PART III

City of Bend Special Provisions to the Oregon Standard Specifications

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to
the Oregon Standard Specifications

Table of Contents

City of Bend Special Provisions to the
Oregon Standard Specifications for Construction

TABLE OF CONTENTS

PART 00200 – TEMPORARY FEATURES AND APPURTENANCES

PART 00200 – TEMPORARY FEATURES AND APPURTENANCES

Section 00220 – Accommodations for Public Traffic

Comply with Section 00220, Accommodations for Public Traffic, of the Standard Specifications modified as follows:

00220.02 Public Safety and Mobility – ADD at end of bullet list:

- When performing trench excavation or other excavation across or adjacent to a travel lane on a roadway having a pre-construction posted speed greater than 35 mph, backfill the excavation, install surfacing, and open the roadway to traffic by the end of each work shift. Prior to opening the roadway to traffic install a "BUMP" (W8-1-48) sign approximately 100 feet before the backfilled area and a "ROUGH ROAD" (W8-8-48) sign approximately 500 feet ahead of the "BUMP" sign. If this requirement is not met, maintain all necessary lane or shoulder closures and provide additional TCM, including flagging, at no additional cost to the Agency. Do not use temporary steel plating to reopen the roadway.

- Unless the routes are closed and alternate routes have been designated in the TCP, do not place work zone signs or supports that will block existing walkways or existing bikeways.

- Notify the Engineer, in writing, at least 14 calendar days in advance of using an automated flagger assistance device (AFAD). Include in the notification the following information:

    - The AFAD specifications from the manufacturer.

    - The TCP for the work zone incorporating the AFAD with times, dates, location, and duration of operation.

00220.03,(b) Work Zone Notifications

(b) Closures

DELETE and REPLACE with the following:

- **Lanes** – A minimum of 72 hours before a lane closure begins.

- **Roads** – A minimum of 72 hours before closure. Also, notify in writing, all affected emergency services, school districts, and US Postal Service a minimum of 72 hours before any closure.

- **Bicycle and Pedestrian Facilities** – A minimum of 72 hours before a bike lane, sidewalk, and/or multi-use path closure. After receiving written approval, provide 48 hour public notification before the closure.

ADD the following paragraph at the end of bullets:

The Contractor shall give occupants of property fronting a street at least 48 hours notice before more than half the street is closed to vehicular traffic due to hi/her operations. The Contractor shall not close a street without prior knowledge of the Engineer and permission of the City of Bend. The Contractor is responsible for coordinating the closing of a street with all concerned and affected individuals and public agencies.

00220.40,(e) General Requirements

(e) Lane Restrictions –REPLACE with the following:

Do not close any traffic lanes and remove all barricades and objects from the roadway during the following periods:

(4) Special Events – ADD the following to the end of the sentence that starts and ends with, “Between noon on . . . final day of the special event”

The following special events will occur during this Project:

- _____

Section 00225 – Work Zone Traffic Control

Comply with Section 00225, Work Zone Traffic Control, of the Standard Specifications modified as follows:

00225.02 General Requirements - ADD the following after the last paragraph of this subsection:

(Fill in the blanks with the appropriate information.)

Install a "ROAD WORK AHEAD" (W20-1-48) sign with "FINES DOUBLE" (R2-6-36) rider on the _____ Highway, according to sign spacing "A" from the "TCD Spacing Table" shown on the standard drawings. Also, install an "END ROAD WORK" (CG20-2A-24) sign approximately 500 feet beyond each end of the Project, facing outgoing traffic. When mounting signs on concrete barrier in median areas, do not install the sign flag boards on the "FINES DOUBLE" rider or on the "ROAD WORK AHEAD" signs.

(Use the following paragraph when it is necessary to reduce the overall roadway width between positive barriers [for example: concrete barrier, guardrail, and falsework] to less than 19 feet.)

When the horizontal clearance for the roadway is less than 19 feet, install horizontal clearance (CW21-12-48) signs, identifying the narrowest width of the roadway. Locate these horizontal clearance signs as shown or as directed.

(Use the following paragraph when it is necessary to reduce the overall vertical clearance to less than 15 feet 3 inches.)

When the vertical clearance is less than 15 feet 3 inches, install low clearance (W12-2-48) and (OW12-2-36) signs. The clearance shown on the signs shall be 4 inches less than the shortest height of the opening. Locate these low clearance signs as shown or as directed.

00225.05 Contractor Traffic Control Plan – DELETE section and REPLACE with the following:

The Contractor will be allowed to use the Agency's TCP, modify the Agency's TCP, or use a different TCP. Submit the following, for approval, five calendar days before the preconstruction conference:

(a) Agency or Contractor TCP - If the Agency's TCP is used without modification, a written notification indicating that the Agency's TCP will be used without modification.

- **Bicycle and Pedestrian Facilities** – A minimum of 72 hours before a bike lane, sidewalk, and/or multi-use path closure. After receiving written approval, provide 48 hour public notification before the closure.

ADD the following paragraph at the end of bullets:

The Contractor shall give occupants of property fronting a street at least 48 hours notice before more than half the street is closed to vehicular traffic due to hi/her operations. The Contractor shall not close a street without prior knowledge of the Engineer and permission of the City of Bend. The Contractor is responsible for coordinating the closing of a street with all concerned and affected individuals and public agencies.

00220.40,(e) General Requirements

(e) Lane Restrictions –REPLACE with the following:

Do not close any traffic lanes and remove all barricades and objects from the roadway during the following periods:

(4) Special Events – ADD the following to the end of the sentence that starts and ends with, “Between noon on . . . final day of the special event”

The following special events will occur during this Project:

- _____

Section 00225 – Work Zone Traffic Control

Comply with Section 00225, Work Zone Traffic Control, of the Standard Specifications modified as follows:

00225.02 General Requirements - ADD the following after the last paragraph of this subsection:

(Fill in the blanks with the appropriate information.)

Install a "ROAD WORK AHEAD" (W20-1-48) sign with "FINES DOUBLE" (R2-6-36) rider on the _____ Highway, according to sign spacing "A" from the "TCD Spacing Table" shown on the standard drawings. Also, install an "END ROAD WORK" (CG20-2A-24) sign approximately 500 feet beyond each end of the Project, facing outgoing traffic. When mounting signs on concrete barrier in median areas, do not install the sign flag boards on the "FINES DOUBLE" rider or on the "ROAD WORK AHEAD" signs.

(Use the following paragraph when it is necessary to reduce the overall roadway width between positive barriers [for example: concrete barrier, guardrail, and falsework] to less than 19 feet.)

When the horizontal clearance for the roadway is less than 19 feet, install horizontal clearance (CW21-12-48) signs, identifying the narrowest width of the roadway. Locate these horizontal clearance signs as shown or as directed.

(Use the following paragraph when it is necessary to reduce the overall vertical clearance to less than 15 feet 3 inches.)

When the vertical clearance is less than 15 feet 3 inches, install low clearance (W12-2-48) and (OW12-2-36) signs. The clearance shown on the signs shall be 4 inches less than the shortest height of the opening. Locate these low clearance signs as shown or as directed.

00225.05 Contractor Traffic Control Plan – DELETE section and REPLACE with the following:

The Contractor will be allowed to use the Agency's TCP, modify the Agency's TCP, or use a different TCP. Submit the following, for approval, five calendar days before the preconstruction conference:

(a) Agency or Contractor TCP - If the Agency's TCP is used without modification, a written notification indicating that the Agency's TCP will be used without modification.

If the Contractor will be using a modified Agency TCP, if no Agency TCP exists, or if the Contractor will not be using the Agency TCP, include the following:

- Proposed TCP showing all TCM and quantities of all TCD
- Proposed order and duration of the TCM
- A detailed temporary striping plan

(b) Tourist-Oriented Directional (TOD) and Business Logo Signs - 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.

- If there are no TOD signs on the project, a written notification that no TOD signs exist within the project limits.

ADD at end of section:

Failure to maintain traffic control devices in accordance with the plans and specifications shall result in the immediate suspension of work. During suspension of the work for failure to maintain traffic control devices, workdays will continue to be charged to the contract. The following representatives of the City of Bend shall have the authority to suspend work for failure to maintain traffic control devices:

- City Engineer or his/her representatives
- Street Maintenance Supervisor
- Uniformed Officers of the Bend City Police Department

During suspension of work, for any reason, the Contractor shall continue to be responsible for and shall maintain temporary traffic control.

00225.11 Temporary Signing – DELETE text (“Furnish new or acceptable temporary signs….”) and REPLACE with:

Furnish temporary signs meeting the requirements of the "Acceptable" category shown in the American Traffic Safety Services Association (ATSSA) "Quality Standards for Work Zone Traffic Control Devices" handbook and the following:

00225.11,(a) Sign Supports – ADD the following subsection:

(5) Lightweight Sign Substrate – Use lightweight sign substrates from the QPL.

00225.11,(b)(5) Square Tube Sign Supports – DELETE and REPLACE with the following:

(5) Perforated Steel Square Tube Sign Supports – Use perforated steel square tube sign supports from the QPL and as shown on the standard drawings.

00225.13,(d) Plastic Drums – DELETE sentence that begins ("Provide drums with…") and REPLACE with the following:

Use retroreflective drum sheeting meeting the requirements of ASTM D 4956 Type III or Type IV.

00225.41(b),(5) Square Tube Sign Supports – DELETE and REPLACE with the following:

(5) Perforated Steel Square Tube Sign Supports – Perforated steel square tube sign supports may be used as a substitute for wood sign posts. Install perforated steel square tube sign supports as shown on the standard drawings.

00225.43,(g) Temporary Striping – ADD the following after paragraph that begins and ends "When scheduled installation . . . if aligned as above":

For temporary striping on new bridge deck surfaces, use temporary removable tape.

00225.62,(b) Temporary Impact Attenuators – DELETE paragraph ("When impact attenuator…") and REPLACE with the following:

When impact attenuator, truck-mounted attenuator, or narrow site attenuator systems are used, have enough modules, cartridges, components and replacement parts on site to replace one complete installation or have on site a complete replacement attenuator. Re-stock replacement items or complete replacement attenuators within 24 hours of use. All modules, cartridges, components and replacement parts, and replacement attenuators not used remain the property of the Contractor.

00225.82 Temporary Barricades, Guardrail, Barrier, and Attenuators – ADD the following subsection:

(e) Temporary Impact Attenuator Repair – Temporary impact attenuator repair will be measured on a unit basis as follows:

- Sand barrel systems will be the replacement of damaged sand modules.

All other systems will be the repair or complete replacement of the attenuator system.

00225.87(a) Flaggers – Add the following after sentence ("Flaggers will be . . ."):

Flagger not approved by the Engineer or included on the approved traffic control plan and schedule will not be measured for payment.

(Use the following Subsection .90(a-1) when impact attenuators are required.)

00225.90,(a),(1) Pay Quantities – DELETE paragraph ("All TCD damaged by…") and REPLACE with:

All TCD damaged by public traffic and replaced by the Contractor, except temporary signing, temporary electrical signs, and portable temporary traffic signals, will be paid for at the Contract price for the pay items listed in the Contract Schedule of Items or in approved Contract change orders, unless otherwise specified. Payment for replacing damaged TCD will only be made when:

00225.92 Temporary Barricades, Guardrail, Barrier, and Attenuators – ADD the following to pay item list:

(n) Repair Temporary Impact Attenuator, ____ Each

ADD the following paragraph after paragraph ("Item (m) includes . . ."):

Item (n), the words "Sand Module" or the type of attenuator, if applicable, will be inserted in the blank. Item (n) includes replacement of sand modules damaged by public traffic or includes repair or complete replacement of impact attenuators damaged by public traffic.

DELETE paragraph that begins ("No separate or additional . . .") REPLACE with the following:

No separate or additional payment will be made for temporary impact attenuator replacements, replacement modules, cartridges, components, or replacements parts that are required to be on site according to 00225.62(b) or for cleaning and removing debris from impacts.

00225.97 Flaggers and Flagger Station Lighting – ADD the following after the paragraph that begins ("Flaggers performing work other…."):

Payment will not be made for Flaggers not included in the approved Traffic Control Plan and Schedule or approved by the Engineer.

Section 00280 – Erosion and Sediment Control

Comply with Section 00280, Erosion and Sediment Control, of the Standard Specifications modified as follows:

00280.01 National Pollutant Discharge Elimination System – DELETE and REPLACE with the following:

Comply with all federal, state and local laws, rules and regulations, including but not limited to, the national Pollutant Discharge Elimination System (NPDES) MS4 and 1200C Permit(s); and the WPCF UIC Permit or rule authorization requirements in its absence. Copies of any local or state agency/government permit(s) are available from the permitted agency/government and may be more stringent than these Specifications.

00280.02 Erosion and Sediment Control Plan on Agency Controlled Lands – REPLACE the bullet ("A Contractor-developed, . . .") with the following:

- A Contractor-developed "construction" ESCP that incorporates the City's ESCP elements and any modifications needed to ensure full compliance with applicable federal, state, and local laws, rules, regulations and permits.

00280.02 Erosion and Sediment Control Plan on Agency Controlled Lands – REPLACE the bullet ("A narrative as described . . .") with the following:

- A narrative incorporating the elements of subsection (a), below, and any applicable federal, state, and local regulatory and permitting requirements.

00280.03 Non-Agency Controlled Lands ESCP – REPLACE the bullet ("A Contractor-developed ESCP . . .") with the following:

- A Contractor-developed ESCP for each unique site covered under applicable federal, state, or local permits or regulations.

00280.14,(a) Plastic Sheeting - ADD at the end of the sentence ("Minimum 6 mil thick . . . ") the following:

Bio-degradable Erosion Control Blankets (ECBs) and Bio-degradable Turf Re-Enforcement mats (TRMs) under (a) Plastic Sheeting.

00280.15,(a) Check Dams – REPLACE the bullet **"Type 2 Straw Bales"** requirement with the following:

Oregon Department of Agriculture Weed-Free certified standard rectangular straw bales meeting the requirements of 01030.15.

00280.16,(a) Construction Entrances - REPLACE bullet for **Aggregate** with the following:

Aggregate size for construction of the pad shall be 3-6 inch stone. If tracking aggregate onto street is concern, 6-8 inch stone can be used.

00280.30 Erosion and Sediment Control Manager – REPLACE the bullet ("Experience in all major . . .") with the following:

Experience in all major disciplines of public project construction.

00280.30 Erosion and Sediment Control Manager – REPLACE the bullet ("Monitor water quality in . . .") in the second set of bullets with the following:

Monitor water quality in receiving streams and UICs in the vicinity of the Project site.

00280.40 Installation – REPLACE the sentence ("Provide continuous erosion . . .") with the following:

Provide continuous erosion and sediment control throughout the period the Contractor is responsible for project sites under Contract as determined by the Engineer.

00280.41,(a) Disturbance Limits – DELETE and REPLACE with the following:

(a) Disturbance Limits – Flag all construction site-clearing limits with high visibility flagging and do not disturb areas outside the flagging limits. Flag all drainage and infiltration areas with high visibility flagging and do not disturb or compact soil within the flagging limits. Maintain the flagging during Project construction.

00280.41,(c) Wet Season Work and Temporary "Work Suspension – REPLACE sentence ("Wet season work is . . . and May 30") with the following:

Wet season work is defined as work between October 1 and June 30.

00280.42,(a) Soil Exposure Limitations - REPLACE bullet(s) ("East of the Cascades (October 1 through April 30)" and ("East of the Cascades (May 1 through September 30") with the following:

- **East of the Cascades (October 1 through June 30)** – Stabilize all other areas within 7 days of exposure.

- **East of the Cascades (July 1 through September 30)** – Stabilize construction areas within 10 days of exposure.

Section 00290 – Environmental Protection

Comply with Section 00290, Environmental Protection, of the Standard Specifications modified as follows:

00290.20(c)(3)(a) Burnable Materials – DELETE subsection in its entirety and add as follows:

00290.20(c)(3)(b) Wood Matter – REPLACE with the following:

> **(a) Woody Matter** – Woody matter, excluding Preserved or Coated Wood per (c) this section, 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.

Re-alphabetize remaining sections as follows:

(b) Preserved and Coated Wood

(c) Concrete and Masonry

(d) Disposal on Agency Owned Lands

(e) Off-Site Disposal

00290.30(a)(1) General – REPLACE the bullet that begins ("Comply with the erosion . . .") with the following:

- Comply with the erosion prevention and sediment control requirements of Section 00280, Erosion and Sediment Control, local requirements, and all applicable DEQ NPDES 1200 Permit requirements.

City of Bend Special Provisions to the Oregon Standard Specifications for Construction

TABLE OF CONTENTS

PART 00300 – ROADWORK

PART 00300 – ROADWORK

Section 00310 – Removal of Structures and Obstructions

Comply with Section 00310 of the Standard Specifications modified as follows:

00310.41(a) General – DELETE and REPLACE with the following:

Where an abutting structure or part of a structure is to be left in place, make clean, smooth, vertical cuts with a saw or other approved cutting device. Avoid operations that may damage any portion of the remaining structure. Prevent any saw-cut slurry from reaching the storm drain system through appropriate measures (e.g. barriers and wet vacuuming).

00310.80 Measurement – ADD to the end of the bullet "**Length and Area**" as follows:

Asphalt pavement cutting will be the length of the actual cut based on a depth of 6 inches. If the depth is greater than 6 inches, the length will be adjusted by converting to an equivalent number of feet on a proportionate length basis.

00310.92 Separate Item Basis – ADD the following to the **"Pay Item"** list:

(g.) Asphalt Pavement Saw Cutting.....Foot

00310.92 Separate Item Basis – ADD the following under sentence ("Item (d) includes. . .")

Item (g) applies to asphalt pavement saw cutting when shown.

Section 00320 – Clearing and Grubbing

Comply with Section 00320 of the Standard Specifications modified as follows:

00320.02(a) Clearing – REPLACE bullet that begins ("Preserving trees and other…") with the following:

- Preserving trees and other vegetation or natural areas designated to remain in place.

00320.40(b)(1) Within the Work Areas – ADD the following:

Trees, shrubbery and flower beds designated by the Engineer shall be left in place and care shall be taken by the Contractor not to damage or injure such trees, shrubbery or flower beds by any of his/her operations.

Where ornamental trees exist in parking areas and are not to be removed, it shall be the Contractor's responsibility to trim low limbs, which will interfere with the normal operation of his/her equipment. The trimming shall be performed in a professional manner by competent personnel prior to his/her machine operations and in such a manner as the Engineer may direct.

The Contractor shall be responsible for all damages to existing improvements resulting from his/her operations.

Add the following subsection:

00320.40(b) Preserving and Trimming Vegetation – ADD the following subsection:

(4) Preservation Zone – Where the plans call for the preservation of trees, the Contractor shall provide a preservation plan to the Engineer, that shall include the following elements, as appropriate:

The Contractor shall fence a preservation zone around the tree to a radius of 1.5 times the crown (drip line) of the tree. This fence shall be plastic mesh fence continuous with no gaps unless otherwise directed. The Contractor shall not operate equipment in this preservation zone except to construct specific items passing through the zone, such as utilities. The preservation zone shall not be used for the storage of materials. Clearing of shrubs and non-designated plant materials in the preservation zone shall be to ground level. There shall be no grubbing in the preservation zone unless specifically directed by the Engineer.

If the nature of the project is such that the preservation zone cannot be fully enclosed as designated above, the Contractor may use the preservation zone lying outside the fence if the Contractor maintains an 8-inch deep layer of wood chips over the

unenclosed preservation zone. The Contractor shall make every attempt to minimize operations in this unenclosed zone.

The Contractor shall routinely water the preservation zone to keep the area moist.

As soon as possible, but not more than two weeks prior to any required construction in a preservation zone per the exceptions above, the Contractor shall thoroughly saturate the preservation zone with water.

When necessary to excavate or trench through a preservation zone, the Contractor shall neatly trim all roots disclosed by the excavation. The Contractor shall not tear or pull roots from the ground with construction equipment, but shall cleanly saw them immediately when disclosed by the equipment. An exception shall be rock saws. However, rock saws shall be operated so as to minimize the shattering of roots.

Trenches in a preservation zone shall be backfilled as soon as possible to minimize the drying of exposed roots. Where trenches need to be open longer than six hours, exposed roots on the trench wall sides abutting trees to be preserved shall be covered with burlap and kept moist.

00320.42 Ownership and Disposal of Matter – DELETE and REPLACE subsection with the following:

00320.42 Disposal of Matter – Dispose of all matter and debris according to 00290.20. Open burning of materials is prohibited within the City limits.

00320.90 Payment – ADD the following after the paragraph that starts (“Payment will be payment . . .”):

No separate or additional payment will be made for plastic mesh fencing.

Section 00330 – Earthwork

Comply with Section 00330 of the Standard Specifications modified as follows:

00330.20 Tamping Foot Rollers – REPLACE "115 tons" in the sentence that begins ("If specified, use . . .") with the following:

"15 tons"

00330.40(b) Preservation of Existing Surfacings – ADD the following to the end of this subsection:

AC pavement cuts shall be straight lines, having vertical faces and are required wherever existing pavement is to be matched or removed to a line designated on the plans and as directed by the Engineer. Where so specified, AC pavement cuts shall be saw cut. Saw-cut slurry shall be kept out of the storm drain system facilities through appropriate measures including but not limited to temporarily blocking downstream storm drains, shoveling, and/or wet vacuuming and removing the slurry from the site.

