release Contractor has had with members of the press or State officials other than Owner.
- (f) Description of cleanup procedures employed or to be employed at the site, including disposal location of spill residue.
- (g) Personnel injuries, if any, resulting from, or aggravated by, the release.

F.6 ENVIRONMENTAL CLEAN-UP

F.6.1 Unless disposition of environmental pollution is specifically a part of this Contract, or was caused by the Contractor (reference F.5 Environmental Contamination), Contractor shall immediately notify Owner of any hazardous substance(s) which Contractor discovers or encounters during performance of the Work required by this Contract. "Hazardous substance(s)" means any hazardous, toxic and radioactive materials and those substances defined as "hazardous substances," "hazardous materials," "hazardous wastes," "toxic substances," or other similar designations in any federal, state, or local law, regulation, or ordinance, including without limitation asbestos, polychlorinated biphenyl (PCB), or petroleum, and any substances, materials or wastes regulated in 40 CFR, Part 261 and defined as hazardous in 40 CFR S 261.3. In addition to notifying Owner of any hazardous substance(s) discovered or encountered, Contractor shall immediately cease working in any particular area of the project where a hazardous substance(s) has been discovered or encountered if continued work in such area would present a risk or danger to the health or well being of Contractor's or any Subcontractor's work force.

F.6.2 Upon being notified by Contractor of the presence of hazardous substance(s) on the project site, Owner shall arrange for the proper disposition of such hazardous substance(s).

F.7 FORCE MAJEURE

A party to this Contract shall not be held responsible for delay or default due to Force Majeure acts, events or occurrences unless they could have been avoided by the exercise of reasonable care, prudence, foresight, and diligence by that party. The Owner may terminate this Contract upon written notice after determining that delay or default caused by Force Majeure acts, events or occurrences will reasonably prevent successful performance of the Contract.

SECTION G INDEMNITY, BONDING, AND INSURANCE

G.1 RESPONSIBILITY FOR DAMAGES / INDEMNITY

G.1.1 Contractor shall be responsible for all damage to property, injury to persons, and loss, expense, inconvenience, and delay that may be caused by, or result from, the carrying out of the Work to be done under this Contract, or from any act, omission or neglect of the Contractor, its Subcontractors, personnel, or agents.

G.1.2 To the fullest extent permitted by law, Contractor shall indemnify, defend (with counsel approved by Owner) and hold harmless the Owner, Owner's Authorized Representative, Architect/Engineer, Architect/Engineer's consultants, and their respective officers, directors, agents, employees, partners, members, stockholders and affiliated companies (collectively "Indemnitees") from and against all liabilities, damages, losses, claims, expenses (including reasonable attorney fees), demands and actions of any nature whatsoever which arise out of, result from or are related to, (a) any damage, injury, loss, expense, inconvenience or delay described in this Section G.1.2, (b) any accident or occurrence which happens or is alleged to have happened in or about the project site or any place where the Work is being performed, or in the vicinity of either, at any time prior to the time the Work is fully completed in all respects, (c) any failure of the Contractor to observe or perform any duty or obligation under the Contract Documents which is to be observed or performed by the Contractor, or any breach of any agreement, representation or warranty of the Contractor contained in the Contract Documents or in any subcontract, (d) the negligent acts or omissions of the Contractor, a Subcontractor or anyone directly or indirectly employed by them or any one of them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder (except to the extent otherwise void under ORS 30.140), and (e) any lien filed upon the project or bond claim in connection with the Work. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section G.1.2.

G.1.3 In claims against any person or entity indemnified under this Section G.1.2 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section G.1.2 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

G.2 PERFORMANCE AND PAYMENT SECURITY; PUBLIC WORKS BOND

G.2.1 When the Contract Price is \$100,000 or more (or \$50,000 or more in the case of Contracts for highways, bridges and other transportation projects), the Contractor shall furnish and

maintain in effect at all times during the Contract Period a performance bond in a sum equal to the Contract Price and a separate payment bond also in a sum equal to the Contract Price. The bonds may be required if the Contract Price is less than the above thresholds if required by the Contract Documents.

G.2.2 Bond forms furnished by the Owner and notarized by awarded Contractor's surety company authorized to do business in Oregon are the only acceptable forms of performance and payment security, unless otherwise specified in the Contract Documents.

G.2.3 Before execution of the Contract the Contractor shall file with the Construction Contractors Board, and maintain in full force and effect, the separate public works bond required by Oregon Laws 2005, Chapter 360, and OAR 839-025-0015, unless otherwise exempt under those provisions. The Contractor shall also include in every subcontract a provision requiring the Subcontractor to have a public works bond filed with the Construction Contractors Board before starting Work, unless otherwise exempt, and shall verify that the Subcontractor has filed a public works bond before permitting the Subcontractor to start Work.

G.3 INSURANCE

G.3.1 Primary Coverage: Insurance carried by Contractor under this Contract shall be the primary coverage, and the Owner's insurance is excess and solely for damages or losses for which the Owner is responsible. The coverages indicated are minimums unless otherwise specified in the Contract Documents.

G.3.2 Workers' Compensation: All employers, including Contractor, that employ subject workers who work under this contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. This shall include Employer's Liability Insurance with coverage limits of not less than \$100,000 for each accident. Contractors who perform the Work without the assistance or labor of any employee need not obtain such coverage if the Contractor certifies so in writing. Contractor shall ensure that each of its Subcontractors complies with these requirements. The Contractor shall require proof of such Workers' Compensation by receiving and keeping on file a certificate of insurance from each Subcontractor or anyone else directly employed by either the Contractor or its Subcontractors.

G.3.3 Builder's Risk Insurance:

G.3.3.1 Builder's Risk: During the term of this Contract, for new construction the Contractor shall obtain and keep in effect Builder's Risk insurance on an all risk form, including earthquake and flood, for an amount equal to the full amount of the Contract. Any deductible shall not exceed \$50,000 for each loss, except the earthquake and flood deductible shall not exceed 2 percent of each loss or \$50,000, whichever is more. The policy will include as loss payees the Owner, the Contractor and its Subcontractors as their interests may appear.

G.3.3.2 Builder's Risk Installation Floater: For other than new construction the Contractor shall obtain and keep in effect during the term of this Contract, a Builder's Risk Installation Floater for coverage of the Contractor's labor, materials and equipment to be used for completion of the Work performed under this Contract. The minimum amount of coverage to be carried shall be equal to the full amount of the Contract. This insurance shall include as loss payees the State of Oregon, the Owner, the Contractor and its Subcontractors as their interests may appear.

