| | | |
|---|---|---|
| **MANDATORY PREBID MEETING**<br><br>**April 14, 2011**<br>**1:30 PM**<br><br>**To be held at**<br>**Multnomah Art Center**<br>**7688 SW Capitol Hwy**<br>**Room 34**<br>**Portland, OR 97219** | **Bureau of Environmental Services** | **PREQUALIFICATION REQUIRED IN**<br><br>**Category 8, Sewer Construction for $ 5,700,000** |

**BID NUMBER 112818**

# BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT

# VOLUME 1 OF 2

**Project Number E09052**

**March, 2011**


**Refer Questions to:**
**Kelly Davis**
**Sr. Procurement Specialist**
**Phone: 503-823-7574**
**Fax: 503-823-6865**
**kelly.davis@portlandoregon.gov**

**Submit Bid to:**
**Procurement Services**
**1120 SW 5th Avenue, Rm. 750**
**Portland, OR 97204**
**Attention: Kelly Davis**
**Sr. Procurement Specialist**


## BIDS DUE:

## April 26, 2011

## BY 2:00 PM

**PROCUREMENT SERVICES**

CITY OF PORTLAND, OREGON

# BUREAU OF ENVIRONMENTAL SERVICES

Dan Saltzman, Commissioner of Public Utilities
Dean C. Marriott, Bureau Director
William F. Ryan, P.E., Chief Engineer

## BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT

## PROJECT # E09052

# BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT
## PROJECT NO. E09052

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# GENERAL BIDDING

# REQUIREMENTS

# NOTICE TO BIDDERS
## BIDS ARE DUE BY 2:00 P.M.

This checklist is provided for the use and convenience of bidders. Please refer to the bid documents for requirements, as we cannot guarantee this list is complete. The responsibility for compliance with all requirements remains with the bidder. All submissions are made to Procurement Services.

**PRIOR TO BID OPENING:** The contractor shall have a current active license from the Oregon Construction Contractors Board. If required by the bid documents, contractors may also be required to attend a pre-bid conference. Contractors also are expected to be aware of, and base their bids upon, all addenda that might be issued prior to bid opening.

1. ☒ **Certification as an EEO Affirmative Action Employer** *http://cityofportland.ebidsystems.com*
   Chapter 3.100 of the Code of the City of Portland requires Equal Employment Opportunity Affirmative Action Employer certification **prior to contract execution.**
2. ☒ Prequalification by City of Portland (*Prequalification Application must be filed with Procurement Services at least 9 business days prior to bid opening, unless that time period has been changed by a prequalification application or the Instructions to Bidders.)*
   ***Download*** *at: http://www.portlandonline.com/omf/index.cfm?c=44700&*
3. ☒ **Current, active CCB license** is required to submit a bid as stated in Chapter 5.34.520 (A) of the Code of the City of Portland. Specialty licensing as required in the Bid Specifications (shown below)
   Specialty license: ☐ None
   Specialty license: ☐ None
4. ☒ Addenda ***(check for receipt of all addenda and acknowledge all addenda before submitting bid)***

5a ☒ Prebid Conference scheduled — 5b. Attendance: ☒ Mandatory ☐ Optional

**Checked items must be submitted WITH the Bid.**

1. ☒ Bid *(see Instructions to Bidders)*
2. ☒ Bid Guarantee *(see Instructions to Bidders)*
3. ☒ Non-Collusion Affidavit
4. ☐ Subcontractor and Self-Perform Work List (Form 1) - ***for Informal Construction projects only***
5. Federally Funded Project forms *(see Federal Specification*
   - ☐ a. Certification of Non-segregated Facilities
   - ☐ b. Certification regarding Debarment, Suspension & Other Responsibility Matters
6. ☐ Other

**Checked items must be submitted BY 4:00 p.m. on the day of the bid opening.**

1. ☒ State of Oregon – First Tier Subcontractor Disclosure Form required if bid is greater than $100,000. *(see State of Oregon Subcontractor Disclosure form for requirements)*
2. ☒ Good Faith Effort Program - Subcontractor and Self-Perform Work List - Form 1
3. ☐ Other

**Low Bidders:**

1. ☒ Good Faith Effort Program: The apparent low bidder must submit M/W/ESB Contact / Bids Received Log – Form 2 by 4:00 p.m. the next working day after bid submission. *(see Good Faith Effort Specification for detailed requirements)*
2. ☒ Workforce Training and Hiring Program *(see Workforce Training Specification for requirements)*
3. ☒ Equal Benefits Compliance Worksheet/Declaration