When potholing is required to locate existing underground facilities the City prefers 8"-12" circular holes to be used vs the standard square opening. Asphalt coupons may be epoxied/glued back with an approved adhesive. Larger openings will be approved on a case by case basis at the discretion of the City.

00330.41(a)(5) Waste Materials – REPLACE subsection with the following:

Unless otherwise specifically allowed and subject to the requirements of 00280.03, dispose of materials, classed as waste materials in 00330.41(a-3) and 00330.41(a-4), outside and beyond the limits of the Project and Agency controlled property according to 00290.20. Do not dispose of materials on wetlands, either public or private, or within 300 feet of rivers or streams.

00330.41(a)(7) Abandoned Pipes and Miscellaneous Matter – ADD All service lines will be abandoned at the main unless otherwise approved by the City. All franchise utilities will remove abandoned facilities unless otherwise approved by the City. Any abandoned facility will be clearly located and recorded on the As-built drawings and submitted to the City. Per the Oregon dig law abandoned facilities remain the responsibility of the utility company.

00330.70 General REPLACE the bullet that begins ("In planting and seeding . . .") with the following:

- In planting and seeding areas, remove all rocks, boulders, and vegetative matter except that necessary to protect preserved areas and to comply with erosion and sediment control as designated in the Erosion and Sediment Control Plan.

(Use the following subsection .82 on embankment projects)

00330.82 Embankment Basis Measurement

In the paragraph that begins (“When measurement of earthwork…”), REPLACE the sentence that begins “Measurement will be limited to…” with the following:

Measurement will be limited to the lines, grades, and slopes of the original ground contours established before the Contractor begins any Work on the Project.

In the paragraph that begins ("The quantities of embankment measured for payment will not include…"), ADD the following bullet after the bullet that begins (“Any additional quantities . . .”):

- Any additional quantities required due to clearing and grubbing operations.

(Use the following subsection .91(d) on excavation projects that include Section 00331 - Subgrade Stabilization.)

00330.91(d) General Excavation – DELETE the bullet that begins ("Includes unsuitable material . . .").

00330.92 Kinds of Incidental Earthwork – Delete the bullet that begins ("If shown on the plans…") and ADD the following bullet(s) to the end of the bullet list:

- On embankment projects, additional quantities of materials required due to clearing and grubbing operations and compaction requirements within embankment limits.

- On embankment projects, earthwork required for driveways and road approaches. Earthwork for driveways and road approaches will be that which is outside the neat line limits shown on the typical section(s).

Section 00340 – Watering

Comply with Section 00340 of the Standard Specifications modified as follows:

00340.10 Water – ADD the following to the end of this subsection:

For a charge, the City can provide water to the Contractor from a fire hydrant or similar source. The Contractor must make an application to the City for such service.

Section 00350 – Geosynthetic Installation

Comply with Section 00350 of the Standard Specifications modified as follows:

00350.10 Materials – ADD the following to the end of this subsection**:**

Provide manufacturer's certifications complying with 02320.10(c) for the following geosynthetic(s):

	Certification	
Geotextile	**Level A**	**Level B**
Drainage, Type 1		
Drainage, Type 2		
Riprap, Type 1		
Riprap, Type 2		
Subgrade		
Embankment		
Pavement Overlay		
Geogrid		
_____		
_____		

Section 00390 – Riprap Protection

Comply with Section 00390 of the Standard Specifications modified as follows:

00390.11(b) Test Requirements – REPLACE 8" under the "Requirement" column next to "Sediment Height" with the following:

8.0"

City of Bend Special Provisions to the Oregon Standard Specifications for Construction

TABLE OF CONTENTS

PART 00400 – DRAINAGE AND SEWERS

PART 00400 – DRAINAGE AND SEWERS

Section 00405 – Trench Excavation, Bedding, and Backfill

Comply with Section 00405, Trench Excavation, Bedding, and Backfill, of the Standard Specifications modified as follows:

405.02 Definitions – REPLACE the definition for ("**Common Excavation**") with the following:

The removal of all material. This includes excavation of rock that may require removal drilling and blasting, wedging, sledging, barring or breaking up with power tools.

405.02 Definitions – REPLACE the definition for ("**Rock Excavation**") with the following:

The Agency does not differentiate between Common Excavation and Rock Excavation

405.12 Bedding - REPLACE the contents of this section with the following:

For all pipes, unless otherwise directed, furnish ¾"-0" base aggregate conforming to 02630.10.

405.13 Pipe Zone Material – REPLACE the contents of this section with the following:

For all pipes, unless otherwise directed, furnish ¾"-0" base aggregate conforming to 02630.10.

Description

00405.14 Trench Backfill – ADD the following subsections:

(f) Concrete Backfill – Concrete backfill shall conform Section 0440.12 CGC.

(g) Sand Cement Slurry (SCS) – Sand Cement Slurry shall conform to the requirements of the Oregon Department of Transportation Specification for Class C bedding. Sand Cement Slurry shall consist of at least 3/4 sack of Portland cement per cubic yard of sand plus water, with a 7-inch slump plus or minus 1-1/2.

00405.42 Rock Excavation – DELETE in its entirety: (The Agency does not differentiate between Common Excavation and Rock Excavation.)

00405.46(c) Trench Backfilling – ADD the following subsections:

(4) Concrete Backfill – Backfill the trench above the pipe zone with concrete backfill as required by the details and only when approved by Engineer.

(5) Sand Cement Slurry – Backfill the trench above the pipe zone with sand cement slurry as required by the details.

00405.46(c) Trench Backfilling – ADD the following:

Trench backfill shall be tested at one passing test for each 3 feet of fill and 100 LF of trench (e.g., 12-foot to 15-foot depth class shall require four to five tests per 100 LF or as directed by the Engineer. Passing test shall meet the requirements for trench compaction in that segment of trench backfill. All sampling and testing, including material certifying tests shall be performed by an independent testing laboratory. Sampling locations shall be determined by the City of Bend. All results, including failing tests, shall be submitted to the City of Bend prior to any subgrade inspection. All compaction testing shall be completed in the presence of a City of Bend representative authorized by Engineer to witness test.

Where trench depths or conditions preclude density testing at deeper elevations because of worker safety concerns, the placement and compaction of backfill will be observed and documented on a full-time basis by contractor's approved testing agency until backfill reaches an elevation at which density testing can commence.

Density testable material shall comply with section 330.43(b) and be tested compacted in place. All compaction reports must be submitted to the City before any pipe testing can commence.

00405.80 Measurement – DELETE and REPLACE with the following:

(a) Linear Foot Basis – The length of trench shall be measured horizontally from centerline to centerline of manholes or to the end of the pipe, whichever is applicable. Measurement of the various depth classes as stated in the Schedule of Bid Items shall be from the pipe invert as constructed to the design subgrade elevation at the point of measurement.

00405.90 Payment – DELETE and REPLACE with the following:

Payment for TRENCH EXCAVATION shall be at the unit price bid per linear foot at the specified diameter for the depth class as measured. Payment shall include all materials, tools, labor, equipment, bedding, backfill, and incidentals required to excavate and backfill the trench as specified. There shall be no separate payment for rock excavation unless specifically called for in the Schedule of Bid items.

Incidental Basis – When not listed in the Schedule of Bid Items as a separate pay item, TRENCH EXCAVATION shall be considered incidental to the price bid for pipe.

Section 00440 – Commercial Grade Concrete

00440.12 Properties of CGC – DELETE and REPLACE with the following mix designs:

The following are the minimum requirements for CGC placed in the City. Alternative mix designs may be submitted for approval. The "optional" additives may be used on a project by project basis to meet weather conditions and workability. Please provide a mix design to the City as required by these standards and approved permit.

a. **curb**
   i. **6.1 sack concrete mix (574 lb cement) 4,000 psi min**
   ii. **0.45 w/c (±1%)**
   iii. **6.0% (±1.5%) Air entrainment**
   iv. **F-100 Fiber (.5 bag per yard)**
   v. **3" max slump**
   vi. **Slag 0-30% (optional)**
   vii. **AEA 90 (optional)**
   viii. **Water reducer (optional)**
   ix. **Superplasticizer may be used (Like VMA 358)**

b. **Flat work**
   i. **6.1 sack concrete mix (574 lb cement) 4,000 psi min**
   ii. **0.45 (±1%) water to cement ratio**
   iii. **6.0% (±1.5%) Air entrainment**
   iv. **F-100 Fiber (.5 bag per yard)**
   v. **6" max slump**
   vi. **Slag 0-30% (optional)**
   vii. **AEA 90 (optional)**
   viii. **Water reducer(optional)**
   ix. **Superplasticizer may be used (Like VMA 358) (optional)**

Any material on substitutions are on an approved equal basis.

00440.40(d) Weather – DELETE and REPLACE with the following:

Concrete is to be placed when the air temperature in the work zone is at least 35°F. All concrete placed below 35° shall be approved under the following prescribed cold weather concrete plan:

Concrete may be placed when the ambient air temperature is 25° F and rising, and the projected day time temperature high will be above 35° F for 2 days (unless otherwise approved by the City Engineer);

- Concrete shall not be poured below 25° F;
- Concrete may not be poured on frozen ground;
- If subgrade is frozen, all frozen material must be removed and new compacted base must be placed before concrete is poured;
- Concrete subgrade must be inspected by the City prior to placing concrete;

- At a minimum, ambient temperatures from 30°F to 40°F hot water will be used to maintain concrete temperatures not less than 55°F at placement;
- At a minimum, ambient temperatures from 25°F to 30°F hot water will be used to maintain concrete temperatures not less than 55°F at placement and 1% non-Chloride accelerator;
- Provide batch tickets to City Engineering Inspector;
- The City may require the use of a Hi/low thermometer to record the temperature of the placed concrete for 7 days. Concrete must be maintained at 40° during this time;
- If concrete temperature falls below 40° F the City may choose to have the concrete removed and replaced at the contractors/permittee expense, and;
- Prevent concrete from freezing for 7 calendar days after concrete is placed;
- At a minimum cover all concrete at night if the seven day forecast shows a potential for freezing. It is up to the contractor to determine the best practice for protecting the concrete.
- Alternate cold weather concrete plans may be submitted for review but approval is at the City's discretion.

Section 00445 – Sanitary, Storm, Culvert, Siphon, and Irrigation Pipe

Comply with Section 00445, Sanitary, Storm, Culvert, Siphon, and Irrigation Pipe, of the Standard Specifications modified as follows:

Materials

00445.10 General – DELETE and REPLACE with the following:

Storm and sanitary sewer pipe shall be designated as gravity, force main, pressure, or vacuum for purposes of this specification. Unless otherwise specified, all gravity sewer, pressure pipe, or vacuum pipe in the project shall be polyvinyl chloride (PVC). Where more than one type of material is indicated as appropriate, the type required shall be designated on the plans. Furthermore, all materials shall be new of U.S.A. domestic manufacture that meet all AWWA, APWA, Federal and, State code requirements, as well as local City and County code requirements. Additionally, strict attention shall be given to workmanship, and materials shall be of good quality.

All new sanitary sewer collection installations shall be gravity systems. No pressure or vacuum systems will be allowed for collection. Pressure systems for transmission are allowed.

00445.11 Materials – DELETE reference to Specification 02410.70 for Polyvinyl Chloride (PVC) Pipe in the following tabular materials:

00445.11 Materials – ADD the following subsections:

(h) Gravity Sanitary and Storm Sewer Pipe

(1) Rigid PVC pipe compounds used in gravity sewer pipe shall conform to ASTM D-1784, Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (PVC) Compounds.

(2) PVC pipe shall conform to ASTM D-3034 standards dimensions ratio not to exceed 35 or to ASTM F789, minimum pipe stiffness of 46 psi. Provide manufacturer's certification, including test results, for all materials supplied under this specification.

(3) Where minimum cover cannot be maintained, or where directed by the Engineer, pipe shall be C-900 water pipe meeting the requirements of AWWA C-900 Specifications, Polyvinyl Chloride (PVC) Pressure Pipe.

(4) Polyethylene ADS N-12 Dual Wall Flexible Water Tight Pipe used in gravity storm sewer pipe shall conform to ASTM F 2648 and shall have a smooth interior and annular exterior corrugations.

(i) Pressure Sewer Pipe

(1) Pipe shall be C900 for pipe greater than 4 inches in diameter or Schedule 40 for pipe 4 inches in diameter and less and have a minimum DR of 18 unless specified otherwise.

(2) The pipe shall be wrapped four (4) times per 20-foot section with marking tape to differentiate this pipe from the white or blue plastic pipe used in potable water applications.

(3) Pipe and fittings 4 inches and smaller in diameter shall be assembled using glued joints. Pipe above 4 inches in diameter shall be gasketed. All fittings above 4 inches in diameter shall use mechanical joints with the exception of service tees, which shall use glued or mechanical joints.

(4) Refer to 00445.48 for marking wire specification.

(j) Jointing Materials – Polyvinyl Chloride Pipe

(1) Gravity Sewer Pipe – Joints shall be rubber gasketed and water tight conforming to ASTM D-3212 for gravity sewers. Gaskets shall conform to ASTM F-477. Lubricant jointing shall be as approved by the pipe manufacturer.

(2) Pressure Sewer Pipe – Joints shall be rubber gasket or solvent welded depending on pipe size.

(3) Gravity Storm Sewer - Joints shall be water tight per requirements of ASTM D 3212. Gaskets shall conform to ASTM F 477. Joint lubricant as approved by manufacturer.

Rubber gasketed joints shall conform to the manufacturer's recommendations for the pressure class specified. Gaskets shall conform to ASTM F-477. Lubricant jointing shall be as approved by the pipe manufacturer.

Solvent welded joints shall conform to the applicable requirements of ASTM D2466 and ASTM D2467.

(k) Fittings – Polyvinyl Chloride Pipe

(1) Gravity Fittings

a. PVC pipefittings shall conform to ASTM D-3034, standard dimensions ratio not to exceed 35 or to ASTM F789, minimum pipe stiffness of 46 psi. Provide manufacturer's certification, including test results, for all materials supplied under this specification.

b. All fittings shall be the same as the joints used on the sewer pipe. Caps or plugs shall be furnished with each tee outlet or stub with the same type gasket and joint as furnished with the service connection pipe specified for future service connections. The plug or cap shall be banded or otherwise secured to withstand all test pressures involved without leakage.

c. Each tee for future service connection shall be marked with marking tape. The face of the curb shall be marked with an "S" locating the service crossing. Where no curbs are being installed, the end of service tee shall be marked with the wye and riser pipe and Brookes Box at finished grade.

(2) Pressure Sewer Fittings

a. Plug Valves – Type V405 Eccentric (Isolation Valves)

Plug valves shall be a non-lubricated type and rated at 175psig CWP drip-tight shutoff, with pressure from either direction, and shall have a cast iron body with flanged ends. The valve-closing member shall rotate 90° degrees to a full open or closed position with the plug rotating out of the sewage flow. The lug shall be cast iron with round or rectangular port of no less than 80 percent of the connecting pipe area. The plug shall be coated with Buna-N or Hycar elastomers with seats Type of 316 stainless steel or nickel. The valve stem bearing shall be self-lubricating stainless steel or reinforced Teflon, with the stem seal multiple V-rings (Chevron), U-cups, or O-ring of nitrile rubber, and shall include grit seals on the valve stem. Valves shall be polymer coated inside and out, and have a non-rising stem. Unless otherwise specified, plug valves shall be supplied with a 2" operating nut. In vault service boxes or above ground plug valves shall be supplied with hand wheels.

Approved manufactures:

1. Keysone; Ballcentric
2. Dezurik; Series 100
3. Victaulic; vic-Plug

b. Check Valves – Check valves on pressure sewer mains shall be external lever and weight actuated, iron-body, plastic or brass, flanged-end, resilient seat check valves equivalent to Kennedy model 106 ALS. APCO model 104P3 with backflow device may be used in lieu of the Kennedy check valve in certain applications.

c. Pressure Sewer MH and C.O. – Cleanouts shall be constructed as indicated on the Standard Drawings. The manhole shall be a 48-inch manhole as illustrated in the Standard Drawings.

d. Pressure Pipe Air-release Valves – Air-release valves shall be constructed as indicated on the Drawings, complete with 2-inch shut-off valve, 1-inch blow-off valve, and back flushing apparatus, APCO Model 400, Valmatic 302, or equal. Valve shall provide for an operating pressure range of 0-50 psi.

e. Hot Tap Specifications – 2-inch and 3-inch saddles shall be epoxy coated ductile iron body saddles with double stainless steel straps equivalent to type 202S as manufactured by Romac.

All taps larger than 2 inch shall be stainless steel sleeves equivalent to type SST service saddles as manufactured by Romac.

f. Valve Boxes – Valve boxes subject to traffic loading shall be a two-piece grade adjustable box. The valve box shall have 7-inch I.D. with a slip top section without a dirt flange on the bottom as shown in the Standard Drawing. Valve boxes shall be caste iron East Jorden Iron Works #363912 or equal. The bottom extension piece shall be a single piece of 6" 3034 pipe of the proper length for to allow for 6"-12" inches of overlap. The word "SEWER" or letter "S" shall be cast into the top of the lid. Valve boxes shall not be located in driveways.

g. Restraining Device – Restraining devices used on pressure sewer shall be a full-circumference wedge-type device as manufactured by Romac Industries. Restraining device shall be Grip Ring™ or approved equal.

(3) Sewer Lateral Fittings

(a) Sewer Service Markers –Each tee for future service connection shall be marked with marking tape. The face of the curb shall be marked with an "S" locating the service crossing. Where no curbs are being installed, the end of service tee shall be marked with the wye and riser pipe and Brookes Box at finished grade.

(b) Service Saddles – Gravity line service saddles shall be Romac "CB" type saddles or equivalent with stainless steel strap. No other type shall be permitted. Pressure line services shall be as defined in Subsection 00303.2.15F.2. On 12-inch or larger pipe, an "Insert-a-tee" tap or equal, as approved by the City Engineer, is required.

(c) Swing Check Valves – Swing valves shall be APCO series 100, Legend Model T451, or equivalent U.S. Brands. The check valve shall be capable of passing a 2-inch diameter solid.

(d) Plug Valves – Non-lubricated 175 psig rated type CWP drip-tight shutoff with pressure from either direction cast iron body with flanged ends. The valve-closing member shall rotate 90° degrees to a full open or closed position with the plug rotating out of the sewage flow. The lug shall be cast iron with round

or rectangular port of no less than 80 percent of the connecting pipe area. The plug shall be coated with Buna-N or Hycar elastomers with seats Type of 316 stainless steel or nickel. The valve stem bearing shall be self-lubricating stainless steel or reinforced Teflon, with the stem seal multiple V-rings (Chevron), U-cups, or O-ring of nitrile rubber, and shall include grit seals on the valve stem. Valves shall be polymer coated inside and out, and have a non-rising stem. Unless otherwise specified, plug valves shall be supplied with a 2" operating nut. In vault service boxes or above ground plug valves shall be supplied with hand wheels.

Approved manufactures:

Keysone; Ballcentric
Dezurik; Series 100
Victaulic; vic-Plug

00445.40 General – ADD the following subsection:

(h) Sewer Taps – Sewer taps shall be performed only by competent personnel of companies' pre-certified for **sewer** taps by the City of Bend. Tapping equipment shall be used only for sewer taps. A representative of the City Engineer must witness every sewer tap.

00445.40(c) Pipe Distribution and Handling – ADD the following:

No more pipe shall be laid out along open ditch, prior to installation, than can be laid in one work shift. Pipeline materials shall be removed daily from a storage area and placed in trench.

00445.43(c) PVC Pipe – ADD the following after sentence that begins ("Cut the pipe…"):

Fittings, plugs, and caps shall be installed in pipe in the manner described within these specifications or by the approval of the City Engineer, or his/her representative. For dissimilar pipes, (e.g. C-900 to 3034), a hard PVC transition type adapter coupling or a Maxx Adaptor, or approved equal, shall be used. Special conditions encountered for which suitable adapter couplings are not available, shall be referred to the City Engineer for consideration of an approved method. Fern-co and Calder Coupling type fitting will not be allowed.

(1) Solvent Welded Joints – After a length of Solvent Weld pipe is placed in the trench, both the spigot end and the receiving bell shall receive a thorough application of primer and glue as per the manufacturer's specifications. The pipe shall be centered, seated, and rotated at least 90°. The pipe shall be brought to correct line and grade and secured in place with approved backfill material. Pipe

and fittings which do not allow a sufficient and uniform space for jointing shall be removed and replaced with pipe and fittings of proper dimensions to ensure such uniform space. Precaution shall be taken to prevent dirt from entering the joint space.

(2) Number of Pipes Laid Before Jointing – Solvent Weld and Rubber gasket joint pipe shall be connected as hereinafter specified as soon as they are placed in the trench.

00445.46 Concrete Blocks – ADD the following subsection:

(a) Pressure Sewer Thrust Blocking – Thrust blocks shall be placed at all angle points on pressure sewer. Where approved by the City Engineer, restrained joints may be used on pressure sewer lines in lieu of thrust blocks or deadmen.