G.3.3.3 Such insurance shall be maintained until Owner has occupied the facility.

G.3.3.4 A loss insured under the Builder's Risk insurance shall be adjusted by the Owner and made payable to the Owner for the insureds, as their interests may appear. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner. The Owner shall have power to adjust and settle a loss with insurers.

G.3.4 Liability Insurance:

G.3.4.1 Commercial General Liability: Contractor shall obtain, at Contractor's expense, and keep in effect during the term of this Contract, Commercial General Liability Insurance covering bodily injury and property damage in a form and with coverages that are satisfactory to the State. This insurance shall include personal injury liability, products and completed operations, and contractual liability coverage for the indemnity provided under this Contract (to the extent contractual liability coverage for the indemnity is available in the marketplace), and shall be issued on an occurrence basis. Contractor shall provide proof of insurance of not less than the following amounts:

Bodily Injury/Death:

Amounts not less than the amounts listed in the following schedule:

Per occurrence limit for any single claimant :

From commencement of the Contract term to
 June 30, 2011: \$1,600,000
 July 1, 2011 to June 30, 2012: \$1,700,000
 July 1, 2012 to June 30, 2013: \$1,800,000
 July 1, 2013 to June 30, 2014: \$1,900,000
 July 1, 2014 to June 30, 2015: \$2,000,000
 July 1, 2015 and thereafter the adjusted limitation as determined by the State Court Administrator pursuant to Oregon Laws 2009, chapter 67, section 3 (Senate Bill 311).

Per occurrence limit for any number of claimants:

From commencement of the Contract term to
 June 30, 2011: \$3,200,000
 July 1, 2011 to June 30, 2012: \$3,400,000
 July 1, 2012 to June 30, 2013: \$3,600,000
 July 1, 2013 to June 30, 2014: \$3,800,000
 July 1, 2014 to June 30, 2015: \$4,000,000
 July 1, 2015 and thereafter the adjusted limitation as determined by the State Court Administrator pursuant to Oregon Laws 2009, chapter 67, section 3 (Senate Bill 311).

Property Damage:

Amounts not less than the amounts listed in the following schedule:

Per occurrence limit for any single claimant:

From commencement of the Contract term to June 30, 2011: \$100,100.
 Effective as of July 1 of each year the adjusted limitation will be as determined by the State Court Administrator pursuant to Oregon Laws 2009, chapter 67, section 5 (Senate Bill 311).

Per occurrence limit for any number of claimants:

From commencement of the Contract term to June 30, 2011: \$500,600.
 Effective as of July 1 of each year the adjusted limitation will be as determined by the State Court Administrator pursuant to Oregon Laws 2009, chapter 67, section 5 (Senate Bill 311).

G.3.4.2 Automobile Liability: Contractor shall obtain, at Contractor's expense, and keep in effect during the term of this Contract, Automobile Liability Insurance covering owned, non-owned and/or hired vehicles, as applicable. The coverage may be written in combination with the Commercial General Liability Insurance. Contractor shall provide proof of insurance of not less than the following amounts:

Bodily Injury/Death:

Amounts not less than the amounts listed in the following schedule:

Per occurrence limit for any single claimant:

From commencement of the Contract term to
 June 30, 2011: \$1,600,000.
 July 1, 2011 to June 30, 2012: \$1,700,000.
 July 1, 2012 to June 30, 2013: \$1,800,000.
 July 1, 2013 to June 30, 2014: \$1,900,000.
 July 1, 2014 to June 30, 2015: \$2,000,000.
 July 1, 2015 and thereafter the adjusted limitation as determined by the State Court Administrator pursuant to Oregon Laws 2009, chapter 67, section 3 (Senate Bill 311).

Per occurrence limit for any number of claimants:

From commencement of the Contract term to
 June 30, 2011: \$3,200,000.
 July 1, 2011 to June 30, 2012: \$3,400,000.
 July 1, 2012 to June 30, 2013: \$3,600,000.
 July 1, 2013 to June 30, 2014: \$3,800,000.
 July 1, 2014 to June 30, 2015: \$4,000,000.
 July 1, 2015 and thereafter the adjusted limitation as determined by the State Court Administrator pursuant to Oregon Laws 2009, chapter 67, section 3 (Senate Bill 311).

Property Damage:

Amounts not less than the amounts listed in the following schedule:

Per occurrence limit for any single claimant:

From commencement of the Contract term to June 30, 2011: \$100,100.
 Effective as of July 1 of each year the adjusted limitation will be as determined by the State Court Administrator pursuant to Oregon Laws 2009, chapter 67, section 5 (Senate Bill 311).

Per occurrence limit for any number of claimants:

From commencement of the Contract term to June 30, 2011: \$500,600.
 Effective as of July 1 of each year the adjusted limitation will be as determined by the State Court Administrator pursuant to Oregon Laws 2009, chapter 67, section 5 (Senate Bill 311).

G.3.4.3 "Tail" Coverage: If any of the required liability insurance is arranged on a "claims made" basis, "tail" coverage will be required at the completion of this Contract for a duration of 24 months or the maximum time period available in the marketplace if less than 24 months. Contractor will be responsible for furnishing certification of "tail" coverage as described or continuous "claims made" liability coverage for 24 months following Final Completion. Continuous "claims made" coverage will be acceptable in lieu of "tail" coverage, provided its retroactive date is on or before the effective date of this Contract. This will be a condition of the final acceptance of Work or services and related warranty (if any).

G.3.5 Additional Insured: The liability insurance coverage, except Professional Liability if included, required for performance of

this Contract shall include the State of Oregon, its departments, divisions, officers, and employees, as Additional Insureds but only with respect to the Contractor's activities to be performed under this Contract.

If Contractor cannot obtain an insurer to name the State of Oregon, its departments, divisions, officers and employees as Additional Insureds, Contractor shall obtain at Contractor's expense, and keep in effect during the term of this Contract, Owners and Contractors Protective Liability Insurance, naming the State of Oregon, its departments, divisions, officers and employees as Named Insureds with not less than a \$1,500,000.00 limit per occurrence. This policy must be kept in effect for 12 months following Final Completion. As evidence of coverage, Contractor shall furnish the actual policy to Owner prior to execution of the Contract.