## PROJECT CONTACTS
## NAMES, ADDRESSES, AND PHONE NUMBERS

**During the bidding process, bidders should direct all questions to Kelly Davis for this project.**

The following names, addresses, and phone numbers are included for the convenience of the Bidders and Contractor:

Certification as an EEO Affirmative Action Employer:
Procurement Services
1120 SW 5th Avenue, Room 750
Portland, OR 97204-1972
(503) 823-6855
(503) 823-6865 FAX
http://cityofportland.ebidsystems.com

Prequalification of Bidders:
Louise Tamiesie
Procurement Services
1120 SW 5th Avenue, Room 750
Portland, OR 97204-1972
(503) 823-6865 FAX
louise.tamiesie@portlandoregon.gov
http://www.portlandonline.com/omf/index.cfm?c=27353&

Submittals of Bids:
(Place return address on outside of envelope)
Kelly Davis
Procurement Services
1120 SW 5th Avenue, Room 750
Portland, OR 97204-1972
(503) 823-7574
kelly.davis@portlandoregon.gov

Purchase of "Standard Construction Specifications":
Permit Application Center
BDS Building, First Floor
1900 SW 4th Avenue
Portland, OR 97204-1971
(503) 823-7660

Good Faith Effort / Workforce Training & Hiring
Brenda Kern
Procurement Services
1120 SW 5th Avenue, Room 750
Portland, OR 97204-1972
(503) 823-6889
(503) 823-6865 FAX
brenda.kern@portlandoregon.gov

## 1.0 SECURING DOCUMENTS

Copies of the Bid Documents may be obtained for examination at the following location:

City of Portland, Procurement Services
1120 SW Fifth Avenue, Room 750
Portland, OR 97204
Phone: (503) 823-5047; Fax: (503) 823-6865

All Bidders who submit bids on this project are required to have copies of a complete set of Bid Documents (plans and specifications), and all addenda issued prior to the bid due date. If there is any question as to the Bid Documents or addenda, contact Procurement Services.

If you intend to submit a bid on this project, you must register as a plan holder through Procurement Services, http://ebidexchange.com/cityofportland

## 1.01 INCORPORATION OF STANDARD CONSTRUCTION SPECIFICATIONS

Bidder shall incorporate all applicable provisions of the City of Portland Standard Construction Specifications, published 2007, into their bid. The Standard Construction Specification may be downloaded at http://www.portlandonline.com/transportation/index.cfm?c=40032

All work done and materials used on this project and the legal relations between the parties and the Contractor's requirements shall be as set forth in said Standard Specifications, except as specially and specifically modified or deleted by these Special Specifications. If there is any difference, discrepancy or conflict between these Special Specifications and the General Requirements of the City of Portland, the Special Specifications as set forth here shall apply. The 2007 Standard Construction Specifications may be purchased direct from the City of Portland, Development Services Center, 1900 SW 4th Avenue, Portland, Oregon, phone (503) 823-7660.

## 2.0 SUBMITTING BIDS

### 2.1 BID FORM

2.1.1 The bid and all other required documents must be enclosed in a sealed envelope and mailed or delivered to Procurement Services to arrive on or before the bid due date and time. The outside of the envelope shall plainly identify; (1) the Project Name as listed on the Bid Form, and (2) the Bid number.

2.1.2 All bids must be on the form included in the Invitation for Bid and all applicable blanks giving general information must be filled in and signed by the Bidder or a duly authorized agent. All bids must be clearly and distinctly

typed or written with ink or indelible pencil. Any statement accompanying and tending to qualify a bid may cause rejection of such bid unless a statement is required in a bid embracing alternatives.

2.1.3 Bidders shall bid on all items included in the bid. Bids that are incomplete or fail to include all items contained in the plans and specifications may be rejected.

2.1.4 Bidders should reference the Notice to Bidders for a list of forms to be submitted with the Bid.

## 2.2 WITHDRAWAL, MODIFICATION OF BID

A bid may be withdrawn by written request if such request is received prior to the date and time set for bid opening. Changes to a bid already submitted may be made by submitting the change, in form and manner required for a bid, prior to the bid due date and time. A change, which makes a successful bid more advantageous to the City, will be considered at any time.

## 2.3 LATE BIDS

Bids received after the scheduled bid due date and time will be returned to the Bidder unopened.

## 2.4 COST OF BIDS

This Invitation for Bid does not commit the City to pay any costs incurred by any Bidder in the submission of their bid, or in making any necessary studies or designs for the preparation thereof.