00445.48 Tracer Wire – DELETE and REPLACE as follows:

Install tracer wire in all trenches for sanitary and storm sewers outside of roadways and bends. 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. All sanitary and storm sewers not located under paved roadway, shall be provided with two layers of tracer wire as required in the standard drawings. Tracer wire to be installed in 1-inch diameter conduit unless otherwise specified.

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 and provide documentation to City of completed test.

Finishing, Clean Up, and Testing

00445.70(b) Siphon, Irrigation, and Sanitary Sewer Installations – ADD the following:

No sewer line will be televised until all inverts and channels in manholes are grouted.

00445.72 Pipe Testing(c)(6) Air Testing – DELETE AND REPLACE section with the following:

Record the time in minutes and seconds that is required for the internal air pressure to drop 0.5 psig.

Follow the chart below:

Minimum Specified Time Required for a 0.5 psig Pressure Drop for Size and Length of Pipe Indicated for Q=0.0015											
Pipe Dia. (in.)	Min. Time (min:sec)	Length for min. time (ft.)	Time for longer length (sec.)	Specification Time (min:sec) for Length L Shown Below in Ft.							
				100	150	200	250	300	350	400	450
4	1:53	597	0.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837L	11:23	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30	14:10	80	10.683L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:08
33	15:35	72	12.926L	21:33	32:19	43:46	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384L	25:39	38:28	51:17	64:06	76:55	89:44	120:34	115:23

Table taken from UNI-B-6-90

00445.72(e) Pressure Sewer and Force Mains - ADD the following:

Pressure and force mains shall be tested by hydrostatic methods. The test pressure shall be two times that of the system pressure, or a minimum of 50 psi, The test shall be conducted for 2 hours minimum. Allowable loss shall be calculated using section 01140.51(a)(5). The test pressure shall not exceed the manufacturer's maximum operating pressure recommendation.

00445.74 Video Inspection of Sanitary and Storm Sewers – DELETE and REPLACE section with the following:

After laying and joining sanitary and storm 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, the Contractor shall coordinate with the City for the City to conduct a video inspection of all sanitary sewer pipes and storm sewer pipes.

Findings of the video inspection shall be recorded, provided to the Contractor, and the Contractor shall be required to correct all deficiencies at no expense to the City. Upon correction of deficiencies revealed by video inspection, the Contractor shall notify the City Engineer and a follow-up video inspection of the corrected areas will be done by the City. Costs for any follow-up video inspections will be borne by the Contractor.

Warrantee Inspection:

The City shall provide video inspection of all lines prior to completion of the one-year warranty and final acceptance of the work. This will be done at no cost to the Contractor.

Findings of the video inspection shall be recorded, provided to the Contractor, and the Contractor shall be required to correct all deficiencies at no expense to the City. Upon correction of deficiencies revealed by video inspection, the Contractor shall notify the City Engineer and a follow-up video inspection of the corrected areas will be done by the City. Costs for any follow-up video inspections will be borne by the Contractor.

If at any time during the one-year warranty period examination of the sewer line discloses a deficiency, that deficiency shall be corrected by the Contractor at no expense to the City.

Measurement

00445.80 Measurement – ADD the following after ("**(k) Installation Under Railroad** – No measurement …").

(l) Sewer Service Line Pipe – Measurement for service line pipe shall be made on a linear foot basis for the size and type of pipe **shown**. Measurement shall be made along the centerline of the service pipe from the main line fitting to the cap or termination of the service line.

No final payment for service line pipe shall be made until the section of sewer into which the services are connected has successfully passed the applicable internal pressure test.

(m) Sewer Taps – Measurement for sewer taps shall be made on a per each basis for the type, kind, and size specified, and shall constitute full compensation for constructing the sewer tap complete and in place.

Payment

00445.91 Payment – ADD pay item as follows:

(n) Sewer Taps …… Each

Section 00470 – Manholes, Catch Basins, and Inlets

Comply with Section 00470, Manholes, Catch Basins, and Inlets, of the Standard Specifications supplement and/or modified as follows:

ADD the following subsection:

00470.44 HDPE Manhole Construction – The bottom thickness of the manholes shall be determined in accordance with ASTM F 1759. Calculations must be provided to justify the thickness of the bottom.

The inlets and outlets shall be extrusion welded on the inside and outside of the structure using good welding practice.

All manhole connections larger than 4” nominal OD pipe shall be butt-fusion welded, electro-fusion welded, or flanged connections. For 4” OD pipe and smaller threaded transition fittings can also be used as well as the acceptable connections listed.

HDPE manholes shall be stored on clean, level, and dry ground to prevent undue scratching or gouging of the pipe. The handling of HDPE manholes shall be done in such a manner that there is no damage.

Trench Construction – The trench and trench bottom shall be constructed in accordance with Section 00405, Trench Excavation, Bedding, and Backfill.

Backfilling shall be done to conform to the ASTM F 1759, Section 4.2, “Design Assumptions”. This Specification indicates that backfill shall extend at least 3.5 feet beyond the edge of the manhole for the full height of the manhole and extend laterally to undisturbed soils. Compaction shall be to 90% proctor density.

H-20 Highway Loads – Reinforced concrete pads spanning the HDPE manhole shall be provided when HDPE manholes are used in traffic areas. A traffic rated frame and cover will be required.

Manholes shall be factory tested with water or with air. The hydrostatic test shall be conducted by filling the structure with water and checking for leaks. Minimum test duration will be one hour. If air is used, 2 to 5 psi shall be used for 30 minutes. Data showing the structure to be leak-free will be supplied. The owner or his representative may request to observe the test.

00470.45 Steps and Ladders – DELETE and REPLACE section:

Steps and ladders are prohibited in manholes.

ADD the following subsection:

00470.48 Drywell Facility Construction – The concrete cap required under roadway areas by the Standard Drywell Drawing need not be formed. It may be poured directly on the moisture barrier. In earth or granular material, the outside two feet (2') of the concrete cap shall be poured over undisturbed earth. In rock excavation, the cap may be poured directly to the rock wall, provided that the rock wall is stable.
The fabric liner specified for the inside of the drywell barrel shall have a smooth finish to promote cleaning by washing down. Felted materials are not acceptable. Fabric liner shall have sufficient tensile strength to be hung without undue sagging, and to resist tearing. It shall be resistant to raveling, and shall be anchored 18 inches back underneath the cone and at each dry well joint for the entire depth of the drywell.

Full-flow vinyl screen (a0706) or equivalent, which is available locally, is an acceptable fabric liner.

The final elevation for each manhole shall conform exactly with the finished street. It is permissible to adjust the manhole frame to final grade after street paving provided the structure is low enough so as not to interfere with the street paving operation. Patching material shall be asphalt concrete with a maximum patch width of 6-inches.

Manhole cover shall have two holes and marked with the descriptive word Storm in cast 2-inch raised letters to describe the nature of the facility served by the manhole. A cut out at the rim should be provided for raising the lid. Don't Pollute shall be stamped into manhole cover.

00470.71(b) Vacuum Testing - ADD the following sentence:

Vacuum testing shall be completed prior to installation of protective coatings.

00470.72 Drywell Facility Testing – **ADD the following subsection:**

Prior to acceptance, all drywells shall pass a performance test under observation by a City representative. The test shall follow the following procedure:

(1) Install the drywell or drill hole as per the local jurisdiction's standard plans, specifications, and applicable construction guidelines.

(2) Inspect the drywell or drill hole and take photographs.

(3) Before beginning the test, field check the accuracy of the flowmeter by filling up a suitable container of known volume; for example, a calibrated 55-gallon barrel.

(4) Introduce clean water into the drywell or drill hole. Monitor flow using an in-line flowmeter.

(5) If possible, raise the water level in the structure until it reaches the top of the active barrel section. In the case of structures interconnected by pipes, raise the

water level to the invert elevation of the connecting pipe, or use an expandable pipe plug to seal the connecting pipe.
(6) Monitor and record the flow rate required to maintain the constant head level in the drywell or drill hole at appropriate intervals. In no case shall the interval exceed 10 minutes in length.

(7) Maintain the water level in the structure, by adjusting the flow rate, for a minimum of 2 hours or until a stabilized flow rate has been achieved, whichever is longer. Test time begins after the water level in the structure has reached the top of the active barrel section, or the invert elevation of any interconnecting pipes. The flow rate is considered stable when the water level in the structure is maintained and the incremental flow rate does not vary by more than 10 percent. *(In any case, the total volume and rate injected into the drywell or drill hole does not need to exceed the design storm volume.)*

(8) Upon completion of the constant head period, discontinue flow, monitor and record the water level in the drywell or drill hole at intervals no more than 5 minutes in length, for a 30-minute time period. This time may need to be extended depending on the soil performance.

Calculations shall follow the following:

1. Calculate the actual potential maximum infiltration rate q(*A*)

$$q(_A) = (Q/H) * H_D \text{ (cfs)}$$

Where: Q = stabilized flow rate observed near the end of the constant head portion of the test (cfs)
H = level of water within the drywell or drill hole (ft); and
Hd = maximum design drywell or drill hole head

2. Determine the design infiltration rates for a drywell or drill hole (*qD*). Apply the appropriate factor of safety (*FS*), see Table 1.

$$q(_D) = q_A / FS \text{ (CFS)}$$

Table 1 Required Safety Factors

GENERAL SOIL TYPE	SAFETY FACTOR
Clean Medium To Coarse Gravel Or Equivalent Such As Large Granular Volcanic Pumice	2.5 (Woven Geotextiles) 5 (Non-Woven Geotextiles)
Sandy Gravels Or Mixed Granular Pumice And Coarse Degraded Pumice	3.3
Medium To Coarse Sands Or Coarse Loose Sandy Pumice	3.3
Fine Sands And Finely Degraded Pumice	1.7

Silts, Glacial Till, Volcanic Ash, Consolidated Fine Pumice	1.25

Report shall include the following:

1. Report the condition of the drywell or drill hole. When applicable, include the following information:
   - General site, weather, and drywell or drill hole conditions prior to the test
   - Silt build-up
   - Water level in the drywell or drill hole
   - Connections to other structures
   - Overall depth of the drywell or drill hole from finished grate to bottom
   - Photographs taken of the drywell or drill hole during or after installation
   - Distance from finished grate to the invert elevation of any interconnecting pipes
   - The length of the active barrel section (the vertical length of the drywell or drill hole in contact with water during the test).

2. Report test data in a format that includes time of day, flowmeter readings, incremental flow rates, observed head levels and water depths in the structure, and total flow volumes.

3. Report the actual infiltration rates, design infiltration rates, and factors of safety.

4. Provide any conclusions or recommendations.

5. Provide name, title, and qualifications of person directing the test and providing the report.

Water trucks used for test water shall be provided with a site gauge or other safe approved method for reading the volume of the tank. Connections to the existing City of Bend water system shall be provided with an approved 12-inch air gap, or two times the size of fill pipe, whichever is greater.

00470.90 Payment – ADD pay items as follows:

(m) Drywell Facility ……..Each

Section 00480 – Drainage Curbs

Comply with Section 00480, Drainage Curbs, of the Standard Specifications supplement and/or modified as follows:

00480.00 Scope – DELETE the following words “or asphalt concrete material” from the sentence that begins (“This work consists . . .”).

00480.10 Materials – DELETE the following item from the tabular list:

Emulsified Asphalt …….. 00440

Section 00490 – Work on Existing Sewers and Structures

Comply with Section 00490, Work on Existing Sewers and Structures, of the Standard Specifications supplement and/or modified as follows:

00490.43 Abandoning Pipe In Place – DELETE and REPLACE with the following:

Abandoning pipe in place is not allowed. All abandoned utilities are required to be removed and disposed of properly, unless otherwise approved by the Engineer.

If pipes are permitted to remain in-place by the City Engineer, a tracer wire should be installed and terminated at both end points at ground surface to allow for utility locates. Brooks Boxes shall be installed at end points in a 2x2 concrete pad if outside hard surfaces.

Section 00495 – Trench Resurfacing

Comply with Section 00495, Trench Resurfacing, of the Standard Specifications supplement and/or modified as follows:

00495.40 General – ADD the following:

All restoration shall conform to section 3.8 the City of Bend's pavement restoration policy as stated in the Design Standards and 330.40 of these specifications. Asphalt shall be placed in lifts no greater than 2" or as approved by the City.

City of Bend Special Provisions to the
Oregon Standard Specifications for Construction

TABLE OF CONTENTS

PART 00600 – BASES

PART 00600 – BASES

Section 00640 – Aggregate Base and Shoulders

Comply with Section 00640 of the Standard Specifications modified as follows:

00640.41 Hauling and Placing – ADD the following paragraph after the sentence that begins (“Transport the aggregate . . .”):

Prior to the placement of base rock, all structures (e.g. manholes, utilities, catch basins) shall be completely installed, grouted, seated, backfilled, set to finish grade, and all compaction tests are supplied to the City Engineer.

Section 00641 – Aggregate Subbase, Base, and Shoulders

Comply with Section 00641 of the Standard Specifications modified as follows:

00641.10 Materials – ADD the following paragraph after section number and title:

– The base material and material source is subject to the approval of the Engineer. If the Contractor is not in agreement with the Engineer, he must prove the material is acceptable by providing test reports on the material, in accordance with standard sampling and testing requirements, by an ODOT-approved independent party. All costs associated with such testing shall be borne by the Contractor.

00641.12 Limits of Mixture – DELETE the paragraph that begins ("Provide a Mixture . . .") and REPLACE with the following:

Provide a mixture of aggregate and water having a uniform moisture content sufficient to obtain the required compaction. Water may be introduced in a mixing plant or on the grade. Proportions will be in percentages by weight and will be known as the Mix Design. Determine the proportion of aggregate and water according to the MFTP. The amount of water for the Mix Design will be based on the dry weight of the aggregate.

When introducing water at the mixing plant, furnish the mixture with a tolerance of ± 2% of the optimum water content at the time of mixing. If approved, excess percentage of water may be allowed. The Agency will treat excess percentage of water according to 00641.80(d).

00641.41 Mixing, Hauling, and Placing

ADD the following after the first paragraph ending ("...according to 00641.12").

Prior to the placement of base rock, all structures (e.g. manholes, utilities, catch basins) shall be completely installed, backfilled, set to finish grade, and all compaction tests are supplied to the City Engineer.

City of Bend Special Provisions to the Oregon Standard Specifications for Construction

TABLE OF CONTENTS

PART 00700 – WEARING SURFACES

PART 00700 – WEARING SURFACES

Comply with Section 00705 of the Standard Specifications modified as follows:

00705.11(c) Fog Coat – REPLACE the sentence that begins ("Provide CSS-1h, or HFRS-P1…") with the following paragraph:

Provide CRS-2P or HFRS-P1 emulsified asphalt for the fog coat.

ADD the following subsection:

00705.50 – Quality Control

Upon completion of paving, with a City inspector present, Contractor shall conduct a water test to ensure proper drainage grades along curblines. Contractor shall discharge a minimum of 500 gallons of water on to paved area. Puddles resulting to a depth of ¼ Inch or any water flowing on to private property shall be repaired.

Section 00706 – Emulsified Asphalt Slurry Seal Surfacing

Comply with Section 00706 of the Standard Specifications modified as follows:

Replace this subsection, except the subsection number and title, with the following:

00706.23 Rollers – DELETE in its entirety

00706.48 Rolling – DELETE in its entirety

Section 00715 – Multiple Application Emulsified Asphalt Surface Treatment

Comply with to Section 00715 of the Standard Specifications modified as follows:

00715.40 Season and Weather Limitations – REPLACE “July 1” with “June 1” in the sentence that begins ("The placing of multiple…").

Section 00730 – Emulsified Asphalt Tack Coat

Comply with Section 00730 of the Standard Specifications modified as follows:

00730.90 Payment – DELETE in its entirety and REPLACE with the following:

No separate or additional payment will be made for emulsified asphalt tack coat. Approximately _____ tons of emulsified asphalt in tack coat will be required on this Project.

Section 00744 – Minor Hot Mixed Asphalt Concrete (MHMAC) Pavement

Comply with Section 00744 of the Standard Specifications modified as follows:

00744.11(a) Asphalt Cement – REPLACE the sentence that begins ("Use PG 64-22 or . . .") with the following sentence:

Use PG 64-28 for standard applications (level I-III) or PG 70-28 asphalt for special applications including but not limited to round-a-bouts or high volume intersections or the City may require a full pavement design to be submitted if the contractor or engineer desires to deviate from these standards.

Recycled Asphalt Pavement (RAP) may be used up to 20%. A lower grade asphalt cement may not be used to replace PG 64-28 or PG 70-28.

00744.16 MHMAC Acceptance – DELETE in its entirety and REPLACE with the following:

A CAT-1 shall perform a minimum of one asphalt content, gradation, mix moisture, and Maximum Specific Gravity (AASHTO T 209) test per day and provide results to the Engineer by the middle of the following work shift. The Contractor shall also provide split samples to the Engineer when requested. Testing may be waived upon written notice and accepted visually by the Engineer according to Section 4(B) of the MFTP.

When three or more tests are performed on a project, a price adjustment will be calculated according to 00744.95.

ADD the following subsection:

00744.17 Small Quantity Acceptance

When less than three test results are obtained on a project and testing has not been waived by the Engineer, the MHMAC will be accepted according to the following:

(a.) Within Specification Limits If all sublot sample test results are within specification limits for all constituents (including compaction) the material will be accepted and the full bid price will be paid for the material represented by that test.

(b.) Outside Specification Limits - If a sublot sample test result for any constituent is outside the specification limit the Engineer will have the backup sample tested.

(1) Backup Within Specifications - If the backup sample test results for all constituents are within specification, the material will be accepted and the full bid price will be paid for the material represented by that test.

(2) Backup Out of Specifications - If the backup sample test results are out of specification, the Contractor may choose to accept the price adjustment calculated according to 00744.95 or may choose to sample the in-place material for further testing. The price adjustments will be computed using all original test results as well as all backup test results. (If there are less than three tests, average the two tests you have and use the average as the third test result). In no case will the composite pay factor (CPF) be greater than 1.0.

(3) In-Place Samples - If the in-place material is sampled, the Engineer will select and sample from three random locations from the area represented by the lot in question. Those samples will be tested and if found to be within specification the material will be accepted and paid for at the full bid price. If the material proves to be outside of the specification limits, the material will be accepted and paid for at an adjusted price according to 00744.95. In no case will the CPF be above 1.0.

00744.49 Compaction – DELETE and REPLACE with the following:

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 to a minimum of 91% of MAMD. Perform finish rolling and continue until all roller marks are eliminated. Determine the density of each sublot by averaging five QC tests performed at random locations by a CDT with the nuclear gauge operated in the backscatter mode according to WAQTC TM 8. Calculate MAMD according to ODOT TM 305. When less than three sublot test results are obtained on a project, the MHMAC will be accepted according to 00744.17. Perform a minimum of one sublot density test per day. The Engineer may waive compaction testing upon written notice.

00744.80 Measurement – DELETE the paragraph that begins ("No separate measurement will be made…").

00744.90 Payment – DELETE the paragraph that begins ("No separate or additional payment will be made for the asphalt tack…").

ADD the following subsection:

00744.95 MHMAC Price Adjustments

The Composite Pay Factor (CPF), calculated according to 00165.40 will be applied to the Contract unit price for the pay items of 00744.90 and to the applicable lot quantities. The CPF will be made available to the Contractor within 24 hours of receipt of the required quality control test results. If less than three samples are tested, the CPF will be computed as outlined in 00744.17. The maximum CPF for any case will be 1.0.

Use the following table to determine price adjustments in the CPF for constituents of MHMAC.

Gradation Constituents	Dense Graded MHMAC Type Weighting Factor (f)		
All Aggregate Passing	**3/4"**	**1/2"**	**3/8"**
1"	1		
3/4"	1	1	
1/2"	1	1	1
3/8"	–	–	1
No. 4	5	5	5
No. 8	5	6	6
No. 30	3	3	3
No. 200	10	10	10
Other Constituents			
Asphalt Content	26	26	26
Moisture Content	8	8	8
Compaction	40	40	40

Those MHMAC constituents statistically evaluated will be eligible for a maximum PF of 1.00 (see 00165.50(b-1)), unless otherwise specified.

If these specifications do not require measurement of a constituent, its individual PF will be considered 1.00 in calculating the CPF according to 00165.40.