- G.3.6 Notice of Cancellation or Change: There shall be no cancellation, material change, potential exhaustion of aggregate limits or intent not to renew insurance coverages without thirty (30) Days' written notice from the Contractor or its insurer(s) to the Owner. Any failure to comply with the reporting provisions of this insurance, except for the potential exhaustion of aggregate limits, shall not affect the coverages provided to the State of Oregon, its Owner and their divisions, officers, and employees.
- G.3.7 Certificate(s) of Insurance: As evidence of the insurance coverage required by this Contract, the Contractor shall furnish certificate(s) of insurance to the Owner prior to execution of the Contract. The certificate(s) will specify all of the parties who are Additional Insureds or Loss Payees. Insurance coverage required under this Contract shall be obtained from insurance companies or entities acceptable to the Owner that are allowed to provide such insurance under Oregon law. Eligible insurers include admitted insurers that have been issued a certificate of authority from the Oregon Department of Consumer and Business Services authorizing them to do an insurance business in the state of Oregon, and certain non-admitted surplus lines insurers that satisfy the requirements of applicable Oregon law and are approved by the Owner. The certificates will also specify that there shall be no cancellation, material change, potential exhaustion of aggregate limits or intent not to renew insurance coverages without thirty (30) Days' written notice from the insurer(s) to the Owner. To the extent Certificates of Insurance contain words to the effect that Contractor shall "endeavor to send notice of cancellation" or similar language, Contractor shall require its insurer to send such notice by making sure that the words "endeavor to" or similar words are removed from the Certificate. The Contractor shall be financially responsible for all deductibles, self-insured retentions and/or self-insurance included hereunder. Any deductible, self-insured retention and/or self-insurance in excess of \$50,000 shall be approved by the Owner in writing prior to execution of the Contract and is subject to Owner's approval.
- G.3.8 Retainer Contract Program: For the OUS Retainer Contract Program the term "Contract" as used in this Section G in the phrases "keep in effect during the term of this Contract" and "prior to execution of the Contract" shall mean each Retainer Contract Supplement issued under the Retainer Contract.

SECTION H **SCHEDULE OF WORK**

H.1 CONTRACT PERIOD

H.1.1 Time is of the essence on this Contract. The Contractor shall at all times carry on the Work diligently, without delay and punctually fulfill all requirements herein. Contractor shall

commence Work on the site within fifteen (15) Days of Notice to Proceed, unless directed otherwise.

H.1.2 Unless specifically extended by Change Order, all Work shall be complete by the date contained in the Contract Documents. The Owner shall have the right to accelerate the completion date of the Work, which may require the use of overtime. Such accelerated Work schedule shall be an acceleration in performance of Work under Section D.1.2 (f) and shall be subject to the Change Order process of Section D.1.

H.1.3 The Owner shall not waive any rights under the Contract by permitting the Contractor to continue or complete in whole or in part the Work after the date described in Section H.1.2 above.

H.2 SCHEDULE

H.2.1 Contractor shall provide, by or before the pre-construction conference, a detailed schedule for review and acceptance by the Owner. The submitted schedule must illustrate Work by significant project components, significant labor trades, and long lead items broken down by building and/or floor where applicable. Each schedule item shall account for no greater than 5 % of the monetary value of the project or 5 % of the available Contract Time. Schedules with activities of less than one Day or valued at less than 1% of the Contract will be considered too detailed and will not be accepted. Schedules lacking adequate detail, or unreasonably detailed, will be rejected. Included within the schedule are the following: Notice to Proceed, Substantial Completion, and Final Completion. Schedules will be updated monthly and submitted with the monthly payment application. Acceptance of the Schedule by the Owner does not constitute agreement by the Owner as to the Contractor's sequencing, means, methods, or durations. Any positive difference between the Contractor's scheduled completion and the Contract completion date is float owned by the Owner. Owner reserves the right to negotiate the float if it is deemed to be in Owner's best interest to do so. In no case shall the Contractor make a claim for delays if the Work is completed within the Contract Time but after Contractor's scheduled completion.

H.3 PARTIAL OCCUPANCY OR USE

H.3.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage, provided such occupancy or use is consented to by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have reasonably accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, insurance or self-insurance, maintenance, heat, utilities, and damage to the Work, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents with respect to such portion of the Work. Approval by the Contractor to partial occupancy or use shall not be unreasonably withheld. Immediately prior to such partial occupancy or use, the Owner and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work. Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

SECTION I **CORRECTION OF WORK**

I.1 CORRECTION OF WORK BEFORE FINAL PAYMENT

The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents,

that the Work will be free from defects, and that the Work will conform to the requirements of the Contract Documents. Work failing to conform to these requirements shall be deemed defective. Contractor shall promptly remove from the premises and replace all defective materials and equipment as determined by the Owner's Authorized Representative, whether incorporated in the Work or not. Removal and replacement shall be without loss or expense to the Owner, and Contractor shall bear the cost of repairing all Work destroyed or damaged by such removal or replacement. Contractor shall be allowed a period of no longer than thirty (30) Days after Substantial Completion for completion of defective (punch list) work. At the end of the thirty-day period, or earlier if requested by the Contractor, Owner shall arrange for inspection of the Work by the Architect/Engineer. Should the work not be complete, and all corrections made, the costs for all subsequent reinspections shall be borne by the Contractor. If Contractor fails to complete the punch list work within the thirty (30) Day period, Owner may perform such work and Contractor shall reimburse Owner all costs of the same within ten (10) Days after demand without affecting Contractor's obligations.

I.2 WARRANTY WORK

I.2.1 Neither the final certificate of payment nor any provision of the Contract Documents shall relieve the Contractor from responsibility for defective Work and, unless a longer period is specified, Contractor shall correct all defects that appear in the Work within a period of one year from the date of issuance of the written notice of Substantial Completion by the Owner except for latent defects which will be remedied by the Contractor at any time they become apparent. The Owner shall give Contractor notice of defects with reasonable promptness. Contractor shall perform such warranty work within a reasonable time after Owner's demand. If Contractor fails to complete the warranty work within such period as Owner determines reasonable, or at any time in the event of warranty work consisting of emergency repairs, Owner may perform such work and Contractor shall reimburse Owner all costs of the same within ten (10) Days after demand, without affecting Contractor's obligations. The Contractor shall perform the warranty Work by correcting defects within twenty-four (24) hours of notification by Owner, unless otherwise specified in the Contract Documents. Should the Contractor fail to respond within the specified response time, the Owner may, at its option, complete the necessary repairs using another contractor or its own forces. If Owner completes the repairs using Owner's own forces, Contractor shall pay Owner at the rate of one and one-half (1½) times the standard hourly rate of Owner's forces, plus related overhead and any direct non-salary costs. If Owner completes the repairs using another contractor, Contractor shall pay Owner the amount of Owner's direct costs billed by the other contractor for the work, plus the direct salary costs and related overhead and direct non-salary expenses of Owner's forces who are required to monitor that contractor's work. Work performed by Owner using Owner's own forces or those of another contractor shall not affect the Contractor's contractual duties under these provisions, including warranty provisions.