## 2.5 BID GUARANTY

No bid will be considered unless accompanied by a certified check, cashier's check, or a bid bond for an amount not less than ten percent (10%) of the aggregate amount of the bid. It shall be payable to the City of Portland as a guaranty that the bid shall be irrevocable for a period of sixty (60) calendar days, unless otherwise specified, after the bid opening date and time and as liquidated damages should the Bidder fail or neglect to furnish the required performance bond and insurance and execute a contract within ten (10) calendar days after receiving said contract from the Chief Procurement Officer for execution. The bid guaranty shall be retained for a period of time in accordance with City of Portland Code 5.33.410.

## 2.6 CONFLICT OF INTEREST

A Bidder submitting a bid hereby certifies that no officer, agent or employee of the City who has a pecuniary interest in this bid has participated in the contract negotiations on the part of the City, that the bid is made in good faith without fraud,

collusion, or connection of any kind with any other Bidder of the same Invitation for Bids, and that the Bidder is competing solely in its own behalf without connection with, or obligation to, any undisclosed person or firm.

## 3.0 LEGAL REQUIREMENTS

### 3.1 LAWS, ORDINANCES, AND REGULATIONS

The Bidder is presumed to be familiar with all Federal, State and local laws, ordinances, and regulations, which in any manner affect the personnel, material or equipment used in the proposed Work.

### 3.2 SPECIFIC STATUTES AND ORDINANCES

The Bidder's attention is called to the requirements of Oregon Revised Statutes Chapter 279A, 279B, 279C, and to Title 17 and Chapter 5.34 of the City of Portland Code with reference to public improvement contracts, purchasing in general, and to contractor's procedures and pre-qualification requirements.

### 3.3 EQUAL EMPLOYMENT OPPORTUNITY (EEO) CERTIFICATION

All Bidders must be certified as Equal Employment Opportunity Employers as prescribed by Chapter 3.100 of the Code of the City of Portland. Failure to receive EEO certification prior to the date and time of bid opening may result in delaying the award of the contract. Details of certification requirements are available from Procurement Services, 1120 SW Fifth Avenue, Room 750, Portland, Oregon 97204, (503) 823-6855, website:
http://www.portlandonline.com/omf/index.cfm?c=26522

### 3.4 NON-DISCRIMINATION IN EMPLOYEE BENEFITS (EQUAL BENEFITS)

In order to be awarded a contract with the City, all Bidders must meet the requirements of the Equal Benefits Program. The requirements of the Equal Benefits Program are available at the following website:
http://www.portlandonline.com/omf/index.cfm?c=43774.
Bidders are encouraged to submit the Equal Benefits Compliance Worksheet/Declaration Form ("Form") with their bid to assist the City in its determination of your Equal Benefits status for purposes of contract award. If not submitted, the Bidder will be contacted and required to provide this Form prior to contract award. The Equal Benefits Compliance Worksheet/Declaration Form can be found in this bid document or from the following web site:
http://www.portlandonline.com/shared/cfm/image.cfm?id=170879
Fill out the Form completely. You may call the Bureau of Internal Business Services, Procurement Services at 503-823-5047 for assistance with correctly completing the Form. You may also call Loretta Young at 503-823-6850 for any questions regarding the City's Equal Benefits requirements.

There are five (5) options for you to choose from on the Worksheet/Declaration Form. The options range from full compliance (Options A, B, or C), to an option that requires advance authorization by the City (Option D – Delayed Compliance),

to Non Compliance. Select the option that most accurately describes your company's benefits policy at the time you submit your bid. Option D may only be used if you have prior approval of Delayed Compliance Authorization from the City. The form to request Delayed Compliance from the City is found at: http://www.portlandonline.com/shared/cfm/image.cfm?id=170880, and should be submitted to the Chief Procurement Officer at Procurement Services. Delayed Compliance may only be authorized by Procurement Services.

If a Bidder currently does not comply with the Equal Benefits Program and does not intend to do so, the Bidder must still complete and submit the Form.

The Form provides the City your declared Equal Benefits status, but submission of the Form does not indicate compliance with the Equal Benefits Program. The City issues the final determination of your Equal Benefits status for purposes of contract award.

If information on your Form is conflicting or not clearly supported by the documentation that the City receives, the City may seek clarification to ensure that it is properly classifying your compliance status.

## 3.5 PRE-QUALIFICATION OF BIDDERS

All public improvement projects with an engineer's estimate of $ 100,000 or greater require pre-qualification.