A price adjustment will be determined by the following formula:

(CPF - 1) x MHMAC Unit Price x (LQ) = ____

Where: LQ is the quantity of mixture in the lot

Section 00745 – Hot Mixed Asphalt Concrete (HMAC)

Comply with Section 00745 of the Standard Specifications modified as follows:

00745.14 Tolerances and Limits – REPLACE the tolerance list with the following:

Gradation	Dense-Graded HMAC Type				Open-Graded HMAC TYPE		
Constitue	1"	3/4"	1/2"	3/8"	3/4"	1/2"	ATPB
1 1/2"	JMF						
1"	90 - 100%	JMF			99 - 100%		99 - 100%
3/4"	JMF ± 5%	90 - 100%	JMF		85 - 96%	99 - 100%	85 - 95%
1/2"	JMF ± 5%	JMF ± 5%	90 - 100%	JMF	55 - 71%	90 - 98%	35 - 68%
3/8"**	–	–	–	90 - 100%	–	–	–
No. 4	JMF ± 5%	JMF ± 5%	JMF ± 5%	JMF ± 5%	JMF ± 5%	JMF ± 5%	JMF ± 5%
No. 8	JMF ± 4%	JMF ± 4%	JMF ± 4%	JMF ± 4%	JMF ± 4%	JMF ± 4%	JMF ± 4%
No. 16**	–	–	–	–	–	–	–
No. 30	JMF ± 4%	JMF ± 4%	JMF ± 4%	JMF ± 4%	JMF ± 4%	JMF ± 4%	–
No. 50**	–	–	–	–	–	–	–
No. 100**	–	–	–	–	–	–	–
No. 200	JMF ± 2.0%	JMF ± 2.0%	JMF ± 2.0%	JMF ± 2.0%	JMF ± 2.0%	JMF ± 2.0%	JMF ± 2.0%

* Maximum not to exceed 100%
** Report percent passing sieve when no tolerance is listed

00745.16(a)(1) Personnel Requirements – ADD the following to the end of the bullet list:

- Providing at least one CAT-1 full-time at each plant site when producing mixture for the Project.

00745.16(a)(4) Testing Frequency – DELETE the paragraph that begins (“After the Mix Design...").

00745.16(a) Quality Control – ADD the following subsection:

(5) Plant Calibration – Calibrate all meters and belt scales at the HMAC mixing plant according to ODOT TM 322 prior to beginning production.

00745.16(b)(1) MDV QUALITY CONTROL – DELETE in its entirety and REPLACE the following subsection:

a. General - Perform MDV testing on projects with Level 2, Level 3, or Level 4 dense graded HMAC. Perform MDV tests on every sublot and as required at start up according to 00745.16(b-1-c) and the MFTP. Perform gradation and asphalt

content testing with each MDV test. Calculate the following values for each MDV test.

- Air Voids
- Voids in Mineral Aggregate (VMA)
- Voids Filled with Asphalt (VFA)
- P No. 200/Effective AC (Pbe) Ratio

The running averages of four MDV results shall be within the limits given below:

	Average of	**Limit**
Air Voids	4 samples	JMF Target ± 1.0%
VMA	4 samples	11.5 - 17.0 (1" Mix) 12.5 - 17.0 (3/4" Mix) 13.5 - 17.0 (1/2" Mix) 14.5 - 17.0 (3/8" Mix)
VFA	4 samples	65 - 75 (3/4" and 1/2" Mix in Level 2, 3 and 4) 65 - 78 (3/8" Mix in Level 2, 3 and 4) 70 - 80 (1/2" and 3/8" Mix in Level 1)
Passing No. 200/Pbe	4 samples	0.8 - 1.6

The CDT shall provide the results from the initial control strip to the CAT II for evaluation and comparison with the MDV results. If the MDV and density test results are contradictory, initiate an investigation. The CAT II shall recommend a plan to the Engineer for resolving the discrepancy based on the results of the investigation.

Take corrective action when required by the MDV start-up process of 00745.16(b-1-c). After the requirements of 00745.16(b-1-c) have been met, take corrective action if the MDV test results show that two consecutive running average of four samples are outside the above limits for air voids, VMA, VFA, or P No. 200/Pbe ratio. Document the corrective action and notify the Engineer. If test results continue to be outside the tolerance, stop production and make adjustments. Restart production only after the Engineer has approved the proposed adjustments. If the MDV test results are outside tolerance, but the mixture meets the current requirements for gradation and asphalt content, an adjustment to the JMF targets is required. Do not start a new lot as a result of the adjustment.

A request for an adjustment to the JMF targets may be made to the Engineer by the Contractor's CAT-II. The requested change will be reviewed and documented by the Engineer. If acceptable, a revised JMF will be allowed. Clearly document the sublot test for which the adjusted targets are in effect. Adjustments for gradation

shall not exceed the tolerances specified for the original JMF limits. Adjustments for AC content shall be within 0.5% of the original JMF. The JMF asphalt content may only be reduced if the production VMA meets or exceeds the above requirements. Adjustments for RAP content shall be within 5% of the original JMF, but shall not exceed the requirements of 00745.03. Regardless of these tolerances, the adjusted JMF shall be within the mixture specification control points of 00745.12. If a redesign of the mixture becomes necessary, submit a new JMF according to the requirements of these specifications.

Perform a Tensile Strength Ratio (TSR) test (AASHTO T 283) on a sample obtained during the first two days of production after QC test results verify that HMAC constituents with a weighting factor greater than one according to 00745.95 are in tolerance. Provide test results to the Engineer within four working days of obtaining the sample. Stop production and make adjustments if the TSR is less than 70. Restart production only after the Engineer has approved the proposed adjustments.

b. Laboratory Compactor Selection - Use a Gyratory compactor for MDV when a Gyratory compactor is used to develop the JMF. For all other cases, use a Gyratory compactor or Marshall compactor, as selected by the Contractor.

c. MDV Requirements at Start-Up - Perform MDV testing at the start-up of the JMF production according to the following process:

1. Obtain a sample during the first 100 tons of production and immediately perform MDV testing.

2. If air voids and VMA are within tolerance, then continue remaining MDV testing at the established random QC sublot interval. If not, then go to step "3".

3. If air voids and/or VMA are out of tolerance according to 00745.16(b-1-a), then make adjustments and immediately obtain another sample and perform MDV testing. Go to step "4".

4. If air voids and VMA from the MDV testing in step "3" are within tolerance, then continue remaining MDV testing at the established random QC sublot interval. If not, go to step "5".

5. If air voids from step "3" are more than $\pm$ 1.5% from the target, then stop production immediately and make adjustments. If they are not, then go to step "6". Obtain approval of the Engineer before restarting production. Begin MDV testing again at step "1".

6. If air voids from step "3" are out of tolerance and 1.5% or less from the target, or the VMA from step "3" is out of tolerance, then make adjustments and immediately obtain another sample and perform MDV testing. Go to step "4".

The initial MDV sample shall be used as the first random QC sublot test. Subsequent MDV samples required due to failure of start-up criteria will be used for a sublot QC test if the sample is taken within 100 tons of the scheduled random QC sample location. If not, the MDV testing shall be performed separate from, and not included in, the random QC testing program. Any required MDV testing will be completed at the Contractor's expense.

00745.24(a) Steel-Wheeled Rollers – DELETE in its entirety and REPLACE with the following:

Provide steel-wheeled rollers with a minimum gross static weight as follows:

Level 1	Level 2	Level 3	Level 4
Breakdown and Intermediate	8 ton	10 ton	12 ton
Finish	6 ton	8 ton	10 ton

00745.40 Season and Temperature Limitations – REPLACE "50 °F" with 40 °F" in the table, for Surface Temperature of Dense Graded Mixes 2 inches to 2 1/2 inches.

00745.42 Preparation of Underlying Surfaces – ADD All restoration shall conform to section 3.8 the City of Bend's pavement restoration policy as stated in the Design Standards and 330.40 of these specifications.

00745.49 (e) Other areas – REPLACE the sentence ("compaction to a specific density will not be required on temporary surfacing (see 00745.50), guardrails flares, mailbox turnouts, road approaches, pavement repair and areas of…)with the following:

…less than 150 square feet in area. Asphalt shall be placed in lifts no greater than 2" or as directed by the City.

00745.61(a)(2) Wearing Course – REPLACE the sentence which begins ("They shall be located…") with the following:

They shall be located at either the centerline, skip lines, or fog lines unless approved by the Engineer.

All restoration shall conform to section 3.8 the City of Bend's pavement restoration policy as stated in the Design Standards and 330.40 of these specifications. Asphalt shall be placed in lifts no greater than 2" or as directed by the City.

00745.80 Measurement – ADD the following sentence to the end of the paragraph that begins ("When RAP materials are used..."):

For non-RAP mixtures, measurement of the total asphalt quantity will be based on quality control tests averaged to the nearest 0.01% when the Engineer determines that payment by invoice and tank sticking is impractical.

Section 00746 – Crack Sealing Flexible Pavements

Comply with Section 00746 of the Standard Specifications modified as follows:

00746.10 Sealants – REPLACE the paragraph that begins ("Furnish hot-poured sealants…") with the following:

Furnish hot poured sealants of the type intended for use in sealing cracks in asphalt concrete pavement that meet the requirements of 02440.30.

Sealants shall meet ASTM D 5329 standard test methods for sealants and fillers. All sealants shall be hot-applied, for joints and cracks in asphaltic and Portland cement concrete. Sand sealing is on an approved basis at the City's discretion.

Section 00749 – Miscellaneous Asphalt Concrete Structures

Comply with Section 00749 of the Standard Specifications modified as follows:

00749.45 - Compacting Asphalt Concrete Delete the end of the sentence that starts with "(Along curbs…~~hot hand tampers, or hand rollers~~.") REPLACE with the following: …with a minimum of four coverages.

SECTION 00759 - MISCELLANEOUS PORTLAND CEMENT CONCRETE STRUCTURES

Comply with Section 00759 of the Standard Specifications modified as follows:

Description

00759.00 Scope – DELETE in its entirety and REPLACE with the following:

This work consists of furnishing, placing and finishing commercial grade concrete curbs, islands, traffic separators, driveways, walks, monolithic curb and sidewalks, concrete driveway connections, ADA curb ramps, miscellaneous surfaces, and stairs with metal handrail in close conformity to the lines, grades and dimensions shown or established. The items in this Section will be collectively referred to as "structures".

This work also consists of removing existing concrete sidewalks and curbs and furnishing and placing sidewalk ramp treatments.

00759.12 Sidewalk Ramp Treatment – DELETE in its entirety and REPLACE with the following:
Where truncated dome detectable warning surfaces are shown, furnish and place the following materials:

ADA Cast-In-Place (Wetset) Detectable Warning Panels with mechanical anchors by Armorcast Products Company (www.armorcastprod.com or (818) 982-3600) or approved equal. Furnish color shown in the plans or approved by the engineer.

Where truncated dome detectable warning surfaces are shown installed on a radius, furnish and place the following materials:

Vanguard Liquid Applied Truncated Domes comprised of resins, reactive monomers, pigments, glass beads, and fillers by Vanguard ADA Systems of America (http://www.vanguardonline.com or (360) 668-5700) or approved equal. Furnish color shown in the plans or approved by the engineer.

ADD the following subsection:

00759.22 – Electronic Level – Furnish a calibrated 48-inch electronic “smart-level” to use during and after construction to verify that all grades and slope meet PROWAG criteria.

00759.41 Earthwork – ADD the following to this sub-section:

Remove existing structures and pavement as shown and as necessary to construct ADA curb ramps. Saw cut pavement to clean straight lines with vertical faces extending completely through pavement section.

Where shown saw cut and remove existing curb. Saw cut curb to clean straight lines with vertical face extending completely through curb section. Make saw cut perpendicular to face of curb. If proposed saw cut is located within two feet from existing expansion or control joint, remove and replace curb to existing joint beyond dimension shown on plans. Saw cut and remove existing sidewalk to dimensions shown on plans. Saw cut concrete sidewalks to clean straight lines with vertical face extending completely through sidewalk section. Make saw cuts perpendicular to sidewalk alignment. When planned saw cut is located within 2 feet of expansion or contraction joint, remove sidewalk to expansion or control joint beyond dimension shown on plans.

00759.46 Concrete – ADD the following to the end of this sub-section:

Before scheduling delivery of concrete, document that forms are constructed to dimensions and grades shown on plans and that grades and dimensions meet PROWAG criteria. Use a 48-inch electronic Smart Level to verify that formwork matches plan and PROWAG grades. Correct all discrepancies before scheduling delivery of concrete to ensure that finished concrete work meets requirements of PROWAG.

Use City of Bend ADA Ramp evaluation form to document that forms comply with PROWAG criteria. Submit completed forms to City inspector before scheduling concrete delivery. Evaluation form can be downloaded from the following website:

(http://www.ci.Bend.or.us/accessibility/curb_ramp_assessment_forms.html)

00759.50 (a) General ADD the following to the end of this sub-section:

Construct ADA curb ramps, sidewalks, and other pedestrian facilities according to all requirements of PROWAG. Verify compliance by using a 48-inch smart level to check grades and slopes.

Curb backfill shall be of good quality topsoil per Section 1040.14. Topsoil shall be fertile, loamy, natural surface soil, well graded and free from substances toxic to plant growth, noxious weeds, roots, refuse, sticks and rocks greater than 3-inch major diameter. Pumice or soil that contains excessive pumice shall not be permitted.

00759.50(c) Driveways, Walks, and Surfacing ADD the following to the end of this sub-section:

Install truncated dome detectable warning surfaces completely across curb ramp opening and perpendicular to the running slope of the ramp.

Before installing truncated domes, review manufacturer's instructions and Plans. Refer all discrepancies to City Inspector. Check supplied warning panel for attached metal concrete anchors and washers. If anchors or washer are missing or damaged, replace with new anchor or washer supplied by the manufacturer before installing. Supply replacement hardware at the Contractor's expense.

Maintain a slump range of 4- to 7-inches for the concrete to permit solid placement of cast in place truncated dome tiles. Do not use an overly wet mix, which will cause tile to float. Pour and finish concrete to a true and smooth surface to the required dimensions and slope before placing panel.

Immediately after finishing concrete, use electronic "smart level" to check that the required slope has been achieved. Place panel true and perpendicular to the running slope of the ramp as shown. Tamp or vibrate panels into the fresh concrete to ensure that the field level of the tile is flush with adjacent concrete surface on all four sides of the tile. Do not attempt to level the tile by stepping on tile. This may cause uneven setting, which can result in air voids under the tile surface. Set surface of tile field (base of truncated dome) flush with adjacent surfaces to permit proper water drainage and to eliminate tripping hazards between adjacent surfaces. Use 25 to 50 pound weights to hold down panels after placement in concrete.

Leave factory installed protective cover on panels during entire installation process to prevent concrete from splashing onto the finished surface of the tile. When preparing to set tile, do not remove concrete in the area that will receive tile. In order to ensure that no air voids form under tile, tile must be set on uniform concrete surface.

While concrete is workable, use steel edging trowel with a minimum of 1/8" radius to edge the finished concrete around the panel. Then use a steel trowel to finish the concrete around the tile's perimeter so it is flush with field level of the tile.

After installing tile, review installation according to dimensions and grades shown on the plans and if necessary, adjust tile before the concrete sets.

Immediately after concrete has cured, remove protective plastic wrap from the tile surface by cutting the plastic wrap with a sharp knife held tight to the concrete/tile interface. If concrete bled under the plastic, use a soft brass wire brush to clean the residue without damage to the tile surface.

00759.50 Surface Finishing – ADD the following subsection:

(d) Service Stamps – All sewer and water locations shall be marked on the top of the curb with the appropriate brand: “S” for sewer and “W” for water. Brand shall be a minimum of 4 inches in height and ¼ inch in depth.

(e) Cutting Truncated Domes – Furnish truncated dome panels in standard sizes supplied by the manufacturer. Where cutting panels is necessary to provide custom sizes shown, follow manufacturer’s recommendations and use the following procedure.

Do not install panels smaller than 2-feet by 2-feet. Provide standard panel sizes and plan cuts to minimize panel waste.

Cut tiles to custom sizes using a continuous rim diamond blade in a circular saw or mini-grinder. Use a straightedge when cutting straight lines.

When placing cut panels, butt clean uncut edges against each other. Orient cut edges to the outsides of the ramp.

Furnish and place anchors for cut panels according to the manufacturer’s recommendations.

(f) Liquid Applied Truncated Domes – Install liquid applied truncated dome detectable warning surfaces according to manufacturer’s directions and recommendations and as shown.

Liquid applied truncated dome detectable warnings must be installed by a certified Vanguard installer. Contact Vanguard of America for a list of installers.

Install liquid applied truncated domes when surface temperature is between 35 degrees Fahrenheit and 88 degrees Fahrenheit.

Install on clean, dry, and fully cured surface free from surface curing compounds, sealers, or surface coloring. If installed on colored concrete, coloring must be integral and not surface applied. Remove all surface curing compounds or sealers by grinding on all concrete that is less than 6-months old or if deemed necessary by certified Vanguard installer.

Install on broom finished surface for maximum adhesion.

Install on concrete with minimum compressive strength 2500 PSI. Allow concrete to cure for minimum of 10 days prior to the installation. The Vanguard installer has full discretion to determine whether it may (or should) be installed earlier or later than above defined timelines to insure proper bonding.

ADD the following subsection:

00759.60 Metal Handrail – Fabricate and assemble free standing and bolted down metal handrail as shown.

(a) Welding – Welding, welder qualifications, prequalification of weld details and inspection of welds shall conform to AWS D1.1. Submit all welding procedure specifications to the Engineer for approval.

(b) Punched Holes - Use a die with a diameter not exceeding the diameter of the punch by more than 1/16 inch. Ream any holes that are required to be enlarged to admit the anchor bolts. Make clean cut holes without torn or ragged edges.

(c) Accuracy of Punched Holes - Locate all holes punched full size so accurately that when multiple anchor plates are stacked with the edges even, a cylindrical pin 1/8 inch smaller in diameter than the nominal size of the punched hole may be entered perpendicular to the face of the plate without drifting in each of the connecting holes in the same plane. Non-conforming pieces will be rejected.

00759.90 Payment – ADD the following pay items:

Pay Item	Unit of Measurement
(k) Concrete Driveway Connections	Square Foot
(l) ADA Curb Ramps	Square Foot
(m) Truncated Dome Detectible Warnings	Square Foot
(n) Liquid Applied Truncated Domes	Square Foot
(o) Metal handrail	Foot

DELETE the paragraph that reads "Items (e) and (f) include sidewalk ramps."

ADD the following after the sentence that begins (“Item (h) includes . . .”)

Item (l) includes saw cutting and removing existing concrete walks, curbs, ramps, or pavement according to Section 00330 and replacing them with new sidewalk ramps and curbs.

City of Bend Special Provisions to the
Oregon Standard Specifications for Construction

TABLE OF CONTENTS

PART 00800 – PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES

SECTION 00810 - METAL GUARDRAIL

[NOTE: Except for extra length guardrail posts, do not separately pay for new guardrail posts under this Section. New posts are already included in the appropriate guardrail pay item. Replacing existing guardrail posts are now covered in Section 00812.]

Comply with Section 00810 of the Standard Specifications modified as follows:

00810.40 Timing and Coordination of Work - ADD the following paragraph at the end of this subsection:

Contact the Engineer and the appropriate utilities 72 hours before beginning hand digging guardrail post holes.

00810.90 Payment - ADD the following pay item:

(j) Extra for Hand Dug Guardrail Post Holes..... Each

In item (j) the extra costs for hand dug holes are costs that are not covered and included in the unit price for one or more of the other listed pay items.

Payment for item (j) performed beyond 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 00812 - ADJUSTING GUARDRAIL

REPLACE Section 00812 of the Standard Specifications in its entirety with the following:

SECTION 00812 - ADJUSTING AND REPAIRING GUARDRAIL

Description

00812.00 Scope - This work consists of adjusting and repairing existing guardrail as shown or directed.

Materials

00812.10 Materials - Furnish replacement metal beam rails, posts, blocks, and hardware meeting the requirements of 00810.10.

Construction

00812.40 General - Install all guardrail components during the same day they are removed. Repair minor damage to galvanizing according to ASTM A 780. Minimum zinc content for Method A2 is 94% on the dry film.

00812.41 Adjusting Guardrail - Adjust existing guardrail by one or both of the following methods:

(a) Posts Remain in Place:

Remove the existing metal beam rails and blocks in a manner that will not damage galvanizing.

If required, drill new bolt holes in posts.

Treat all existing and all new holes with a preservative from the QPL.

Reinstall the metal beam rails and blocks.

Perform all other required work as shown.

(b) Raise Posts - Remove and reinstall posts to the required height, or raise them to the required height and work grout or other materials under them in a manner satisfactory to the Engineer.

Adjust existing terminal ends by raising the soil tubes and ground struts to the required height and placing and compacting matching material under the ground struts.

00812.43 Repairing Guardrail - Repair existing guardrail by replacing metal beam rails, posts, blocks, and hardware. Install new metal beam rails, posts, blocks, and hardware according to 00810.42 and 00810.43.

Measurement

00812.80 Measurement - The quantities of work performed under this Section will be determined as follows:

- **Adjusting Guardrail** - Adjusted guardrail will be measured on the length basis, of existing guardrail adjusted. Measurement will be by one of the following methods:

  - **Count Method** - The number of standard sections will be counted and multiplied by 12 1/2 feet. For purposes of this subsection, a standard section is defined as 12 1/2 feet of complete guardrail, without regard to the number of existing posts or existing rail elements. Non-standard sections will be measured from center of post to center of post, to the nearest foot, and added to the total calculated length of the standard sections for each run.

  - **Length Method** - Measurement will be from center to center of terminal end posts, or as otherwise shown, along the line and grade of each run of each type to the nearest foot.

- **Repairing Guardrail** - Repaired guardrail metal beam rails, posts, and blocks will be measured on the unit basis. For purposes of this subsection, a metal beam rail is defined as 12 1/2 feet long.