I.2.2 This provision does not negate guarantees or warranties for periods longer than one year including without limitation such guarantees or warranties required by other sections of the Contract Documents for specific installations, materials, processes, equipment or fixtures.

I.2.3 In addition to Contractor's warranty, manufacturer's warranties shall pass to the Owner and shall not take effect until affected Work has been accepted in writing by the Owner's Authorized Representative.

I.2.4 The one-year period for correction of Work shall be extended with respect to portions of Work performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work, and shall be extended by corrective Work performed by the Contractor

pursuant to this Section, as to the Work corrected. The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

I.2.5 Nothing contained in this Section I.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the period for correction of Work as described in this Section I.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

I.2.6 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Price will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

SECTION J

SUSPENSION AND/OR TERMINATION OF THE WORK

J.1 OWNER'S RIGHT TO SUSPEND THE WORK

J.1.1 The Owner and/or the Owner's Authorized Representative has the authority to suspend portions or all of the Work due to the following causes:

- (a) Failure of the Contractor to correct unsafe conditions;
- (b) Failure of the Contractor to carry out any provision of the Contract;
- (c) Failure of the Contractor to carry out orders;
- (d) Conditions, in the opinion of the Owner's Authorized Representative, which are unsuitable for performing the Work;
- (e) Time required to investigate differing site conditions;
- (f) Any reason considered to be in the public interest.

J.1.2 The Owner shall notify Contractor and the Contractor's Surety in writing of the effective date and time of the suspension, and Owner shall notify Contractor and Contractor's surety in writing to resume Work.

J.2 CONTRACTOR'S RESPONSIBILITIES

J.2.1 During the period of the suspension, Contractor is responsible to continue maintenance at the project just as if the Work were in progress. This includes, but is not limited to, protection of completed Work, maintenance of access, protection of stored materials, temporary facilities, and clean-up.

J.2.2 When the Work is recommenced after the suspension, the Contractor shall replace or renew any Work damaged during the suspension, remove any materials or facilities used as part of temporary maintenance, and complete the project in every respect as though its prosecution had been continuous and without suspension.

J.3 COMPENSATION FOR SUSPENSION

J.3.1 Depending on the reason for suspension of the Work, the Contractor or the Owner may be due compensation by the other party. If the suspension was required due to acts or omissions of Contractor, the Owner may assess the Contractor actual costs of the suspension in terms of administration, remedial work by the Owner's forces or another contractor to correct the problem associated with the suspension, rent of temporary facilities, and other actual costs related to the suspension. If the suspension was caused by acts or omissions of the Owner, the Contractor shall be due compensation which shall be defined using Section D, Changes in Work. If the suspension was required through no fault of the Contractor or the Owner, neither party owes the other for the impact.

J.4 OWNER'S RIGHT TO TERMINATE CONTRACT

J.4.1 The Owner may, without prejudice to any other right or remedy, and after giving Contractor seven (7) Days' written notice and an opportunity to cure, terminate the Contract in whole or in part under the following conditions:

- (a) If Contractor should voluntarily or involuntarily, seek protection under the United States Bankruptcy Code and Contractor as debtor-in-possession or the Trustee for the estate fails to assume the Contract within a reasonable time;
- (b) If Contractor should make a general assignment for the benefit of Contractor's creditors;
- (c) If a receiver should be appointed on account of Contractor's insolvency;
- (d) If Contractor should repeatedly refuse or fail to supply an adequate number of skilled workers or proper materials to carry on the Work as required by the Contract Documents, or otherwise fail to perform the Work in a timely manner;
- (e) If Contractor should repeatedly fail to make prompt payment to Subcontractors or for material or labor, or should disregard laws, ordinances or the instructions of the Owner or its Authorized Representative; or
- (f) If Contractor is otherwise in material breach of any part of the Contract.

J.4.2 At any time that any of the above occurs, Owner may exercise all rights and remedies available to Owner at law or in equity, and, in addition, Owner may take possession of the premises and of all materials and appliances and finish the Work by whatever method it may deem expedient. In such case, the Contractor shall not be entitled to receive further payment until the Work is completed. If the Owner's cost of finishing the Work exceeds the unpaid balance of the Contract Price, Contractor shall pay the difference to the Owner.

J.5 TERMINATION FOR CONVENIENCE

- J.5.1 Owner may terminate the Contract in whole or in part whenever Owner determines that termination of the Contract is in the best interest of the public.
- J.5.2 The Owner will provide the Contractor with seven (7) Days prior written notice of a termination for public convenience. After such notice, the Contractor shall provide the Owner with immediate and peaceful possession of the premises and materials located on and off the premises for which the Contractor received progress payment under Section E. Compensation for Work terminated by the Owner under this provision will be according to Section E. In no circumstance shall Contractor be entitled to lost profits for Work not performed due to termination.

J.6 ACTION UPON TERMINATION

- J.6.1 Upon receiving a notice of termination, and except as directed otherwise by the Owner, Contractor shall immediately cease placing further subcontracts or orders for materials, services, or facilities. In addition, Contractor shall terminate all subcontracts or orders to the extent they relate to the Work terminated and, with the prior written approval of the Owner, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts and orders.
- J.6.2 As directed by the Owner, Contractor shall, upon termination, transfer title and deliver to the Owner all Record Documents, information, and other property that, if the Contract had been completed, would have been required to be furnished to the Owner.

SECTION K CONTRACT CLOSE OUT

K.1 RECORD DOCUMENTS

As a condition of final payment (refer also to section E.6), Contractor shall comply with the following: Contractor shall provide Record Documents for the entire project to Owner's Authorized Representative. Record Documents shall depict the project as constructed and shall reflect each and every change, modification, and deletion made during the construction. Record Documents are part of the Work and shall be provided prior to the Owner's issuance of final payment. Record Documents include all modifications to the Contract Documents unless otherwise directed, and accurate MWESB Reports.

K.2 OPERATION AND MAINTENANCE MANUALS

As part of the Work, Contractor shall submit two completed operation and maintenance manuals ("O & M Manuals") for review by the Owner's Authorized Representative prior to submission of any pay request for more than 75% of the Work. No payments beyond 75% will be made by the Owner until the O & M Manuals have been received. The O & M Manuals shall contain a complete set of all submittals, all product data as required by the specifications, training information, phone list of consultants, manufacturers, installer and suppliers, manufacturer's printed data, record and shop drawings, schematic diagrams of systems, appropriate equipment indices, warranties and bonds. The Owner's Authorized Representative shall review and return one O & M Manual for any modifications or additions required. Prior to submission of its final pay request, Contractor shall deliver three (3) complete and approved sets of O & M Manuals to the Owner's Authorized Representative.

K.3 AFFIDAVIT/RELEASE OF LIENS AND CLAIMS

As a condition of final payment, the Contractor shall submit to the Owner's Authorized Representative a notarized affidavit/release of liens and claims form in a form satisfactory to Owner, which states that all Subcontractors and suppliers have been paid in full, all disputes with property owners have been resolved, all obligations on the project have been satisfied, all monetary claims and indebtedness have been paid, and that, to the best of the Contractor's knowledge, there are no claims of any kind outstanding against the project. The Contractor shall indemnify, defend (with counsel of Owner's choice) and hold harmless the Owner from all claims for labor and materials finished under this Contract. The Contractor shall furnish complete and valid releases or waivers, satisfactory to the Owner, of all liens arising out of or filed in connection with the Work.

K.4 COMPLETION NOTICES

- K.4.1 Contractor shall provide Owner notice of both Substantial and Final Completion. The certificate of Substantial Completion shall state the date of Substantial Completion, the responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance,

and the time within which the Contractor shall finish all items on the punchlist accompanying the Certificate. Both completion notices must be signed by the Contractor and the Owner to be valid. The Owner shall provide the final signature on the notices. The notices shall take effect on the date they are signed by the Owner.

All warranty and indemnification provisions of this Contract, and all of Contractor's other obligations under this Contract that are not fully performed by the time of Final Completion or termination, shall survive Final Completion or any termination of the Contract.

K.4.2 Substantial Completion of a facility with operating systems (e.g., mechanical, electrical, HVAC) shall be that degree of completion that has provided a minimum of thirty (30) continuous Days of successful, trouble-free operation, which period shall begin after all performance and acceptance testing has been successfully demonstrated to the Owner's Authorized Representative. All equipment contained in the Work, plus all other components necessary to enable the Owner to operate the facility in the manner that was intended, shall be complete on the Substantial Completion date. The Contractor may request that a punch list be prepared by the Owner's Authorized Representative with submission of the request for the Substantial Completion notice.

K.5 TRAINING

As part of the Work, and prior to submission of the request for final payment, the Contractor shall schedule with the Owner's Authorized Representative training sessions for all equipment and systems as required in the individual specifications sections. Contractor shall schedule training sessions at least two weeks in advance of the date of training to allow Owner personnel adequate notice. The O & M Manual shall be used as a basis for training. Training shall be a formal session held after the equipment and/or system is completely installed and operational in its normal operating environment.

K.6 EXTRA MATERIALS

As part of the Work, Contractor shall provide spare parts, extra maintenance materials, and other materials or products in the quantities specified in the specifications prior to final payment. Delivery point for extra materials shall be designated by the Owner's Authorized Representative.

K.7 ENVIRONMENTAL CLEAN-UP

As part of the Final Completion notice, or as a separate written notice submitted with or before the notice of Final Completion, the Contractor shall notify the Owner that all environmental pollution clean-up performed as a part of this Contract has been disposed of in accordance with all applicable rules, regulations, laws, and statutes of all agencies having jurisdiction over such environmental pollution. The notice shall reaffirm the indemnification given under Section F.5.1 above.

K.8 CERTIFICATE OF OCCUPANCY

The Contractor shall not be granted Final Completion or receive final payment if the Owner has not received an unconditioned certificate of occupancy from the appropriate state and/or local building officials, unless failure to obtain an unconditional certificate of occupancy is due to the fault or neglect of Owner.

K.9 OTHER CONTRACTOR RESPONSIBILITIES

The Contractor shall be responsible for returning to the Owner all items issued during construction such as keys, security passes, site admittance badges, and all other pertinent items. The Contractor shall be responsible for notifying the appropriate utility companies to transfer utility charges from the Contractor to the Owner. The utility transfer date shall not be before Substantial Completion and may not be until Final Completion, if the Owner does not take beneficial use of the facility and the Contractor's forces continue with the Work.

K.10 SURVIVAL

OREGON UNIVERSITY SYSTEM
STANDARD PUBLIC IMPROVEMENT CONTRACT
BID FORM

OUS CAMPUS: OREGON INSTITUTE OF TECHNOLOGY
PROJECT: BID #2012 – GEOTHERMAL EFFLUENT PIPELINE
BID CLOSING: JUNE 28, 2012, 1:00 PM, PACIFIC TIME
BID OPENING: JUNE 28, 2012, 2:00 PM, PACIFIC TIME

FROM: _____
Name of Contractor

TO: Oregon State Board of Higher Education
Oregon Institute of Technology
3201 Campus Drive
Klamath Falls, OR 97601

1. The Undersigned (*check one of the following and insert information requested*):

- ___ a. An individual doing business under an assumed name registered under the laws of the State of _____; or
- ___ b. A partnership registered under the laws of the State of _____; or
- ___ c. A corporation organized under the laws of the State of _____; or
- ___ d. A limited liability corporation organized under the laws of the State of _____;

hereby proposes to furnish all material and labor and perform all work hereinafter indicated for the above project in strict accordance with the Contract Documents for the Basic Bid as follows:

_____ Dollars (\$_____)

Complete and attach the Base Bid Schedule for unit pricing.

and the Undersigned agrees to be bound by the following documents:

- Advertisement for Bids
- Supplemental Instructions to Bidders
- Performance Bond and Payment Bond
- Instructions to Bidders
- Public Improvement Agreement Form
- OUS General Conditions

number. Failure to register and disclose the number will make the bid unresponsive and it will be rejected, unless contrary to federal law.