Payment

00812.90 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**
Adjusting Guardrail	Foot
Metal Beam Rails	Each
Guardrail Posts	Each
Guardrail Blocks	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:

- Hardware
- Adjusting terminal ends
- Replacement metal beam rails, posts, and blocks that are damaged by Contractor equipment or operations.

SECTION 00815 - BOLLARDS

Comply with Section 00815 of the Standard Specifications modified as follows:

00815.10 Materials - REPLACE the reflective sheeting line with the following:

Retroreflective Sheeting (Type III and Type IV)...From QPL

SECTION 00820 - CONCRETE BARRIER

Comply with Section 00820 of the Standard Specifications modified as follows:

00820.12(a) New Barrier Used for Temporary Applications - In the bullet that begins "Are given two coats of…", REPLACE "02210.30(c)" with "02210.30".

00820.12(b) Barrier Used on Previous Projects - In the paragraph that begins "Apply two coats of…", REPLACE "02210.30(c)" with "02210.30".

SECTION 00830 - IMPACT ATTENUATORS

Comply with Section 00830 of the Standard Specifications modified as follows:

00830.40 General - ADD the following paragraph at the end of this subsection:

Install fixed object markers on the head of the impact attenuator.

SECTION 00840 - DELINEATORS AND MILEPOST MARKER POSTS

Comply with Section 00840 of the Standard Specifications modified as follows:

00840.10 Materials - REPLACE the "Reflective Sheeting for Delineators" line with the following line:

Delineator Reflective Sheeting (Type III and Type IV) ... From QPL

SECTION 00850 - COMMON PROVISIONS FOR PAVEMENT MARKINGS

(When this Section is used on a project and when it has a completion date of September 15 or later, contact the Scheduler to determine if a separate completion date for striping is required. If a separate completion date is required, include an interim completion date in 00180.50(h).)

Comply with Section 00850 of the Standard Specifications modified as follows:

00850.20(b) Equipment for Longitudinal Lines - REPLACE the paragraph that begins "Use equipment capable of…" with the following paragraph and bullets:

Provide equipment that can:

- Place two parallel lines simultaneously with 4 inch minimum to 12 inch maximum spacings between the two lines.
- Place the entire width of a line in one pass.

00850.46 Placement Tolerance - REPLACE the bullet that begins "Thickness of lines…" with the following bullet:

- **Thickness of flat, surface applied lines:** + 1/3 of the specified thickness, – 1/10 of the specified thickness

00850.47(b) Curing of Material - REPLACE the sentence that begins "Rate the line…" with the following sentence:

Rate the line, markings, and pavement marker adhesive at the time of installation to determine if the material has properly cured.

00850.47(c) Retroreflectivity - REPLACE the sentence that begins "Use a retroreflectometer…" with the following sentence:

Use a 30 meter geometry retroreflectometer to measure the retroreflectivity within 48 hours of curing, except for paint applications:

00850.70 Disposal of Waste - REPLACE this subsection with the following subsection:

00850.70 Disposal of Materials - Dispose of all materials according to 00290.20.

SECTION 00851 - PAVEMENT MARKING REMOVAL

Comply with Section 00851 of the Standard Specifications modified as follows:

00851.40 General - REPLACE the paragraph that begins "Remove non-durable pavement markings…" with the following paragraph:

Remove non-durable pavement markings by hydroblasting or steel shot blasting so that the pavement surface is not damaged below a depth of 1/8 inch. Remove durable markings by steel shot blasting or grinding the pavement surface to a depth no greater than 1/8 inch, creating a smooth, flat slot of uniform depth.

SECTION 00857 - RUMBLE STRIPS

Comply with Section 00857 of the Standard Specifications modified as follows:

00857.40 Construction - REPLACE this subsection, except for the subsection number and title, with the following:

Clean the pavement by sweeping to remove dust and other foreign matter. Dispose of all materials according to 00290.20.

00857.80 Measurement - In the paragraph that begins "The quantities of…", replace the sentence that begins "Measurement will be…" with the following sentence:

Measurement will be made along each continuous rumble strip run, regardless of location or width of strip.

SECTION 00860 - LONGITUDINAL PAVEMENT MARKINGS - PAINT

Comply with Section 00860 of the Standard Specifications modified as follows:

00860.45 Installation - In the bullet that begins "For yellow colored markings…", REPLACE the sentence that begins with "For yellow colored markings…" with the following two sentences:

For yellow colored markings that delineate two-way traffic, apply the second application in the opposite direction of the first application. For yellow colored markings on one-way roadways or adjacent to raised medians, apply the second application in the same direction of the first application.

SECTION 00867 - TRANSVERSE PAVEMENT MARKINGS - LEGENDS AND BARS

Comply with Section 00867 of the Standard Specifications modified as follows:

00867.40 General - DELETE this subsection.

00867.45 Installation – DELETE this subsection and REPLACE with the following:

Place permanent markings only when the manufacturer's representative determines that the pavement is ready for the pavement marking material.

Transverse joints will be allowed with no overlap or gap allowed at the joint.

Minimum initial retroreflectivity shall be 250 mcd/m^2/lx.

Apply one of the following marking material types:

- **Type B: Preformed, Fused Thermoplastic Film** - Install preformed, fused thermoplastic film as shown.

- **Type B-HS: Preformed, Fused Thermoplastic Film High Skid** - Install preformed, fused thermoplastic film high skid, that has intermixed reflective elements with factory installed crushed glass or aggregate on the surface for all staggered continental crosswalks, bike lane stencils, bike path railroad crossings, and other transverse pavement markings as shown.

- **Type BH**: Install Type B or Type B-HS as the Contractor elects.

00867.90 Payment - REPLACE this subsection, except for the subsection number and title, with the following:

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:

(Modify this list of pay items to only include project specific pay items. Delete those that are not required on the project. Re-alphabetize the list starting with (a), then (b), etc. Obtain information from the Traffic Designer.)

	Pay Item	**Unit of Measurement**
(a)	Pavement Legend, Type ____ : Arrows	Each
(b)	Pavement Legend, Type ____ : "ONLY"	Each
(c)	Pavement Legend, Type ____ : "SCHOOL"	Each
(d)	Pavement Legend, Type ____ : "SCHOOL" Large	Each
(e)	Pavement Legend, Type ____ : "BUS"	Each

(f) Pavement Legend, Type ____ : Railroad Crossing ..... Each
(g) Pavement Legend, Type ____ : Railroad Crossing, Narrow Each
(h) Pavement Legend, Type ____ : Railroad Crossing, BikeEach
(i) Pavement Legend, Type ____ : Bicycle Lane Stencil ... Each
(j) Pavement Legend, Type ____ : Disabled Parking ..... Each
(k) Pavement Legend, Type ____ : On-Street Parking..... Each
(l) Pavement Legend, Type ____ : __' x __' Yield Line Triangle Each
(m) Pavement Legend, Type ____ : _____ ..... Each
(n) Pavement Bar, Type____ ..... Square Foot

(Include only the appropriate following paragraphs for project specific items. Delete the paragraphs that do not apply to the project. Re-alphabetize the paragraphs as appropriate to match the re-alphabetized list above.)

In items (a) through (n), the type of pavement marking material will be inserted in the first blank.

In item (m), the name of the legend will be inserted in the second blank.

Item (a) includes single or multiple headed arrows as required.

Items (f) and (g) include the R x R symbol, two 24 inch wide white pavement bars placed directly above and directly below the R x R symbol, and one 24 inch wide white stop bar placed prior to the tracks.

Item (h) includes the R x R symbol and one 12 inch wide white pavement bar placed above the R x R symbol.

Item (i) includes the bike lane stencil and arrow.

Item (j) includes the wheelchair stencil only. The 4 inch wide white lines used to mark the disabled parking space and access aisle will be paid for according to 00860.90

Item (k) includes the cross style marking or the end marking.

(Obtain information from the Traffic Designer to fill in the blank for items (l and m).

Item (l) includes one triangle used to form the yield line.

Item (m) includes _____ .

Item (n) includes all transverse pavement markings that are defined as a "BAR", including but not limited to, stop bars, crosswalk bars, chevron bars, transverse median bars, and transverse shoulder bars.

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.

Payment for work under this Section will be limited to 75% of the amount due until the Agency has received the signed warranty.

City of Bend Special Provisions to the
Oregon Standard Specifications for Construction

TABLE OF CONTENTS

PART 00900 – PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS

Section 00905 – Removal and Reinstallation of Existing Signs

Comply with Section 00905 of the Standard Specifications.

00905.40 General – ADD the following after the paragraph that begins ("Remove to 1 foot . . ."):

Existing signs and posts meeting current standards and in good condition designated for "removal only" shall be protected and returned to the City of Bend Publics Works at 575 NE 15th Street, Bend, Oregon. Contact the Streets Division Supervisor at (541) 317-3000 at least one business day prior to delivery.

Section 00910 – Wood Sign Posts

Comply with Section 00910 the Standard Specifications modified as follows:

00910.40 Post Holes – ADD the following paragraph after the sentence that begins ("On completion of the work"):

When using posts treated with wood preservatives, maximize the distance between post placement and stormwater facilities (including streets) and, when installing or servicing the sign posts, take measures such as incorporating and maintaining soil berms to minimize the potential of stormwater runoff from within 20 inches of the post from reaching the street or other storm drainage facility.

Section 00920 – Sign Support Footings

Comply with Section 00920 of the Standard Specifications.

00920.80 Measurement – DELETE the paragraph that begins (“Estimated quantities of concrete…”).

Section 00930 – Metal Sign Supports

Comply with Section 00930 of the Standard Specifications modified as follows:

(Use the following subsection .01 when mast arm street name sign mounts are included in the project. Check with Designer.)

00930.01 Definitions and Terms - ADD the following:

Mast Arm Street Name Sign Mounts - This group includes the frame members, attachment channel or bracket, steel bands or cables, and fasteners necessary to install a street name sign on a signal mast arm.

00930.02 Working Drawings – DELETE the bullet "Square Tube Sign Supports" in the paragraph that begins ("Working drawings are not…").

00930.10 Materials – ADD the following in the paragraph that begins "Furnish galvanized bolts…", after the words "job site":

Minor Sign Supports

REPLACE the sentence that begins ("Galvanizing shall conform to…") with the following:

Except for square tube sign supports, galvanizing shall conform to the requirements of Section 02530. Galvanize square tube sign supports according to ASTM A653 G140.

(Use the following subsection .80 to list the estimated quantities of steel. List items by pay item name. Obtain information from the Designer)

00930.80 Measurement – ADD the following to the end of this subsection:

The estimated quantities of structural steel are as follows:

Item	Estimated Quantity (Pound)

00930.90 Payment – REPLACE the paragraph that begins ("No separate or additional payment…") with the following:

No separate or additional payment will be made for route marker frames, wind bracing, pole clamps, stainless steel clamps, mast arm street name sign mounts, or special sign brackets.

Section 00940 – Signs

Comply with Section 00940 of the Standard Specifications modified as follows:

(Use the following subsection .00 when directed by the Sign Designer. If used, include SP937.)

00940.00 Scope – ADD the following to the end of this subsection:

Paint the backs of aluminum substrate signs, and all metal sign supports, according to Section 00937.

00940.03 Drawings – REPLACE the sentence that begins (“Copies of working drawings…”) with the following:

Within 30 calendar days after executing of the Contract, submit at least three copies of working drawings for each non-standard sign on the project. Obtain Agency approval prior to fabrication.

00940.46 Inspection - REPLACE the sentences that begin "Inspection will…" and "Testing for…" with the following sentence:

Inspection will be for conformance to the plans and Specifications, and for conformance to nighttime visibility.

(Use the following addition to subsection .80 when City-provided signs are required. Check with Sign Designer.)

00940.80 General – ADD the following sentence to the end of the sentence that begins “(No deductions will be . . .”):

No measurement will be made for signs furbished by the Agency.

(Use the following addition to subsection .90 when City-provided signs are required. Check with Sign Designer.)

00940.90 Pament – ADD the following sentence to the paragraph that begins (“The accepted quantities for signs…”):

No payment will be made for signs furnished by the Agency.

Section 00950 – Removal of Electrical Systems

(Follow all instructions. If there are no instructions above a subsection, paragraph, sentence, or bullet, then include them in the project but make necessary modifications to only include project specific specifications. Delete specifications that do not apply to the project.)

Comply with Section 00950 of the Standard Specifications modified as follows:

(Use the following subsection .02 to define the electrical systems. Obtain information from the Signal Designer. Remove the "(s)" or the parentheses, whichever is applicable.)

00950.02 Definitions - ADD the following after the "**Electrical Systems**" definition:

The electrical system(s) to be removed under this Contract include:

(Use the following lead-in paragraph and subsection .42 when salvaging and stockpiling removed materials. Be sure that a "public interest finding letter" is on file before including this subsection. Contact Engineer for all information regarding equipment to be salvaged. List materials and stockpile locations.)

ADD the following subsection:

00950.42 Salvaging and Stockpiling Materials - The following materials will remain the property of the Agency. Salvage the materials and stockpile them at the locations indicated. Contact Engineer to confirm delivery 48 hours prior to delivery.

Materials	Stockpile Locations

(Use the following subsection .90 when salvaging and stockpiling removed materials.)

00950.90 Payment - ADD the following paragraph after the paragraph that starts ("Payment will be payment . . ."):

No separate or additional payment will be made for salvaging and stockpiling materials.

Section 00960 – Common Provisions for Electrical Systems

Comply with Section 00960 of the Standard Specifications modified as follows:

00960.41(f) Disposition of Waste Materials – REPLACE this subsection with the following subsection:

00960.41(f) Disposal of Materials – Dispose of all materials according to 00290.20.

(Use the following lead-in paragraph and subsection .47 when temporary signal wood poles are required. Check with Designer.)

ADD the following subsection:

00960.47 Wood Poles - Submit wood pole designs according to 00960.02 including proposed ANSI 05.1 wood pole Class, guy anchor and span wire designs, and pole setting depths.

Section 00962 – Metal Illumination and Traffic Signal Supports

Comply with Section 00962 of the Standard Specifications modified as follows:

00962.05(c) Illumination Supports – ADD the following to the end of this subsection:

The following standard illumination pole drawings are prequalified for use on the Project:

Ameron Pole Products Division	Drg. OR7, Rev. C, 1/02 Drg. OR8, Rev. C, 1/02 Drg. OR9, Rev. E, 2/02
Union Metal Corp.	Drg. 71049-B18 sh 1, R3, 2/99 Drg. 71049-B18 sh 2, R3, 2/99 Drg. 71049-B19 sh 1, R3, 2/99 Drg. 71049-B19 sh 2, R3, 2/99
Northwest Signal Supply	Drg. NWS2285M, 9/00
Valmont Industries Inc.	Drg. DB00386 sh 1, Rev. B, 3/12/03 Drg. DB00386 sh 2, Rev. B, 3/12/03 Drg. DB00386 sh 3, Rev. B, 3/12/03 Drg. DB00387 sh 1, Rev. B, 3/12/03 Drg. DB00387 sh 2, Rev. B, 3/12/03

00962.10 Materials – ADD the following to the end of the material list:

High-Strength Fasteners 02560.20

00962.41(b) Disposition of Waste Materials – DELETE and REPLACE this subsection with the following:

Disposal of Materials – Dispose of all materials according to 00290.20.

Section 00963 – Signal Support Drilled Shafts

Comply with Section 00963 of the Standard Specifications modified as follows:

00963.10 Materials – ADD the following paragraph to the end of this subsection:

Provide the commercial grade concrete mixture with a slump of 8 inches ± 1 1/2 inches.

Section 00970 – Highway Illumination

Comply with Section 00970 of the Standard Specifications modified as follows:

00970.00 Scope – DELETE and REPLACE with the following:

In addition to the requirements of Section 00960, Section 00962, and Section 02926, install highway illumination according to the following Specifications.

ADD the following subsection:

00970.50 Grounding and Bonding – In addition to the requirements of 00960.50 and 00962.50, ground and bond metal illumination poles and high mast towers according to the following:

Install 1 inch non-metallic conduit from the pole base to the concrete and polymer concrete junction box at each pole. Install a ground rod in each junction box and install No. 6 AWG copper ground wire from the ground stud in the pole base to the ground rod in the junction box. The ground rod may be installed in the same junction box that provides illumination circuitry to the pole, however, provide a separate and independent conduit for the ground wire. Bond all metal conduit and metal junction box covers, if used, together to the ground rod.

On the inside of high mast tower shafts, weld a 1/2 inch Type 308, 309, or 310 threaded stainless steel stud for a grounding lug. Locate the grounding lug 90 degrees from and level with the bottom of the handhole.

00970.80 Measurement – REPLACE the sentence that begins and ends "The estimated quantities of…the Special Provisions." with the following:

The quantities of lighting poles and arms are listed on the Project plans.

Section 00990 – Traffic Signals

Comply with Section 00990 of the Standard Specifications modified as follows:

00990.00 Scope – DELETE in its entirety and REPLACE subsection with the following:

In addition to the requirements of Section 00960, Section 00962, and Section 02925, install traffic signals according to the following Specifications.

(Use the following subsection .42 when audible pedestrian signals are required. Check with Signal Designer before using.)

00990.42 Indication Equipment – ADD the following to the end of this subsection:

(h.) Audible Pedestrian Signal (APS) - Provide a unique APS sound coincidental with the WALK indication. The APS system shall include a solid state electronic board, power supply, enclosure, loudspeaker, and mounting hardware necessary for fulfilling the intended use and the applicable portions of Standard Specification for Microcomputer Signal Controller.

(1) General - Provide an actuated delay time button that is adjustable in one-second increments throughout the range of 0 to 15 seconds.

The APS unit shall have a sound inhibit circuit capable of control by an external device.

(2) Electrical Requirements - The APS unit shall operate on 95 to 130 VAC, 60Hz, ≤ 3 W.

Provide a power protection circuit consisting of both fuse and transient protection.

Provide an optically isolated circuit allowing delayed actuation of the audible signal.

(3) Environmental Requirements - The APS unit shall function properly throughout an ambient air temperature range of -35 °F to +165 °F.

(4) Outputs - Provide voice message, including automatic repeat capability for messages up to 20 seconds in length.

The audible signal shall be self-adjusting based on ambient noise during the WALK period.

The volume level at a distance of 3 feet from the APS enclosure shall be 66 dB typical, with a maximum of 90 dB.

The minimum volume level shall be adjustable proportionally from 66 dB to 90 dB without dismantling the APS unit housing.

Provide two switch-selectable electronic sounds according to the following:

Parameter	Sound No. 1	Sound No. 2
Sound type	"Peep-peep"	"Cuckoo"
Method	Electronic var. frequency tone	Electronic var. frequency tone
Period	1.0 sec. ± 20%	1.5 sec. ± 20%
Duration	0.2 sec. ± 20%	0.6 sec. ± 20%
Frequency Base	2800 Hz ± 20%	1100 Hz ± 20%
Frequency Deviation	– 800 Hz ± 20%	+120 Hz ± 20%

00990.43(a) Pedestrian Push Buttons – REPLACE the sentence that begins (“Install push buttons…which it is intended.”) with the following:

Install pushbuttons in a standard H-frame mount, unless otherwise noted on the plans. All pushbutton assemblies shall include an arrow pointing to the crosswalk for which it is intended.

ADD the following:

(Use the following subsection .43(c) when video detection is included in the Project. Check with the Signal Designer before using)

00990.43(c) Video Detection System:

(1) Installation - The product supplier of the video detection system shall supervise the installation and the testing of the video equipment. A factory certified representative from the manufacturer shall be on-site during installation. The factory representative shall install, make fully operational, and test the system as indicated on the traffic signal drawings and this specification.

(2) Warranty - The video detection system shall be warranted against manufacturing defects in materials and workmanship for a period of three years from date of installation. The video detection supplier shall provide all documentation necessary to maintain and operate the system.

(Add the following City-specific special provisions on all projects with traffic signal control equipment)

00990.70(b) Control Equipment Testing – REPLACE the sentence that begins ("The following traffic signal…") with the following:

The following traffic signal control equipment will be tested by the Oregon Department of Transportation for conformance with the Contract Documents before being installed:

DELETE the paragraph that begins with "Control equipment will…" and substitute the following:

The Contractor shall pay all costs incurred as a result of testing and retesting of all equipment to pass the required Oregon Department of Transportation testing procedures at the Signal Lab in Salem, Oregon.

00990.70(e) Control Equipment Acceptance – REPLACE the paragraph that begins with "Traffic signal control equipment..." with the following:

Traffic signal control equipment that successfully passes the testing procedure will be certified by ODOT as acceptable for installation. Acceptability for installation does not guaranty final acceptance of the completed installation.

00990.70(f) Control Equipment Installation – REPLACE this subsection with the following:

Be responsible for pick-up, delivery and installation of the controller cabinet.

Other control equipment not physically wired to the controller cabinet will be stored at the test facility until the signal installation is ready to be turned on. No more than 30 calendar days prior to the anticipated signal completion date, contractor shall pick-up the other control equipment, such as controller units, input devices, switch packs, monitor units, miscellaneous plug-in devices and auxiliary devices and deliver to:

ODOT Region 4 Tech Center
63034 OB Riley Road
Bend, OR 97701
Coordinate delivery with Dave Foster, Region Traffic Operations Engineer, at (541) 388-6472.