9. The successful Bidder hereby certifies that all subcontractors who will perform construction work as described in ORS 701.005(2) were registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 at the time the subcontractor(s) made a bid to work under the contract.

10. The successful Bidder hereby certifies that, in compliance with the Worker's Compensation Law of the State of Oregon, its Worker's Compensation Insurance provider is _____, Policy No. _____, and that Contractor shall submit Certificates of Insurance as required.

11. Contractor's Project Manager for this project is: _____,
Office Phone: _____ Cell Phone: _____.

12. The Undersigned certifies that it has not discriminated against minority, women, or emerging small businesses in obtaining any subcontracts for this project.

13. The Undersigned certifies that it has performed Good Faith Efforts as required in the Bid and has attached Forms 1 and 2 to this Bid Form.

By signature below, Contractor agrees to be bound by this Bid.

NAME OF FIRM _____

ADDRESS _____

TELEPHONE NO _____

FAX NO _____

SIGNATURE 1) _____

Sole Individual

or 2) _____

Partner

or 3) _____

Authorized Officer of Corporation

***** **END OF BID** *****

**OIT 2011 GEOTHERMAL UTILITY CORRIDOR
BASE BID SCHEDULE**

BID ITEM NO.	APPROX. QTY.	ITEM (WITH UNIT PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES	EXTENDED TOTAL AMOUNT
1	<u>1</u>	LS MOBILIZATION _____ _____	\$ _____	L.S. \$ _____
2	<u>1</u>	LS EROSION CONTROL _____ _____	\$ _____	L.S. \$ _____
3	<u>1</u>	LS TRAFFIC CONTROL _____ _____	\$ _____	L.S. \$ _____
4	<u>30</u>	CY TRENCH FOUNDATION _____ _____	\$ _____	CY \$ _____
5	<u>554</u>	SY COLD PLANE PAVEMENT REMOVAL (4" THICK) _____ _____	\$ _____	SY \$ _____
6	<u>78</u>	TON ASPHALT INLAY - 4" _____ _____	\$ _____	TON \$ _____
7	<u>3111</u>	LF INSTALL 12" NON-INSULATED DUCTILE IRON PRIMARY RETURN PIPE W/CLASS "A" BACKFILL, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____
8	<u>501</u>	LF INSTALL 12" NON-INSULATED DUCTILE IRON PRIMARY RETURN PIPE W/CLASS "B" BACKFILL, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____

BID ITEM NO.	APPROX. QTY.	ITEM (WITH UNIT PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES	EXTENDED TOTAL AMOUNT
9	<u>118</u>	LF INSTALL 12" NON-INSULATED DUCTILE IRON PRIMARY RETURN PIPE W/CLASS "E" BACKFILL & A/C "T" PATCH, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____
10	<u>397</u>	LF INSTALL 6" NON-INSULATED DUCTILE IRON PRIMARY RETURN PIPE W/CLASS "A" BACKFILL, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____
11	<u>18</u>	LF INSTALL 6" NON-INSULATED DUCTILE IRON PRIMARY RETURN PIPE W/CLASS "B" BACKFILL, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____
12	<u>265</u>	LF INSTALL 6" NON-INSULATED DUCTILE IRON PRIMARY RETURN PIPE W/CLASS "E" BACKFILL & A/C "T" PATCH, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____
13	<u>1</u>	EA INSTALL 12" 45° & 22.5° HORIZONTAL BENDS (MJ) WITH MJ ADAPTOR AND THRUST BLOCK _____ _____	\$ _____	EA \$ _____
14	<u>3</u>	EA INSTALL 12" 45° HORIZONTAL BEND (MJ) W/THRUST BLOCK _____ _____	\$ _____	EA \$ _____
15	<u>2</u>	EA INSTALL 12" 11.25° VERTICAL BEND (MJ) W/THRUST BLOCK _____ _____	\$ _____	EA \$ _____
16	<u>1</u>	EA INSTALL 6" 90° HORIZONTAL BEND (MJ) W/THRUST BLOCK _____ _____	\$ _____	EA \$ _____

BID ITEM NO.	APPROX. QTY.	EA	ITEM (WITH UNIT PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES		EXTENDED TOTAL AMOUNT
17	<u>1</u>	EA	INSTALL 6" 45° VERTICAL BEND (MJ), 6" 22.5° HORIZONTAL BEND (MJ), & MJ ADAPTOR W/RESTRAINTS _____ _____ _____	\$ _____	EA	\$ _____
18	<u>2</u>	EA	INSTALL 6" 22.5° HORIZONTAL BEND (MJ) W/THRUST BLOCK _____ _____ _____	\$ _____	EA	\$ _____
19	<u>1</u>	EA	INSTALL 6" 11.25° VERTICAL BEND (MJ) W/RESTRAINTS _____ _____ _____	\$ _____	EA	\$ _____
20	<u>1</u>	EA	INSTALL 6" 11.25° VERTICAL BEND (MJ) W/THRUST BLOCK _____ _____ _____	\$ _____	EA	\$ _____
21	<u>1</u>	EA	INSTALL CONNECTION DETAIL 4, SHEET C11 _____ _____ _____	\$ _____	EA	\$ _____
22	<u>1</u>	EA	INSTALL CONNECTION DETAIL 5, SHEET C11 _____ _____ _____	\$ _____	EA	\$ _____
23	<u>1</u>	EA	INSTALL CONNECTION DETAIL 6, SHEET C11 _____ _____ _____	\$ _____	EA	\$ _____
24	<u>2</u>	EA	INSTALL CONCRETE WATER DAM W/4" SCHEDULE 40 PVC TO DAYLIGHT _____ _____ _____	\$ _____	EA	\$ _____
25	<u>2</u>	AC	LANDSCAPING - HYDROSEEDING _____ _____ _____	\$ _____	AC	\$ _____

BID ITEM NO.	APPROX. QTY.	ITEM (WITH UNIT PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES	EXTENDED TOTAL AMOUNT
26	<u>178</u>	LF PAVEMENT STRIPING - CENTER LINE _____ _____ _____	\$ _____	LF \$ _____
27	<u>500</u>	CY ROCK EXCAVATION _____ _____ _____	\$ _____	CY \$ _____
28	<u>500</u>	CY BOULDER EXCAVATION _____ _____ _____	\$ _____	CY \$ _____

BASE BID SCHEDULE TOTAL: _____

**OIT 2011 GEOTHERMAL UTILITY CORRIDOR
ADDITIVE BID SCHEDULE NO. 1 – ELECTRICAL**

BID ITEM NO.	APPROX. QTY.	ITEM (WITH UNIT PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES	EXTENDED TOTAL AMOUNT
1	<u>3588</u>	LF INSTALL TWO (2) - 5" SCH 40 PVC ELECTRICAL CONDUITS & TWO (2) - 2" SCH 40 PVC DATA CONDUITS W/CLASS "A" BACKFILL, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____
2	<u>24</u>	LF INSTALL TWO (2) - 5" SCH 40 PVC ELECTRICAL CONDUITS & TWO (2) - 2" SCH 40 PVC DATA CONDUITS W/CLASS "B" BACKFILL, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____
3	<u>118</u>	LF INSTALL TWO (2) - 5" SCH 40 PVC ELECTRICAL CONDUITS & TWO (2) - 2" SCH 40 PVC DATA CONDUITS W/CLASS "E" BACKFILL & A/C "T" PATCH, COMPLETE IN PLACE _____ _____	\$ _____	LF \$ _____
4	<u>13</u>	EA INSTALL ELECTRICAL VAULT _____ _____	\$ _____	EA \$ _____
5	<u>13</u>	EA INSTALL COMMUNICATION VAULT _____ _____	\$ _____	EA \$ _____

ADDITIVE BID SCHEDULE NO. 1 TOTAL: _____

**OIT 2011 GEOTHERMAL UTILITY CORRIDOR
ADDITIVE BID SCHEDULE NO. 2 – SANITARY SEWER LINE**

BID ITEM NO.	APPROX. QTY.	ITEM (WITH UNIT PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES	EXTENDED TOTAL AMOUNT
1	<u>563</u>	LF INSTALL 6" PVC SANITARY SEWER W/CLASS "A" BACKFILL, COMPLETE IN PLACE _____ _____ _____	\$ _____	LF \$ _____
2	<u>12</u>	LF INSTALL 6" PVC SANITARY SEWER W/CLASS "B" BACKFILL, COMPLETE IN PLACE _____ _____ _____	\$ _____	LF \$ _____
3	<u>125</u>	LF INSTALL 6" PVC SANITARY SEWER W/CLASS "E" BACKFILL & A/C/ "T" PATCH, COMPLETE IN PLACE _____ _____ _____	\$ _____	LF \$ _____
4	<u>2</u>	EA INSTALL SSMH _____ _____ _____	\$ _____	EA \$ _____
5	<u>1</u>	LS CONNECT TO EXISTING SSMH _____ _____ _____	\$ _____	LS \$ _____

ADDITIVE BID SCHEDULE NO. 2 TOTAL: _____

**OREGON UNIVERSITY SYSTEM
PUBLIC IMPROVEMENT AGREEMENT FORM**

This Agreement for the Geothermal Effluent Pipeline (the "Contract"), made by and between the State of Oregon, acting by and through the Oregon State Board of Higher Education on behalf of the Oregon Institute of Technology, hereinafter called OWNER, and **(Insert Contractor's Name)** hereinafter called the CONTRACTOR (collectively the "Parties"), shall become effective on **(Insert contract award date)**, or the date this Contract has been signed by all the Parties and all required State of Oregon governmental approvals have been obtained, whichever is later.

WITNESSETH:

1. Contract Price, Contract Documents and Work.

The CONTRACTOR, in consideration of the sum of _____(the "Contract Price"), to be paid to the CONTRACTOR by OWNER in the manner and at the time hereinafter provided, and subject to the terms and conditions provided for in the Instructions to Bidders and other Contract Documents (as defined in the OUS General Conditions referenced within the Instructions to Bidders), all of which are incorporated herein by reference, hereby agrees to perform all Work described and reasonably inferred from the Contract Documents. The Contract Price is the amount contemplated by the Base Bid adjusted for Alternates **[Identify accepted Alternates]**, as indicated in the accepted Bid.

Also, the following documents are incorporated by reference in this Contract and made a part hereof if checked for inclusion [X]:

[] (RESERVED)

2. Representatives.

CONTRACTOR has named **(Insert Name)** its' Authorized Representative to act on its behalf. OWNER designates, or shall designate, its Authorized Representative as indicted below (check one):

[] Unless otherwise specified in the Contract Documents, the OWNER designates David Ebsen as its Authorized Representative for project management with responsibility for performance, payment, authorizations. The OWNER designates George Marlton as the Contract Representative for matters related to Contract compliance and modification.

[] Name of OWNER'S Authorized Representative shall be submitted by OWNER in a separate writing.

3. Key Persons.

The CONTRACTOR'S personnel identified below shall be considered Key Persons and shall not be replaced during the project without the written permission of Owner, which shall not be unreasonably withheld. If the CONTRACTOR intends to substitute personnel, a request must be

given to Owner at least 30 days prior to the intended time of substitution. When replacements have been approved by Owner, the CONTRACTOR shall provide a transition period of at least 10 working days during which the original and replacement personnel shall be working on the project concurrently. Once a replacement for any of these staff members is authorized, further replacement shall not occur without the written permission of Owner. The CONTRACTOR'S project staff shall consist of the following personnel:

Project Executive: _____ shall be the CONTRACTOR'S project executive, and will provide oversight and guidance throughout the project term.

Project Manager: _____ shall be the CONTRACTOR'S project manager and will participate in all meetings throughout the project term.

Job Superintendent: _____ shall be the CONTRACTOR'S on-site job superintendent throughout the project term.

Project Engineer: _____ shall be the CONTRACTOR'S project engineer, providing assistance to the project manager, and subcontractor and supplier coordination throughout the project term.

4. Contract Dates.

COMMENCEMENT DATE: Within (Insert # of Days) Days of the Notice to Proceed.

SUBSTANTIAL COMPLETION DATE: (Insert # of Days) from "Notice to Proceed" (or a date certain).

FINAL COMPLETION DATE: (Insert # of Days) from "Notice to Proceed" (or a date certain).