00990.70(g) Field Testing – REPLACE the paragraph that begins ("Field testing of traffic…") with the following:

Field testing of traffic signal installations will be performed by ODOT crews on behalf of the Agency. Notify the Engineer one week in advance of the anticipated signal completion date. The Engineer will notify ODOT staff of the anticipated date. Field testing will be performed within ten working days following the date of completion. The Engineer will notify the Contractor of the test results. If an intermediate Contract time is specified for signal work, the Engineer may suspend that portion of the work so that

time may be excluded according to 00180.50(e) after the final corrections have been completed, or the signal is turned on.

00990.70(h) Traffic Signal Turn–On – REPLACE the paragraph that begins (“The Engineer will establish…”) with the following:

The Engineer will establish the date and time the installation is to be turned on. Signals will not be turned on Fridays or on days preceding a holiday. The Contractor shall allow two weeks from the time of notification that the work is complete for field testing and turn-on of the installation.

(Use the following subsection .90 when Section 00963 is included for standard mast arm pole drilled foundations or standard strain pole drilled foundations. Delete the pole foundation type that does not apply. Remove the parentheses.)

00990.90 Payment – ADD the following paragraph before the paragraph that begins ("No separate or additional…"):

Standard mast arm pole foundations (and standard strain pole foundations) will be paid for according to 00963.90.

City of Bend Special Provisions to the Oregon Standard Specifications for Construction

TABLE OF CONTENTS

PART 01100 – WATER SUPPLY SYSTEM

PART 01100 – WATER SUPPLY SYSTEM

Section 01120 – Irrigation Systems

Comply with Section 01120, Irrigation Systems, of the Standard Specifications.

Description

01120.01 Qualifications – ADD the following subsection:

01120.01a Contractor Requirements – Contractors are required to be properly certified in the installation of Automatic irrigation equipment and/or be able to demonstrate the knowledge, skills, and ability to work with the City of Bend, subcontractors, and/or vendors in order to properly install smart irrigation equipment. An independent outside consultant may be hired by the Contractor to fulfill the requirement.

ADD the following subsection:

01120.02 References

Always REFERENCE THE LATEST VERSION of the following information:

American Society for Testing and Materials

ASTM D 2241-89	Poly (Vinyl Chloride) (PVC) Pressure - Rated Pipe (SDR – PR)
ASTM D 2464-89	Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM A 5	Steel Pipe and Tubing
ASTM D 2564-89	Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
ASTM D 2774-72	Standard Recommended Practice for Underground Installation of Thermoplastic Pressure Piping (R 1983)
ASTM D 2855-83	Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings

American Water Works Association

AWWA C 800-84	Underground Service Line Valves and Fittings with Appendix on Collected Standards for Service Line Materials.

National Electrical Manufacturers Association

NEMA 250-85	Enclosures for Electrical Equipment (1000 Volts Maximum) (R1-1986, R-2-1988)

Underwriters' Laboratories, Inc.

UL 651-89	Schedule 40 and 80 Rigid PVC Conduit

International Assoc. of Plumbing and Mechanical Officials
UPC-1988 Uniform Plumbing Code

ADD section:

01120.10 General – ADD the following before the sentence that begins ("Furnish only commercial…")

Contractor Requirements – To facilitate standardization, the City of Bend requires Rain Bird products or the equivalent and/or smart compatible irrigation equipment, installation, and components. Submit alternate products for approval by the City of Bend before installation.

01120.11(d) Polyethylene Pipe – ADD the following subsection(s):

(3) Swing Joint Riser – PVC ST Ells (Marlex) - 6504 /5004 Installations (3)

The swing arm assembly shall be three PVC ST Ells (Marlex) designed to rotate in all directions, as shown on drawings.

The nipple length shall be 10 inches.

(4) Swing pipe tubing (1800 spray head and 1300 bubbler installation only): the swing pipe shall be flexible black tubing constructed of virgin linear low-density polyethylene material. The tubing shall have a wall thickness of 0.090 inch It shall have an inside diameter of 0.0490 inch for use with SB Series spiral barb fittings without the necessity of glue or clamps. The model number and logo shall be printed at 12-inch intervals along the length of the tubing. Each 18-inch length of tubing shall be capable of pressure testing at the rate of 100 pounds per square inch (psi) per second to a minimum burst pressure of 475 psi. The tubing shall have an operating pressure rating of 80 psi at 110 degrees F. See standard detail drawing.

01120.12 Automatic Controllers – ADD the following bullets under **"Weather Station"** after the paragraph that begins ("A field station . . ."):

- **Freeze Clicks** – Used on spray and rotor zones where there is a potential of applying water on to any hard surface in freezing temperatures. In most installations, the sensor acts as a switch to break the circuit to the solenoid valves of the irrigation system when temperatures approach freezing. This allows the timer to advance as scheduled, but stops the valves from activating. Once temperature periods are above 37°F, the switch closes, allowing normal operation.

- **Flow Sensor** – Flow sensor shall be FS-100P, FS-150P, FS-200P, FS-300P, FS-400P, or approved equal. Size as required.

- **Pulse Decoder** – Pulse decoder shall be DEC-PUL as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California.

- **Flow Meter** – Model PT #1502 wall mount in NEMA cabinet, as manufactured by Rain Bird Sprinkler Mfg. Corp., Glendora, California.

01120.11 Pipe, Tubing, and Fittings – ADD the following subsection:

(e) Conduit – Conduit shall be Schedule 40, rigid polyvinyl chloride conduit, meeting the requirements of UL 651.

Condolets shall be Schedule 40. Size as required.

ADD the following subsection after the bullet "**Flow Meter"**:

01120.12(a) Automatic Irrigation Controllers – The controller shall be weather-based ET controller, with a built-in scheduling engine. The irrigation controller shall be a hybrid type that combines electro-mechanical and microprocessor-based circuitry capable of both fully automatic and manual operation. The ET controller will be approved by The City of Bend and have the following minimum specifications:

(1) Hardware

- The Controller shall have a minimum 3-year warranty.
- The Controller shall be UL-listed.

(2) Weather Data

- Weather data shall be provided for local area at a resolution of 1 square kilometer or better.

- Weather data shall use data from at least five weather stations to determine weather conditions for each controller.

- Weather data shall be delivered daily and wirelessly to each controller with no weather sensor required on site to calculate accurate ET.

- The communication system shall be able to detect if weather data is received by the controller and engage a backup process to re-send weather data as needed.

- The controller shall have the capability to be compatible with any controller-associated weather data sensors and equipment such as "Freeze Clicks," soil moisture sensors, flow sensors and other weather or water conservation- related data collectors and sensors.

(3) Controller Programming

- Controller shall have station-/zone-specific scheduling capability

- Controller shall include a scheduling engine that uses plant, soil, slope, sprinkler precipitation rate and sun exposure settings to automatically calculate a daily irrigation schedule.

- Controller shall use a maximum allowable depletion (MAD) model FOR EACH ZONE to determine watering days and 'skip' (non-watering) option days.

- MAD shall be able to be custom programmed by user.

- Controller shall provide 'water rationing' that assures each zone gets a rationed minimal amount of water, if a defined 'water window' is insufficient to allow watering to be completed to all zones.

- Controller shall automatically create cycle and soak sequences for user, based on soil and slope settings.

- Controller shall have the ability to be % (percent) adjusted plus (+) or minus (–) per each station.

- Controller shall have the ability to run multiple programs at the same time (overlap).

- Controller shall calculate and allow for run times at a resolution of 10-second intervals or smaller.

- Controller shall allow for two programs using set day pattern assignments, including day of week and odd /even day interval.

- Controller shall allow ET mode to be ON or OFF by station.

- Controller shall have a 'Rain Pause' feature that allows a pause for up to 100 days.

- Controller shall be capable of being operated manually at any time.
- Controller shall have an internal non-volatile memory that will retain the irrigation schedule for a minimum of 10 years without power. A 9 VDC rechargeable battery and recharging circuit shall be included for counting down the program-in-progress during a power outage, and shall allow programming of the controller when it is disconnected from the main power supply.

(4) History

- Controller shall be approved by The Irrigation Association's SWAT, (Smart Watering Advanced Technology) Testing Protocol of 100% efficiency and 0% runoff.
- SWAT protocol test results must include actual method of sending/receiving ET to the controller, in the manner being deployed in the field, as part of test results.
- Controller shall have a minimum of five public agency studies proving quantified water savings and dry weather runoff reduction.

01120.17(h)(2) Automatic Control Valves – ADD the following subsection:

(a) Remote Control Valves – 100-PE-B, 150-PE-B, 200-PE-B-By Rain Bird Sprinkler Mfg. Corporation, Glendora, California. Provide a scrubber valve (PE-S) for applications where the water supply is not from a potable water source (i.e., dedicated irrigation wells or from surface supplies such as canals) for the 1-inch, 1-½-inch, and 2-inch electric remote control plastic valves.

(b) Valve Tags – Each valve shall be number-tagged (Rain Bird Part No. VID1Y24 or brand and part number corresponding to approved equal.)

01120.18 Valve Boxes and Valve Chambers – ADD the following subsections:

(a) Carson Box Model 1730 – for Bermad, Kennedy, or double check valves. These shall be one-piece plastic with fiber-reinforced plastic cover. Provide brick supports, one (1) under each corner of the box.

(b) AMTEK 12STD PLS – for Remote Control Valves or Manual Valves. These shall be one-piece plastic, 11 x 17-inch, with fiber-reinforced plastic cover, marked with "IRRIGATION." Provide brick supports, one (1) under each corner of box.

ADD the following subsection(s):

01120.22 Sprinklers

(a) 6504 Full or Part Circle Pop-Up Rotor – By Rain Bird Sprinkler Mfg. Corp. or approved equal. The sprinkler shall have the following:

- The sprinkler shall have a screen attached to the drive housing to filter inlet water, protect the drive from clogging, and simplify its removal for cleaning and flushing the system.

- The sprinkler body shall have a double-wall construction 1-inch Female National Pipe Thread (FNPT) bottom inlet.

- The sprinkler shall have a standard rubber cover that designates the full circle sprinkler from the top, as well as designates each adjustment opening from the top.

- The sprinkler shall have a factory-installed nozzle as specified on the drawings.

- The angle of trajectory shall be 25 degrees from the horizontal.

(b) 5004-PC SAM 5004-FC-SAM full or part circle pop-up rotor – By Rain Bird Sprinkler Mfg. Corp. or approved equal. The sprinkler shall have the following:

- Arc adjustment from the top

- Water-lubricated gear drive design

- Standard rubber cover

- 40-360 degree arc rotation and reversing full circle rotation

- Standard angle nozzle providing 23 to 40 feet distance of throw

- Radius adjustment screw allows 25% radius reduction without changing nozzle

- 4-inch pop-up

- Additional o-rings and seals for extra protection in “gritty” water

- 3/4-inch NPT female bottom-threaded inlet

- Seal-A-Matic pressure regulating check valve option included

- Nozzle as shown on drawing

(c) 1804-SAM-PRS, 1806-SAM-PRS, 1812 SAM-PRS spray heads – By Rain Bird Sprinkler Mfg. Corp. or approved equal. The sprinkler shall have the following

- Seal-A-Matic pressure regulating pop-up spray sprinkler: 4-inch, 6-inch, or 12-inch pop-up spray shall be used when indicated on the design

- Sprinklers shall have a Seal-A-Matic check valve and a pressure-regulating device. These units shall be identifiable from the top with SAM-PRS markings on the cap.

- 4-inch and 6-inch pop-up spray shall use the bottom inlet

- The 1800 Series sprinkler shall use the Matched Precipitation Rate (MPR) series nozzles, as specified on the drawings

- The fixed-arc nozzle shall accept the 1800 Series or approved equal plastic screen to protect nozzle against clogging and to allow for radius adjustment

- The nozzle shall have a precipitation rate matched with other 1800 Series MPR or approved equal nozzles

(d) MP1000, MP2000, and MP3000 – MP Rotator Adjustable arc, adjustable radius matched precipitation rate sprinkler – By Walla Walla Sprinkler Company, a subsidiary of Nelson Irrigation Corporation, Walla Walla, Washington, or approved equal. The sprinkler shall have the following:

- The sprinkler shall be the viscous fluid brake rotary type and produce multiple rotating streams.

- The sprinkler shall produce and maintain a matched precipitation rate no greater than 0.6 inch per hour throughout the arc adjustment range and radius adjustment range (up to 25% of radius reduction) when spaced at 50% wetted diameter.

- The part circle sprinkler shall have an infinitely adjustable arc between 90 and 210 degrees or between 210 and 270 degrees, depending on the model selected. The full circle sprinkler shall irrigate a full 360 degrees.

- Full or part circle sprinklers shall be capable of up to 25% radius reduction using a stainless steel radius adjustment screw on top of the nozzle. The radius reduction screw shall have a slip clutch mechanism to prevent internal damage if turned past the minimum or maximum radius settings. The radius reduction screw shall reduce the pressure and flow upstream of the nozzle, thereby maintaining stream integrity.

- Part circle sprinklers shall have arc adjustment capabilities using a stainless steel ring at the top edge of the nozzle. The adjustment ring should be effective only while the sprinkler is popped up and ineffective while the sprinkler is not popped up. When turned past the minimum or maximum arc limits, the adjustment mechanism shall have a slip clutch action to prevent internal damage. This same slip clutch shall allow the orientation of the fixed edge of the variable arc when installed on a fixed riser or in a pop-up body. This is independent of and in addition to any ratchet that may exist in a pop-up body.

- The sprinkler shall have a pop-up that occurs at approximately 15 psi of water pressure. Upon cessation of water pressure, the sprinkler shall pop down. When installed in a pop-up body, the sprinkler pop-up shall occur after the pop-up of the body stem. Upon decreasing pressure, the sprinkler pop- down shall occur before the pop-down of the body stem.

- The sprinkler nozzle orifice shall be manufactured from urethane material for durability. The sprinkler shall be fitted with a detachable filter stem.

- Sprinkler assembly models MP1000, MP2000, and MP3000 shall be able to be installed in pop-up spray head bodies having a 5/8-27 UNS male threaded stem (Rain Bird) and nominal pop-up heights of 2", 3", 4", 6", or 12". Sprinkler assembly shall also be able to be attached to a ½ FIPT x 5/8-27 UNS male threaded adapter (Rain Bird) for use on fixed pipe risers. Models MP1000T, MP2000T, and MP3000T shall be able to be installed in pop-up sprayhead bodies having a 5/8-28 UNS female threaded stem (Toro) and nominal pop-up heights of 2", 3", 4", 6", or 12." Sprinkler assembly shall also be able to be attached to a ½ FIPT x 5/8-28 UNS female threaded adapter (Toro) for use on fixed pipe risers.

(e) PA-80 Plastic Adapter – The plastic adapter shall have a ½-inch Male National Pipe Thread (MNPT) outlet and a fine threaded female inlet that will accept an 1800 pop-up stem, thus adapting the 1800 Series sprinkler for use with various ½-inch FNPT sprinklers and nozzles

ADD the following subsection:

01120.23 Double Check Backflow Prevention Assemblies: Install Watts 007 Series or approved equal on all new systems. Size as required. Permanent test fittings with threaded protective caps to keep out debris shall be installed.

01120.40(a) Plumbing – ADD the following subsection:

(3) Blowouts – Install a blowout connection point to facilitate winterization by the use of compressed air on all electric solenoid controlled underground irrigation systems. The entire system shall be manually drainable. Install blow out fittings after the Double Check Valve assembly. The end point of each underground mainline circuit 4 inches or larger shall be equipped with a 4-inch x 2-inch mechanical tap cap, 2-inch x 36-inch galvanized nipple, 90 degree fitting, and a brass ball valve. The valve shall be installed with a valve box. See typical drawings for installation details.

01120.43 Piping – ADD the following after the paragraph that begins ("Place all live mains"):

Provide for thermal movement of components in the system. Use threaded nipples for risers to each sprinkler to facilitate easy replacement. Use swing joint riser or swing pipe as specified.

Concrete thrust blocks shall be provided at changes in direction of mainline piping and at the end of mainline piping with the bearing surface against undisturbed soil normal to the direction of the thrust on pipes 3 inches or greater in diameter.

01120.44 Pipe Jointing – ADD the following subsection:

(e) Pipe Joints: All pipe joints shall be solvent welded and made according to ASTM D 2855-83 Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings. Solvent welded joints shall be installed by workers qualified and experienced in the joining of PVC pipe and materials. Threaded joints shall be made with polytetrafluoroethylene sealant. Mechanical joints shall be installed on pipe larger than 3 inches in diameter. Irrigation valves on mainlines 3 inches and larger shall be installed using FIPT FLO PVC saddles sized appropriately. (Example: 4-inch pipe would use a 4-inch x 2-inch FIPT.)

01120.45 Installation – ADD the following subsection:

(h) Drain Pockets – Excavate a minimum of 10 cubic feet. Backfill with drain gravel to 12 inches below grade. Cover with geotextile and 6 inches of topsoil.

01120.46 Low Voltage Electrical Installation – ADD the following after the paragraph that begins (“In wire adjacent . . .”):

Provide one control circuit for each zone. All wiring, including low voltage control wiring, shall be in conduit. Provide a 2-inch minimum conduit for future phone or telemetry connections.

Provide 16-gauge insulated ‘trace wire’ for locating lateral irrigation lines. All splices shall be waterproof. Coil wire ends in the valve box.

01120.49 Backfill – ADD the following after the paragraph that begins “(If sufficient suitable . . .”):

The minimum horizontal clearance between lines for piping 2 inches or less is 4 inches, and 12-inch minimum clearance for 2-1/2-inch and larger pipe. The minimum vertical clearance between pipe shall be 4 inches.

Section 01140 – Potable Water Pipe and Fittings

Comply with Section 01140, Potable Water Pipe and Fittings, of the Standard Specifications, Potable Water Pipes, and Fittings modified as follows:

Description

01140.00 Scope – ADD the following:

The Contractor shall secure and comply with all applicable City, County, and State permits including Construction Safety and Health Standards. Prior to installing a water facility in an unimproved street, the street shall be brought to subgrade to ensure that adequate bury, depth of cover, and utility separation is provided.

This section covers the work necessary for furnishing and installing water pipe and fittings normally used for water distribution systems. Water line depth from finished grade to top of pipe shall be a minimum of 36 inches and a maximum of 72 inches

Proposed corrosion protection measures shall be approved by the City Engineer prior to final design.

01140.10 Materials – DELETE in its entirety and ADD the following:

Unless otherwise specified, all materials shall be new of U.S.A. domestic manufacture with the certification of the country of origin. Materials shall meet all AWWA standards and applicable City, County, and State code requirements, for the specified materials.

Piping materials used in pump station, meter vault, or control valve applications shall be approved by the City Engineer on a case-by-case basis.

Additionally, the following material requirements shall be part of all new construction:

- All fittings being purchased by suppliers shall be purchased directly from the Manufacturer.

- Mechanical joint C153 ductile iron fittings shall be marked with the Manufacturer's name.

- Mechanical joint water main fittings with accessories, 4-inch through 36-inch, shall be manufactured in accordance with and meet all applicable terms and provisions of standards ANSI A21.10 and AWWA C110 and ANSI A21.11 and AWWA C 111, current revisions. Mechanical joint fittings 4- through 24-inch shall be rated for 350 psi working pressure and fittings 30- and 36-inch shall be rated for 250 psi working pressure. Mechanical joint fittings with branches and 14-inch or larger caps and plugs shall be rated for 250 psi working pressure, and 4- through 12-inch minimum

size UL listed and marked for Fire Main Equipment. Cement-lined and seal-coated fittings shall meet ANSI A21.4 and AWWA C104 standards. All coated and lined fittings shall meet requirements of NSF-61.

- Approved Manufacturers: Tyler Pipe, Union, Clow, and American Iron Pipe Co.

(a) Ductile Iron Pipe – Ductile iron pipe shall be centrifugally cast in metal molds and cement-lined in accordance with AWWA specification C151-76. Push-on type joint pipe shall be used except where conditions require mechanical joints as shown and approved on plans. No material shall be shipped inside coated pipe. Pipe shall meet the following specifications:

(1) 4-inch through 12-inch I.D., Class 52 Ductile, AWWA Specification C151-76 DI pipe.

(2) 14-inch I.D. and larger, Class 50 Ductile, AWWA Specification C151-76 DI pipe.

- Approved Manufacturers: U.S. Pipe, Pacific States Pipe, American Pipe and Griffin Pipe.

(b) Service Pipe – Service lines from the main to the meter stops and 6 feet beyond meter box shall be as follows:

I.D.	Type
1” and smaller	Type K soft annealed copper tubing (non-rigid)
1 1/4 ” and larger	Ductile iron or rigid copper (Type K-hard)

(c) Service Saddles – Service saddles for 2-inch water services shall be used on existing and new water lines. Where service saddles are allowed, they shall be Mueller double strap DR25, or as approved by the Utilities Manager. The brass nipple between saddle and valve is to be installed horizontally; saddle bolts shall be torqued to manufacturer’s specifications. If a 1-1/2-inch service is desired by the customer, this reduction shall be made within the 2-inch meter setter.

(d) Saddle Tap – Bit size shall be as follows: 1-inch tap - 15/16-inch bit; 2-inch tap – 1 7/8-inch bit. All bits to be Mueller or equal, and approved for tapping cast iron, DI, galvanized and steel pipe.

The tapping machine shall be a Mueller #E-5, #D-5, or equal.

(e) Direct Tap – 1-inch tap bits to be Mueller AWWA tapered thread combined drills and taps or equal, and must be approved for tapping cast iron and DI water mains. 2-inch and larger taps shall be made using a hole saw.

(f) Pipe Fittings

(1) Buried – Buried ductile iron fittings with mechanical joints shall meet ANSI 21.10, 250 PSI working pressure, with full body glands (AWWA C-110/C-153), bolts, and gaskets in accordance with ANSI 21.11. A non-toxic vegetable soap lubricant shall be supplied in sufficient quantities for installing the pipe. Lubricant must meet the appropriate AWWA Standards.

(2) Aboveground – Aboveground ductile fittings with threaded flanged joints or restrained joint meeting appropriate ANSI specifications, 250 PSI working pressure, bolts and gaskets in accordance with appropriate ANSI specification.

(3) Solid Sleeves – Solid sleeves 4- to 12-inch in diameter must be a minimum of 12 inches long; 14-inch-diameter or larger must be the long pattern. All solid sleeves must be standard Pacific States (Union /Tyler Foundry) or U.S. Pipe M.J. DI sleeve. Appurtenances shall be of same manufacturer.

(g) Plugs – **Caps** – Caps shall be mechanical joint DI and properly restrained.

(h) Special Coatings and Linings – Special coatings and linings shall be approved by the City Engineer prior to the time of purchase.

(i) Concrete for Thrust Blocking – Commercial grade concrete for thrust blocking shall conform to ASTM C 94, Alternate 2, and shall be proportioned to obtain a 28-day compressive strength of 4000 pounds per square inch. “Sacrete” type products are not allowed.

01140.11 Handing Pipe and Fittings – ADD the following subsection:

(c) Daily Production and Staging No more pipe material shall be strung on job than can be installed in one shift. Material that is rejected at the point of delivery because of defects or damage shall be replaced by the Contractor. Material damage subsequent to acceptance by the Engineer or the City shall be replaced by the Contractor.

01140.41 Laying Pipe – DELETE in its entirety and REPLACE with the following:

(a) Push-on Joint Pipe – Ductile iron pipe with rubber gasket Tyton and/or Fastite type joints shall be laid and jointed in strict accordance with the manufacturer’s recommendations and in accordance with the requirements of these Specifications.

Deflection limits shall conform with Figure 1. For pipe sizes not listed, maximum deflection shall be one-half the manufacturer's maximum deflection.

Lubricant for the pipe gaskets shall be furnished by the pipe manufacturer.

Once installed, rubber gaskets cannot be recovered and reused and must be discarded.

(1) Push-on Joint Restraints for Ductile Iron Pipe – Push-on joints shall be restrained using field Lok gaskets for Tyton joint pipe and fast grip gaskets for Fastite joint pipe, using stainless steel locking segments vulcanized into the gaskets.

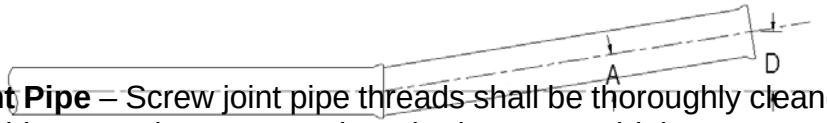
(2) Approved manufacturers of mechanical restraints are Ebba Iron – 1100 Series "Mega-Lug," and Romac – Romagrip.

One half of the maximum deflection will be permitted.

Maximum Deflection of Tyton Gasket Joint Pipe
(Based on 18-Foot Pipe Length)

Pipe Size	Bend in One Joint Angle A	Deflection in Inches D	Approx. Radius in Feet of Curve Produced by Succession Of Joints
6"	2° 00'	8"	450'
8" through 12"	2° 00'	8"	450'
14" through 24"	1° 30'	6"	650'

FIGURE 1
Pipe Deflection



(b) Screw Joint Pipe – Screw joint pipe threads shall be thoroughly cleaned by wire-brushing, swabbing, or other approved method. Approved joint compound shall be applied to the threads prior to making the joint. Joints shall be watertight at test pressures before acceptance.

(c) Installation of Mechanical and Flexible Couplings – Mechanical and flexible couplings shall be provided where indicated on the plans and shall be installed in accordance with the manufacturer's recommendations. Before pipe lengths are joined, the ends of each pipe shall be thoroughly cleaned of oil, scale, rust, and dirt for a minimum distance of at least 8 inches from the end. Gaskets shall be wiped clean and lubricated with pipe lubricant for installation on the pipe ends. Coupling

bolts shall be tightened progressively, drawing up bolts on opposite sides until all bolts have a uniform tightness. Workers tightening bolts shall be equipped with torque-limiting wrenches or other approved wrench type. Mechanical and flexible couplings shall be tested when the tests on the adjacent pipe are made. If the couplings do not pass the requirements of the leakage tests, the couplings shall be removed and reassembled on the pipe, and the leakage test shall be repeated. Deflection shall be in conformance with Figure 1. For pipe sizes not listed, maximum deflection shall be one-half the manufacturer's maximum deflection.

Maximum Deflection of Mechanical Joint Pipe
Safe Deflection for 150 PSI[1]
Based on 18-Foot Pipe Length (see Figure 1)

Pipe Size	Maximum Joint Angle A	Deflection in Inches D	Approx. Curve Radius produced by maximum angle
8"-12"	2º 00'	8"	450'
14"-16"	1º 45'	7"	590'
18"-20"	1º 30'	5"	685'
24"	1º	4"	1000'

Note: For test pressures above 150 psi, reduce the tabulated deflection by 10% for each additional 150 psi.

(d) Tapping – Tapping of City mains shall be done when the air temperature is at least 35°F and rising. When the air temperature is between 20°F and 35°F, taps may be permitted by the Engineer if the tapping bit is protected and heated to 35°F or above. If a heated tapping bit is used, the work must be backfilled immediately upon completion.

(e) Hot Taps – When appropriate and/or shown on the plans, branches and large services may be connected to existing City of Bend water lines by using a tapping sleeve and tapping valve. This procedure shall be performed only by a City-approved contractor and said approval shall be obtained from the City Engineer or their authorized representative at least 48 hours in advance of performing the hot tap. No pipe shall be exposed for tapping without a City representative onsite.

All hot tap sleeve and tee assemblies shall be air tested prior to start of tapping operation.

Hot taps shall be scheduled only during the hours of 7:30 AM to 3:30 PM, Monday through Friday.

All hot taps 4-inch and larger are required to be thrust blocked per Section 01140.44.

(f) Tapping Sleeve Requirement – Match sleeve types as shown in the table with the type of main being tapped. Tapping sleeves shall be as manufactured by JCM, Mueller, Romac, or Smith Blair and as specified below:

(1) Epoxy-coated Fabricated Steel Sleeve; JCM 532 or equal.

(2) Stainless Steel Sleeve; JCM 432; Romac SST III (with stainless steel flanges); Mueller H-304; Smith Blair 665, or equal

NOTE: Numbers in tables below correspond to accepted sleeve types.

For Taps Other Than Size-on-Size					
Type of Main Being Tapped	**Main 8"and Under**	**Main 10" or 12" Tap 8" and Under**	**Main 12" 10" Tap**	**Main 14" and Over Tap 8" and Under**	**Main 14" and Over Tap 10" and 12"**
C-900 Plastic	2	2	2	N/A	N/A
Steel Size Plastic	2	2	N/A	N/A	N/A
Ductile Iron	2	2	2	1	
Cast Iron (spun)	2	2	2	1	1
Cast Iron (pit cast)	2	2	2	1	1
Steel	2	2	2	1	1

For Size-on-Size Taps (ex. 8" tap on 8" mainline)				
Type of Main Being Tapped	**Main 8" and Under**	**Main 10"**	**Main 12"**	**Main 14" and Over**
C-900 Plastic	2	2	2	N/A
Ductile Iron	2	2	2	1
Cast Iron (spun)	2	2	2	1
Cast Iron (pit cast)	2	2	2	1
Steel	2	2	2	1
N/A = not applicable N/R = not recommended				

01140.44 Thrust Restraint – DELETE in its entirety and REPLACE with the following:

(a) Thrust Blocking – All additions and alterations to the City of Bend water system shall incorporate mechanical restraint systems into their design. Thrust blocking and the use of a deadman to supplement mechanical restraints are only allowed with the

approval of the City Engineer, and must be designed by the Engineer of Record and detailed on plans.

(b) Thrust Blocking Materials – Concrete shall conform to the requirements of the Standard Specifications, Section 00440, Commercial Grade Concrete, and shall develop a minimum compressive strength of 4000 psi at 28 days, per Section 00440.00. “Sacrete” type products are not acceptable.

(c) Anchorage – Reaction or thrust blocking shall be placed as shown on the plans. Blocking shall be placed between the undisturbed ground and the fitting to be anchored. Reaction blocking shall be placed so as to allow access to fitting joints unless specifically shown otherwise on the Plans. The pipe and joint fittings shall be wrapped with 6 mm plastic sheeting before placing concrete.`

(d) Existing Thrust Blocks – No existing thrust blocks shall be removed by Contractor unless a City of Bend representative is on site for inspection and coordination.

01140.49 Backfilling – DELETE in its entirety and REPLACE with the following:

After the pipe has been installed an inspected, backfill the trench as follows:

(a) Pipe Bedding – The trench shall be excavated to a minimum depth of 7 inches below the pipe to provide minimum bedding. Over-excavation shall be backfilled and compacted with pipe zone material to a grade of 4 inches to 7 inches below the pipe bell as specified below. The pipe bedding shall be uniform, at grade, and compacted prior to placing pipe.

(b) Compaction Testing – For waterline construction with a standard 3-foot cover depth, one compaction test shall be taken per 100 lf of trench at top of pipe zone and at finish subgrade elevations. For installations deeper than 3 feet, trench backfill shall be tested for each 3 feet of fill and 100 lf of trench. All sampling and testing, including material certifying tests, shall be performed by an independent testing laboratory. Sampling locations shall be determined by the City of Bend. All results, including failing tests, shall be submitted to the City of Bend prior to any pipe testing inspection.

(c) Electrical Continuity – When so stated in the Specifications, the Contractor shall provide adequate means to permit an electric current to pass across all pipe joints. The electrical connection shall be made by driving silicon-bronze wedges between the barrel and the bell of joints using rubber gaskets. Two wedges shall be installed per joint on opposite sides of the pipe on the horizontal centerline. The wedges shall be approximately 1 inch square and shall be tapered from 1/8-inch to 1/16-inch, approximately. The wedges shall have serrated edges to provide good contact. The voltage drop at 500 amperes current flow shall not exceed 1.0 volt per joint.

Field Testing

DELETE the following subsections in their entirety 01140.50, 01140.51, and 01140.52

ADD the following subsection:

01140.53 Filling, Flushing, and Hydrostatic Testing

(a) Certification – The Contractor's employee responsible for conducting these tests shall be approved by the City of Bend. This person shall be present at and shall supervise all phases of these procedures.

Prior to testing, the Contractor shall be certified by the City of Bend Water Division. This Certification shall be contingent upon the Contractor passing a standard test prepared by the City. This test shall prove the Contractor's organizational ability of the steps required for chlorinating/flushing/testing; and a field demonstration of their techniques.

The metering device used in chlorination and/or pressure test procedures must have been certified by the City Water Division within 6 months of the test.

(b) Testing Procedures – Testing procedures shall be conducted between 8:00 AM and 3 PM, Monday through Friday. Pressure testing shall be scheduled so completion is within these normal working hours. Chlorine and pressure tests shall be performed when the temperature is, or is expected to be, no less than 33ºF. Chlorine tests require a minimum of 24 hours duration.

The Contractor shall not operate any valve connected to City water lines or take any action that would affect the operation of the existing system except with a City representative present, and only at that representative's express direction.

(c) Flushing – The Contractor shall be responsible for all pipeline flushing, including but not limited to flushing air from service and main lines at time of chlorination, flushing chlorination water after all chlorination and rechlorination. System flushing procedures shall meet all State and Federal requirements for discharge and disposal.

Following removal of all air in the system, the Contractor shall thoroughly flush all lines with potable water. Flushing velocity shall not be less than 2 feet per second (fps). Flushing is considered completed when the system chlorine residual matches the background chlorine residual level of the City system at that point.

A portion of the flushing process for chlorinated systems may, after start-up with the Inspector, be completed by the Contractor without the Inspector being present. After chlorine residual testing on the City system and the chlorinated systems has been done and the inspector has operated the necessary valves, the Contractor may

independently complete the test. The Contractor will be furnished with appropriate forms to be completed as verification that the test results have been completed and the results are in compliance with City's Standards & Specifications.

(d) Chlorination – The Contractor shall be responsible for installation of chlorine taps at the terminal points of all lines, including all dead end lines Taps may also be required on high points to vent trapped air. Tap location and placement shall be coordinated and observed by the City of Bend. With Inspector approval, fire hydrants may be used as a chlorination injection point.

Before chlorination, the City Representative shall witness all valves being opened in the system being chlorinated.

The City Representative shall collect all samples for chlorine residual testing as follows:

(1) After chlorination (beginning of test initial value).

(2) Prior to the chlorination solution being flushed at the end of the 24-hour test period (finish value).

(3) After the system has been thoroughly flushed and refilled.

A maximum of 60 parts per million (ppm) and a minimum of 25 ppm of free residual chlorine are the acceptable limits for the initial test. Any residual above or below acceptable initial limits shall be grounds for restarting the chlorination test. If the finished residual value varies by 60% or more than the starting value, the test shall be deemed to have failed and rechlorination shall be required after thoroughly flushing the line.

If after three chlorinations no passing level is obtained, the line shall be deemed contaminated, be removed, and replaced by the Contractor at their expense.

(e) Bacteriological Testing – Comply with AWWA C651.

(f) Pressure Testing – Comply with AWWA C600.

(g) Flow Testing – The Contractor shall flow test all services and hydrants for a minimum of 2 minutes prior to acceptance of the system by the City. Flow testing equipment shall be checked and approved by the City and the test conducted under direct supervision of the City. Test reports shall provide the following information:

- Hydrant flow in gallons per minute (gpm)
- Hydrant static pressure

- Station of hydrant
- Service line flow in gpm
- Lot and block of service

(h) Other Tests – The City Representative may require other tests, such as volatile organic compounds, inorganic chemicals, or synthetic organic chemicals, if there is reason to believe the line has been contaminated by such compounds. The costs of these tests can be substantial and shall be borne by the Contractor. Failure to pass such other tests shall be grounds to reject the work and cause it to be replaced.

(i) Cleanup – Upon completion of the testing and acceptance of the tests by the City of Bend, the Contractor shall clean the area as directed by the City.

01140.80 Measurement – DELETE in its entirety and REPLACE with the following:

(a) Pipe – Pipe length shall be measured horizontally from centerline to centerline of valves, fittings or to the end of the pipe, whichever is applicable. Measurement of the various depth classes as stated in the Bid Schedule shall be from the pipe invert as constructed to the design subgrade elevation or the finished ground surface at the point of measurement.

(b) Fittings Measurement – Measurement of fittings shall be made on a unit price basis for the type, kind, and size specified and installed. No separate or additional payment shall be made for couplings, joint lubricant, nuts, bolts, washers, and other fitting-related hardware or supplies.

(c) Thrust Blocks – Measurement for thrust blocks shall be made on a unit price basis for each thrust block installed.

(d) Testing and Disinfection – When neither specified nor listed in the proposal for separate payment, flushing, chlorination, and testing shall be considered incidental work for which no separate payment shall be made.

(e) Incidental Basis – Items not listed in the Bid Schedule shall be considered incidental work for which no separate payment shall be made.

Section 01140.90 Payment – ADD after pay item (“(e) ____ Inch Connection…”):

(f) Payment for TRENCH EXCAVATION shall be at the unit price bid per LF at the specified diameter for the depth class as measured. Payment shall include all materials, tools, labor, equipment, bedding, backfill, and incidentals required to

excavate and backfill the trench as specified. There shall be no separate payment for rock excavation unless specifically called for in the Bid Schedule.

When not listed in the Bid Schedule as a separate pay item, TRENCH EXCAVATION shall be considered incidental to the price bid for pipe.

Section 01150 – Potable Water Valves

Comply with Section 01150, Potable Water Valves, of the Standard Specifications, Potable Water Valves modified as follows:

Section 01150.10 Materials – DELETE this subsection and REPLACE to read:

Section 01150.10 Materials

(a) Resilient Seated Epoxy Coated Gate Valves – Buried epoxy-coated iron body gate valves shall meet AWWA standards (C-509), have non-rising stems, be rated at 200 pounds (lb) working pressure and 350 lb hydrostatic pressure, open left – 2-inch-square operating nuts, resilient seat, with brass fittings, "O" ring stem pressure seals, non-directional, mechanical joints with full body glands (AWWA C-110); as manufactured by Mueller, Kennedy, Waterous, CLOW, or American Flow Control, and as approved by the City Engineer..

Aboveground or in-vault gate valves shall be equipped with hand wheels.

(b) Butterfly Valves – Butterfly valves shall meet the requirements of AWWA C-504 latest revision, Class 150-B mechanical joint etc., except worm gear operators are not permitted. To reduce the number of different valves in the system, the Mueller line seal seat in body, or equal, shall be the preferred valve. The valve can be domestic or non-domestic, unless contractually obligated otherwise. Where 18 inches of cover cannot be obtained from operating nut to finish grade, butterfly valves shall be required. Butterfly valves shall be used on all water lines of 10-inch size and larger, or where 24 inches of cover cannot be obtained on smaller mains.

Aboveground or in-vault butterfly valves shall be equipped with hand wheels.

(c) Valve Boxes – Valve boxes shall be an East Jordan Iron Works # 363912 18-inch box rated at 3500 psi. The valve box shall have a 7-inch I.D. with a 12-inch flange on the top, and a lid with raised letters on the top reading: City of Bend, or Bend Water as shown in the Standard Drawings.

The East Jordan Iron Works series #363912 shall have a section of PVC 3034 placed below the 18- inch box with a 6-inch to 12-inch overlap. It shall be cut to the proper length to allow adjustment in the depth of cover.

(d) Check Valves

(1) Swing Check Type – Swing check valves shall be bronze-mounted with cast or ductile iron body with outside lever and spring unless otherwise specified.

(2) Spring Loaded Plug or Disc Type – Spring-loaded plug or disc type check valves shall be bronze-mounted with bronze, cast, or DI body, bronze plug or disc, stainless

steel spring, and resilient seal suitable for clear cold water service. The plug or disc of the check valves shall be easily removed and replaced.

(3) Hydraulic Cushion Type – Hydraulic cushion type check valves shall be of bronze, cast or ductile iron, with bronze disc and disc faces, seat rings, and pivot pins. The valve shall provide drop-tight sealing. The valve shall be provided with an adjustable speed, integrally mounted oil dashpot mechanical snubber system.

(4) Meters – The meter will have no moving parts and constructed of a noncorrosive material. The Meter will utilize an electromagnetic or ultrasonic measurement system. The meter must meet federal low lead requirements and be compliant with American water works Standard C-700, C-710, NSF/ANSI Standard 61 Annex F-G. The meter must be capable of measuring water flow in Cubic Feet and show reverse flow. The meter must operate with a maximum working pressure of 175 psi without leakage, damage or effect on accuracy. A ¾" meter will have an allowable pressure loss not to exceed 7 PSI at 30 GPM. A 1"meter will have an allowable pressure loss of 4 PSI at 30 GPM. The ¾" meter shall guarantee 1.5% accuracy rate at normal operating flows of 3 GPM for the service life of the meter. The 1"meter shall guarantee 1.5% accuracy rate at normal operating flows of 4 GPM for the service life of the meter. The meter will fit within the City of Bend Premises Isolation Program specification. The meter and register must be fully compatible with all ACLARA MTU firmware, factory constructed NICOR ends, Extended Range 2-way transmitting system and the newest available version of ACLARA MTU. The meters must be currently approved with a tested meter type scaling by ACLARA. The meter shall also be 9" lay length for ¾" meters and 11-inch lay length for 1"meters.

(5) Corporation Stop – Corporation stops shall be Mueller #B-25008 full port ball valve, or approved equal.

(6) Meter Stop – Meter stops shall be Mueller #B-24258 ball angle meter valve, or approved equal.

(7) Meter Setters – All 1-1/2" through 2-inch meters shall use a meter setter series # B-2423-99000 with a 12-inch setter height as shown in Standard Drawing ___-___.

(8) Meter Boxes – Meter boxes shall be installed as shown on the Standard Drawings. All boxes shall include a DI reader lid. Meter boxes shall not be installed within a sidewalk or paved area. Meter vaults shall be traffic rated.

Meter boxes approved by the City of Bend Water Division. Refer to Part II Section 2-5, Chapter 5.4.3 Meters.