5. Tax Compliance.

The individual signing on behalf of CONTRACTOR hereby certifies and swears under penalty of perjury that s/he is authorized to act on behalf of CONTRACTOR s/he has authority and knowledge regarding CONTRACTOR'S payment of taxes, and to the best of her/his knowledge, CONTRACTOR is not in violation of any Oregon tax laws. For purposes of this certification, "tax" means those programs listed in ORS 305.380(4). For purposes of this certification, "tax laws" means a state tax imposed by ORS 401.792 to 401.816 and ORS chapters 118, 314, 316, 317, 318, 320, 321 and 323; the elderly rental assistance program under ORS 310.630 to 310.706; and local taxes administered by the Department of Revenue under ORS 305.620.

6. Integration

The Contract documents constitute the entire agreement between the parties. There are no other understandings, agreements or representations, oral or written, not specified herein regarding this Contract. CONTRACTOR, by the signature below of its authorized representative, hereby acknowledges that it has read this Contract, understands it, and agrees to be bound by its terms and conditions.

In witness whereof, the STATE OF OREGON, acting by and through the Oregon State Board of Higher Education on behalf of the Oregon Institute of Technology executes this Contract and the CONTRACTOR does execute the same as of the day and year first above written.

CONTRACTOR DATA:

(Insert Contractor Name & Address)

CONTRACTOR NAME _____

CONTRACTOR CCB # _____ Expiration Date: _____

[Payment information will be reported to the IRS under the name and taxpayer ID # provided above. Information must be provided prior to contract approval. Information not matching IRS records could subject Contractor to 31 percent backup withholding.]

CONTRACTOR SIGNATURE

By _____

Signature

Date

Print Name

Title

STATE OF OREGON acting by and through the
OREGON STATE BOARD OF HIGHER EDUCATION
on behalf of the Oregon Institute of Technology

By _____

Name/Title

Date

By _____

Name/Title

Date

OREGON UNIVERSITY SYSTEM

STANDARD PUBLIC IMPROVEMENT CONTRACT

PERFORMANCE BOND

Bond No. _____

Solicitation: Bid #2012-01

Project Name: Geothermal Effluent Pipeline

_____ (Surety #1)	Bond Amount No. 1:	\$ _____
_____ (Surety #2)*	Bond Amount No. 2:*	\$ _____
<i>* If using multiple sureties</i>	Total Penal Sum of Bond:	\$ _____

We, _____ as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the State of Oregon, Oregon State Board of Higher Education (OSBHE), the sum of (Total Penal Sum of Bond) _____ (Provided, that we the Sureties bind ourselves in such sum “jointly and severally” as well as “severally” only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety), and

WHEREAS, the Principal has entered into a contract with the State of Oregon, the plans, specifications, terms and conditions of which are contained in the above-referenced Solicitation;

WHEREAS, the terms and conditions of the contract, together with applicable plans, standard specifications, special provisions, schedule of performance, and schedule of contract prices, are made a part of this Performance Bond by reference, whether or not attached to the contract (all hereafter called “Contract”); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans and specifications, and all authorized modifications of the Contract which increase the amount of the work, the amount of the Contract, or constitute an authorized extension of the time for performance, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal herein shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things undertaken by Contractor to be performed under the Contract, upon the terms set forth therein, and within the time prescribed therein, or as extended as provided in the Contract, with or without notice to the Sureties, and shall indemnify and save harmless the State of Oregon,

OSBHE, and the Oregon Institute of Technology, and members thereof, its officers, employees and agents, against any direct or indirect damages or claim of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Principal or its subcontractors, and shall in all respects perform said contract according to law, then this obligation is to be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the State of Oregon, or the above-referenced agency(ies), be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapters 279C and 351, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES.

Dated this _____ day of _____, 20__.

PRINCIPAL: _____

By _____

Signature

Official Capacity

Attest: _____

Corporation Secretary

SURETY: _____

[Add signatures for each surety if using multiple bonds]

BY ATTORNEY-IN-FACT:

[Power-of-Attorney must accompany each surety bond]

Name

Signature

Address

City State Zip

Phone Fax

OREGON UNIVERSITY SYSTEM

STANDARD PUBLIC IMPROVEMENT CONTRACT

PAYMENT BOND

Bond No. _____

Solicitation: Bid #2012-01

Project Name: Geothermal Effluent Pipeline

_____ (Surety #1)	Bond Amount No. 1:	\$ _____
_____ (Surety #2)*	Bond Amount No. 2:*	\$ _____
<i>* If using multiple sureties</i>	Total Penal Sum of Bond:	\$ _____

We, _____, as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the State of Oregon, Oregon State Board of Higher Education (OSBHE), the sum of (Total Penal Sum of Bond) _____

_____ (Provided, that we the Sureties bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety), and

WHEREAS, the Principal has entered into a contract with the State of Oregon, the plans, specifications, terms and conditions of which are contained in above-referenced Solicitation;

WHEREAS, the terms and conditions of the contract, together with applicable plans, standard specifications, special provisions, schedule of performance, and schedule of contract prices, are made a part of this Payment Bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans and specifications, and schedule of contract prices which are set forth in the Contract and any attachments, and all authorized modifications of the Contract which increase the amount of the work, or the cost of the Contract, or constitute authorized extensions of time for performance of the Contract, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things by it undertaken to be performed under said Contract and any duly authorized modifications that are made, upon the terms set forth therein, and within the time prescribed therein, or as extended therein as provided in the Contract, with or without notice to the Sureties, and shall indemnify and save harmless the State of Oregon, OSBHE and the Oregon Institute of Technology, and members thereof, its officers, employees and agents, against any claim for direct or indirect

damages of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Contractor or its subcontractors, and shall promptly pay all persons supplying labor, materials or both to the Principal or its subcontractors for prosecution of the work provided in the Contract; and shall promptly pay all contributions due the State Industrial Accident Fund and the State Unemployment Compensation Fund from the Principal or its subcontractors in connection with the performance of the Contract; and shall pay over to the Oregon Department of Revenue all sums required to be deducted and retained from the wages of employees of the Principal and its subcontractors pursuant to ORS 316.167, and shall permit no lien nor claim to be filed or prosecuted against the State on account of any labor or materials furnished; and shall do all things required of the Principal by the laws of this State, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the State of Oregon, or the above-referenced agency(ies), be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapters 279C and 351, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dated this _____ day of _____, 20__.

PRINCIPAL: _____

By _____

Signature

Official Capacity

Attest: _____

Corporation Secretary

SURETY: _____

[Add signatures for each surety if using multiple bonds]

BY ATTORNEY-IN-FACT:

[Power-of-Attorney must accompany each surety bond]

Name

Signature

Address

City State Zip

Phone

Fax