Construction

Section 01150.40 General – ADD the following subsection(s):

(d) General – Before installation, valves shall be cleaned of all foreign material and inspected in open-closed position. Unless otherwise indicated, gate valves shall be mounted with the stem vertical. Butterfly valves shall be mounted with the stem vertical and on the 'curb' side of the main. Horizontal valves shall be mounted in such a manner that adequate clearance is provided for operation. Installation practices shall conform to the manufacturer's recommendations.

(e) Valve Boxes – A metal valve box shall be provided for every valve unless the valve is located in a vault. The valve box shall not transmit shock or stress to the valve, and shall be centered and plumb over the operating nut of the valve. The box cover shall be flush with the surface of the finished pavement or such level as may be directed by the Inspector.

(f) Meter Installations – Meter installations shall be constructed as shown in the Standard Drawings. When a meter is not installed at time of completion, a jumper spacer set to the dimension of the proposed meter and backflow prevention device shall be installed to provide service. This jumper shall be a galvanized nipple or Schedule 80 polyvinyl chloride (PVC) drilled to prevent flow.

All meter installations shall be constructed with an electric wire jumper of not less than 10 gauge. The material of the electric jumper shall be the same or galvanically compatible with the material of the water service; that is, galvanized wire on galvanized pipe and copper wire on copper pipe.

01150.80 Measurement – ADD following subsection(s):

(a) Backflow Prevention Device – Measurement for backflow prevention devices shall be made on a unit price basis for the type, kind, and size specified.

(b) Meters – Measurement for meters shall be made on a unit price each basis for the type, kind, and size specified.

(c) Incidental Basis – When neither specified nor listed in the proposal for separate payment, valves and meters shall be considered incidental work for which no separate payment shall be made.

01150.90 Payment – ADD following pay item g):

(h) Backflow Prevention Device – Measurement and payment for backflow prevention devices shall be made on a unit price basis for the type, kind, and size specified.

(i) Meters – Measurement and payment for meters shall be made on a unit price basis for the type, kind, and size specified.

(j) Incidental Basis – When neither specified nor listed in the proposal for separate payment, valves and meters shall be considered incidental work for which no separate payment shall be made.

Section 01160 – Hydrants and Appurtenances

Comply with Section 01160, Hydrants and Appurtenances, of the Standard Specifications, Hydrants and Appurtenances, modified as follows:

01160.10 Materials – DELETE in its entirety and REPLACE as follows:

(a) Hydrants –Traffic model fire hydrants shall meet AWWA specification C-502-64 with dry top. They shall have a center stem compression, 5-¼-inch valve opening, (2) 2-½-inch hose and (1) 5-1/4-inch steamer nozzles with National Standard Threads, 6-inch mechanical joint inlet connection, open left (1) 1-½-inch pentagon operating nut, and gaskets in nozzles. The bury line shall be used as control to ensure proper installation of hydrants. At no time shall finish grade be less than 3 inches below the bury line, or higher than the bury line of the hydrant. If a hydrant is not provided with a bury line, the bottom flange of the hydrant shall be used as control and finish grade shall be set at exactly 4 inches below the bottom flange, or as directed by the City's representative. The Muller Super Centurion 250 is the preferred hydrant to be placed in the City's water system. A brass seating ring is required. All hydrants shall be red from the manufacturer at time of installation. Variations of red from different manufacturers is permitted.

(b) Hydrant Extensions – Hydrant extensions shall be allowed on existing Fire Hydrants only. Extensions shall be from the manufacture or approved equal. Maximum of 1 extension per hydrant. Extension height 1 foot maximum. City of Bend Utility Department shall have sole discretion as to when extensions will be used. No extensions allowed on newly installed Fire Hydrants.

(c) Gravel for Drainage – Gravel for drainage under fire hydrants shall be graded river gravel free of organic matter, sand, loam, clay, and other small particles that shall tend to restrict water flow through the gravel.

01160.40 Setting Hydrants – ADD the following after **"(b) Out-of-service hydrants"**:

(c) Location – Hydrants shall be located as shown on the Plans or as directed by the City Engineer. All hydrants shall have two (2) reference points (swing ties) indicating the face of hydrant, tops of curb, and face of curb. The center of the operating nut on the hydrant barrel shall be set 6'-2" from face on curb as shown in the Standard Drawings. Hydrants shall be placed outside the pedestrian path of travel so that pedestrians, including people with disabilities, will have access to sidewalks and pedestrian paths.

Hydrants shall be protected by a 6-foot-by-6-foot concrete pad and bollards if deemed necessary by the City Engineer.

(d) Position – No hydrant should be set within 70 feet of a drywell unless specifically permitted by the City Engineer.

(1) No hydrant shall have more than a 6-foot bury. If deeper use bends to gain appropriate height.

(2) All hydrants shall be installed plumb with their nozzles parallel with or at right angles to the curb with the pumper nozzle facing the curb. Hydrants shall be set to the established grade. All hydrants shall be surrounded by a concrete pad as shown on the Standard Drawings. Hydrant pads shall be placed flush with sidewalks and curbs at 2% grade

(e) Hydrant Drainage – Unless otherwise specified in the Plans or special specifications, hydrant drainage shall be provided at the base of the hydrant by placing a geotech mat against the native earth, and graded river gravel from the bottom of the trench to at least 6 inches above the waste opening in the hydrant and to a distance of 1 foot around the bowl. No drainage system shall be directly connected to a storm or sanitary sewer.

(f) Service – All out-of-service hydrants shall be provided with a white ring with the words “Out of Service” inscribed on it. Disks shall be 8-inch-diameter plastic supplied by the Contractor. Rings shall be affixed to the steamer nozzle immediately after installation and shall remain on hydrant until the hydrant passes inspection and is placed in service.

(g) Hydrant Operation – Following installation, no person shall operate a City of Bend fire hydrant without first obtaining a “City of Bend” hydrant permit.

Measurement

01160.80 Measurement – DELETE in its entirety and REPLACE with the following:

Measurement shall be made on a unit basis for the type of hydrant specified and installed. When not listed in the Bid Schedule for separate payment, fire hydrants shall be considered incidental work for which no separate payment shall be made.

New pipe for hydrant connections to existing mains and lateral tees will be measured according to Section 01140.80.

Section 01170 – Potable Water Service Connections, 2 Inch and Smaller

Comply with Section 01170, Potable Water Service Connections, 2 Inch and Smaller, of the Standard Specifications, with modified as follows:

01170.10 Materials – DELETE in its entirety and REPLACE with the following:

(a) Fittings for copper pipe shall be CC 110 Compression type Mueller or approved equal.

(b) All services shall have 3 feet of cover.

(c) Any services larger than 1 inch shall be attached to the main line using a saddle connection. All 1-½- to 2-inch meters shall use a 2-inch meter setter series # B-2423-99000 as shown in Standard Drawing 4-5.

(d) Bedding and pipe zone material shall be placed at least 7 inches below and 12 inches above all pipes. The material shall be compacted with hand-held compaction equipment to 95 % density as determined by AASHTO T-99, Standard Proctor.

(e) Meter boxes shall be installed at each meter. The box shall be centered on the meter and elevated to existing ground level or proposed finish grade. All box covers shall include a hinged polymer concrete metal impregnated meter inspection lid.

(f) Main corporation and meter stops shall be of a Mueller or approved equal.

(g) Meter box lids shall be set 12 inches behind the sidewalk and 18 inches to 24 inches behind the curb where there is no sidewalk. Meter boxes are to be located between the curb and sidewalk and located outside hard surfaces, where possible.

(h) Service taps on C-900 shall be installed using a Ford S90 or Romac 901 series tapping saddle or equal.

01170.40 General– DELETE in its entirety and REPLACE with the following:

(a) All services shall be flushed of all foreign objects before connecting double check valve.

(b) All services shall be flushed and checked for flow by contractor.

(c) Services installed during water line construction and prior to meter placement shall be constructed with temporary meter jumpers and supplied by the Contractor.

(d) Service runs between the corporation stop and the meter setting shall not contain fittings unless approved by the City Engineer.

(e) Electrical continuity shall be provided on all services as shown in the Standard Drawings.

(f) Existing water services to be abandoned must be cut at the corporation stop and removed from the right-of-way. Corporation stops on services larger than 1 inch shall be removed and replaced with a plug at the water main. Whenever possible the water service line including any fittings and valves shall be physically removed from the right-of-way.

(g) All property that is subject of a site plan, or any new construction that is being served by an inadequate water service, shall be required to upgrade the existing water service to City standards.

(h) Water service meter boxes shall be set with a minimum distance of 18 inches between each water service box and any concrete areas. All water services shall have a minimum of 10 feet horizontal separation from any sanitary sewer in the public right-of-way.

(i) Marking tape shall be installed on all services.

(j) Temporary water use during construction must be metered and shall be protected from backflow using an approved backflow protection device.

ADD subsection(s) as follows:

01170.43 Fire Services – All fire line backflow prevention assemblies, whether Double Check or Reduced Pressure Principle Device, shall include a detector assembly complete with a bypass line with double check or reduced pressure principle device assembly inline and a meter that meets City of Bend specifications.

Backflow assemblies may be installed in the vertical position, provided that the assemblies are
spring-loaded and meet the following criteria:

(a) 4-inch diameter or smaller, and/or specifically listed in the Oregon Health Division's Approved Backflow Prevention Assembly List

(b) Recommended by the manufacturer for vertical installation

(c) Has the normal flow upward

(d) Fire lines shall require backflow protection commensurate with the degree of hazard (per UPC Chapter 6).

01170.44 Backflow Requirements – All services shall have an approved backflow prevention assembly installed commensurate with the degree of hazard for the premises it serves. Backflow prevention shall be in accordance with OAR 333-061-070/UPC

Chapter 6 and conditions set forth in the City of Bend Cross Connection Ordinance. Assembly shall be installed on the Owner's side of meter. If approved by the City of Bend Cross Connection Specialist, and the backflow assembly is a Reduced Pressure Principle Device Assembly, it may be installed immediately inside the building being served. In all cases, the device must be installed upstream of the first branch line leading off the service line. See examples from Drawings _-16, _-16A, _-16B. Such backflow prevention device assembly(s) shall be installed and approved before water service shall be provided.

Double-check valves to be installed at the time the meter is installed.

All backflow prevention device assemblies, once installed, shall be inspected by the City of Bend Cross Connection Inspector or authorized agent. Prior to acceptance and initiation of service, the device shall be tested by an Oregon State Certified backflow tester with the results forwarded to and received by City of Bend Public Works Cross Connection Program.

01170.80 Measurement – DELETE in its entirety and REPLACE with the following:

The quantities of service connections, fire services, and backflow prevention devices will be measured on a unit price basis.

Payment

01170.90 Payment – ADD the following payment items:

(d) Fire Services …….. Each
(e) Backflow Prevention Devices…… Each

TABLE OF CONTENTS

PART 02000 – MATERIALS
(Concrete Materials and Additives)

Wood Products

Section 02110 – Posts, Blocks, and Braces

Comply with Section 02110 of the Standard Specifications modified as follows:

02110.40(a) Grading – REPLACE chart with the following:

Species	**4" x 4"**	**4" x 6"**	**6" x 6" and Larger**
Douglas Fir	124-c WCLIB 42.12 WWPA	123-c WCLIB 62.12 WWPA	131-cc WCLIB 80.12 WWPA
Hem-Fir	124-c WCLIB 42.12 WWPA	123-c WCLIB 62.12 WWPA	(not allowed) (not allowed)

Section 02450 – Manhole and Inlet Materials

Comply with Section 02450 of the Standard Specifications modified as follows:

02450.30 Metal Frames, Covers, Grates, and Ladders – REPLACE "Inlet frames and grates" under the Projects on State Highways requirements with the following:

Inlet frames and grates	M 306	Class 35 B
	M 227 (A 663)	65
	M 270 (A 709) A 36	36
	M 103 (A 27)	65 - 35

Section 02630 – Base Aggregate

Comply with Section 02630 of the Standard Specifications modified as follows:

02630.10(a) Grading – ADD the following "sieve size" in Table 02630-01 above "No. 10" and add the following footnote at the end of the table:

No. 4 *	–	–	–	–	–

* Report percent passing sieve when no grading requirements are listed

DELETE Section 02830 in its entirety and REPLACE with the following:

Section 02830 – Handrail

Description

02830.00 Scope – REPLACE with the following:

This Section includes the requirements for the steel in handrail for stairways and pedestrian facilities.

02830.10 Shapes, Plates, and Bars – Punch anchor plate bolt holes at the locations shown before fabrication.

02830.20 Steel Pipe – Steel pipe shall conform to ASTM A 500, seamless, Grade B.

02830.21 Steel Tube – Steel tube shall conform to ASTM A 500, seamless, Grade B.

02830.22 Fasteners – Fasteners shall meet the requirements of Section 02560. Machine screws shall be SAE 18-8 stainless steel.

02830.30 Galvanizing – Hot-dip galvanize all handrail components according to AASHTO M 111 (ASTM A 123) after shop fabrication.

02830.31 Repair of Hot-Dip Galvanizing – Repair damaged hot-dip galvanizing according to ASTM A 780 and ASTM A 123. Minimum zinc content for Method A2 is 94% on the dry film.

02830.40 Incidentals – Plates, caps, and miscellaneous pieces necessary to complete the rail shall be as shown.

02830.50 Acceptance – Acceptance of handrail materials will be according to 00165.35 and this Section.

Illumination and Traffic Control Materials

Section 02910 – Sign Materials

Comply with Section 02910 of the Standard Specifications modified as follows:

02910.02 Types of Signs – REPLACE the "W9" sign type with the following:

Silver-white Type III or Type IV sheeting background with blue nonreflective screened or cut-out permanent legend.

02910.75 Manufacturer's Warranty – REPLACE the paragraph that begins ("The Agency will date all…" with the following:

The Agency will date all approved signs at project completion. That date is the start of the Warranty period.

Section 02920 – Common Electrical Materials

(Follow all instructions. If there are no instructions above a subsection, paragraph, sentence, or bullet, then include them in the project but make necessary modifications to only include project specific specifications. Delete specifications that do not apply to the project.)

Comply with Section 02920 of the Standard Specifications modified as follows:

02920.22 Cable – ADD the following sentence to the end of the "Loop Feeder Cable" bullet:

When shown, construct loop feeder circuits of two-conductor No. 18 AWG twisted pair shielded cable with drain wire conforming to IMSA 50-2.

Section 02925 – Traffic Signal Materials

(Follow all instructions. If there are no instructions above a subsection, paragraph, sentence, or bullet, then include them in the project but make necessary modifications to only include project specific specifications. Delete specifications that do not apply to the project.)

Comply with Section 02925 of the Standard Specifications modified as follows:

(Use the following subsection .42 when traffic signal control devices are required. Obtain information from the Signal Designer.)

02925.42 Traffic Signal Control Devices - ADD the following to the end of this subsection:

The following changes are made to the September 2001 Standard Specifications for Microcomputer Signal Controller:

(Use the following Chapter 2 lead in sentence and 2.1.10 on all off-system, local Agency funded or developed projects.)

REPLACE Chapter 2, Section 1, Unit 10 with the following:

(Fill in the blank with CONTRACTOR, COUNTY, CITY, etc. as appropriate.)

2.1.10 The traffic signal control program and PROMS with PROM module for the Model 170E will be furnished by the _____

(Use the following for all signal cabinets.)

3.1.6.1 REPLACE "15 amps" with "10 amps"

(Use the following when auxiliary files are needed in Model 332 cabinets.)

6.1.1.1 ADD the following to the listed items: Auxiliary output file

(Use the following when auxiliary files are needed in Model 334 cabinets.)

6.1.1.2 ADD the following to the listed items: Auxiliary output file

(Use the following if a Model 400 modem is not required in Model 332 or 334 cabinets.)

6.1.1.4 REMOVE "with Model 400 Modem" in the sentence that begins (“The controller unit . . .”)

(Use the following when Model 332 or 334 cabinets are used.)

6.5.2.1 REPLACE the sentence that begins (“All space connectors . . .”) with the following:

All spade connectors on wires connecting to the input panel (terminal blocks TB1 through TB10 and DC ground bus) and/or input files (terminal blocks T1 through T15) shall be crimped and soldered to the wires.

(Use the following when auxiliary files are needed in Model 336s intersection cabinets.)

7.1.1.1 ADD the following to the listed items: Auxiliary output file

(Use the following when auxiliary files are needed in Model 336S ramp meter cabinets.)

7.1.1.2 ADD the following to the listed items: Auxiliary output file

(Use the following if a Model 400 modem is not required in Model 336 or 336S cabinets.)

7.1.1.4 REMOVE "with Model 400 Modem" in the sentence that begins (“The controller unit with . . .”).

(Use the following when Model 336 or 336S cabinets are used.)

7.5.2.1 REPLACE the sentence that begins (“All spade connectors . . .”) with the following:

All spade connectors on wires connecting to the input panel (terminal blocks TB1, TB2, and DC ground bus) and/or input files (terminal blocks T1 through T15) shall be crimped and soldered to the wires.

(Use the following Chapter 8, Section 3 on projects with phone equipped cabinets. Choose either phone line or cellular phone line. Delete the method that does not apply.)

ADD the following new Section to Chapter 8:

SECTION 3 - TELEPHONE EQUIPPED CABINETS

8.3.1 General Requirements

(Use the following 8.3.1.1 and 8.3.1.2 for cellular phone lines.)

8.3.1.1 Provide and install equipment as shown on Standard Drawing TM423, (Telephone equipped cabinet). Use the following amended parts list:

MC 480 installation kit - #FLN3181
Cellular connector - #S1936C
Transceiver- #19024NAASC.

8.3.1.2 Cellular phone shall have local phone number for the "Installed Signal" location.

(Use the following 8.3.1.1 for phone lines (non-cellular).)

8.3.1.1 Data transmission between the controller and the remote control locations shall be by standard dial-up telephone line. Transmission rate shall support a variable transmission rate determined by autosyncing of the modem. The modem shall operate with the controller at any speed or settings the modem establishes with the external source. The remote station shall have a dial-up telephone line at the remote control. Provide one auto-dial/auto-answer external modem (28,000 bps minimum) for the controller.

(Use the following lead-in paragraph and Chapter 9 on projects when 2070L controllers are required.)

ADD the following new Chapter 9:

CHAPTER 9 - MODEL 2070 CONTROLLER UNIT

SECTION 1 - MODEL 2070L CONTROLLER

9.1.1 Unit Chassis

9.1.1.1 The 2070L Controller shall consist of a 2070 Chassis meeting the following requirements:

1. Lite Cage
2. 2070-1B CPU Module
3. 2070-2A C1 Field I/O Connector Module
4. 2070-4A or 4B Power Supply Module
5. 2070-3B 8x40 LCD Display Module

6. 2070-6A 1200 baud Modem Module
7. Two 2Mb Data Key

9.1.2 **Controller and Module**

9.1.2.1 The 2070L Controller and module shall meet the following specifications:

1. Caltrans 2002 TEES
2. TEES Errata 1, October 27, 2003
3. TEES Errata 2. June 8, 2004
4. Caltrans QPL Listed
5. OS-9 Operating System version 3.3 (Ethernet Capable)
6. Controller Boot Code Compatible with NW Signal Voyage Controller Firmware and all included features
7. Tested and approved Boot Codes are:

    a. Econolite - Boot Code 2002 V1.01.08.02b or later
    b. Simens/Eagle - Boot Code OS0 V3.3.0 Operating System 7.0.0.0.0.15 or later
    c. McCain - Boot Code 01.92

(Use the following subsection .51 on projects when new vehicle signals or when new pedestrian signals are required. Check with Signal Designer before using.)

02925.51 Traffic Signal Lamps - ADD the following to the end of this subsection:

Provide the following LED modules:

Vehicle Signals

Indication Color	8 Inch Lens Type	12 Inch Lens Type
Red	LED [1]	LED [1]
Yellow	LED [1]	LED [1]
Green	LED [1]	LED [1]

Pedestrian Signals [2]

Indication Color	Side by Side Type	Countdown Type
Hand	LED [3]	LED [4]
Walking Man	LED [3]	LED [4]
Numbers	–	LED [4]

[1] Flange mount LED modules.

[2] Pedestrian signal LED modules may be a combination of indication in one module or single indication in separate modules.

[3] Side by side LED modules are a combination of indication (both the hand and walking man in one module).

[4] Countdown LED modules are a combination of indication (both the hand and walking man overlaid on the left with numbers on the right in one module).

(Use the following subsections .65(a-1) and .65(a-2) on projects when new pedestrian signals are required. Check with Signal Designer before using.)

02925.65(a)(1) Standard – DELETE in its entirety and REPLACE with the following:

The standard light source shall meet the requirements of 02925.51.

02925.65(a)(2) Count Down - DELETE in its entirety and REPLACE with the following:

The count down shall meet the requirements of 02925.51.

(Use the following lead-in paragraph and subsection .68 on projects when new vehicle signals or new pedestrian signals are required. Check with Signal Designer before using.)

ADD the following subsection:

02925.68 Signal Head Covers - Provide signal head covers that:

- Are yellow prefabricated nylon.
- Completely cover the head, visors, and backplate.
- Include a fine mesh insert for signal testing.
- Have integral elastic bands and clips to secure the covers to the signal.