**Bidders shall be prequalified in Category 8 – Sewer Construction in the amount of $ 5,700,000**

Prequalification application forms may be obtained from Procurement Services, 1120 SW Fifth Ave, Room 750, Portland, Oregon 97204, or by download at the following internet site: http://www.portlandonline.com/omf/index.cfm?c=44700&

Prequalification applications must be received by Procurement Services at least nine (9) business days prior to the date of bid opening, unless specifically stated otherwise in the advertisement. Pre-qualification applications received less than nine (9) business days prior to the bid opening may be processed or rejected at the City's sole discretion. If the application is not approved notice shall be given by the City at least three (3) business days prior to the bid opening date per City Code 5.34.510 (F).

Pre-qualification applications submitted without designation for a specific project shall be considered as general pre-qualification applications and processed pursuant to ORS 279C.430 (2).

3.6 DRUG TESTING PROGRAM

Pursuant to ORS 279.505 (2) (1), the Contractor awarded the contract shall demonstrate that an employee drug-testing program is in place.

3.7 AMERICANS WITH DISABILITIES ACT

Bidders agree that if awarded a contract, the successful Bidder will comply with all applicable provisions of the Americans with Disabilities Act of 1990, 42 UFC Section 12101 et seq. If any Bidder requires special assistance or auxiliary aids during the bidding process, please notify Procurement Services, (503) 823-6855, or TDD (503) 823-6868, at least two (2) business days prior to the required assistance.

3.8 BUSINESS LICENSE COMPLIANCE

A current business license is required before doing business with the City (See City Code 7.02.300 License Required: "No person shall do business within the City unless such a person shall have first paid a license fee under this Chapter". Persons whose gross receipts from all business, both within and without the City, amounts to less than $25,000 in any tax year are exempt.) Information related to obtaining a business license can be found on the following website: http://www.portlandonline.com/licenses/

3.9 CONSTRUCTION CONTRACTORS BOARD

Construction contractors must be licensed with the State of Oregon Construction Contractors Board in accordance with ORS 701.005 and any other specialty licensing as required in the bid specification prior to submitting a bid to the City. For information contact:

CONSTRUCTION CONTRACTORS BOARD
700 Summer St. NE, Suite #300
Salem, OR 97310
(503) 378-4621
(website) http://www.ccb.state.or.us

## 4.0 PRE-BID REQUIREMENTS

4.1 EXAMINATION OF BID DOCUMENTS & WORKSITE

Before submitting a bid, each Bidder shall carefully examine the Drawings, read the Specifications and all Addenda and visit the site of the Work. Each Bidder shall fully inform themselves prior to submitting a bid as to all existing conditions and limitations under which the Work is to be performed, and shall include in the bid a sum to cover all costs of all items necessary to perform the Work as set forth in the Bid Documents. No allowance will be made to any Bidder because of lack of such examination or knowledge. Submission of a bid will be construed as conclusive evidence that the Bidder has made such examination.

4.2 CLARIFICATION OF BID DOCUMENTS PRIOR TO BID - ADDENDA

4.2.1 Requests for additional information or interpretation of the bid document shall be submitted to the Chief Procurement Officer no later than five (5) calendar days before the deadline for submission of bids. Bid due date is indicated on the cover of the Bid Document.

4.2.2 If, in the opinion of the City, additional information or clarification is required, an addendum will be issued to all plan holders on record in Procurement Services. Any addenda issued by the Chief Procurement Officer seventy-two (72) hours or more before the scheduled closing time for filing bids shall be binding upon the Bidder. Failure of the Bidder to receive or obtain such addenda shall not excuse them from compliance therewith if they are awarded the contract.

4.2.3 Oral instructions or information given by City Officers, employees or agents to Bidders concerning this Bid Document or the work in general shall not bind the City.

4.3 PRE-BID CONFERENCE

A pre-bid conference may be scheduled to answer Bidders' questions. See front cover of Bid Document for date, time and place. If a mandatory pre-bid conference is scheduled, only General Contractors are required to attend, it is optional for sub-contractors.

## 5.0 CONTRACT AWARD

5.1 BASIS OF AWARD

5.1.1 The contract, if awarded, will be made to the lowest, responsive and responsible Bidder offering the lowest unit price base bid.

5.1.2 Determination of the lowest responsive, responsible bid is subject to review by the City Attorney.

5.1.3 The City reserves the right to accept or reject any or all bids in whole or in part, and waives irregularities not affecting substantial rights; and may reject for good cause all bids upon the City's finding that it is in the public interest to do so.

5.1.4 Award of contract, if awarded, will be made within sixty (60) calendar days after the date of bid opening unless otherwise stated in the Bid Documents.

5.2 EXECUTION OF CONTRACT DOCUMENTS

5.2.1 The Contract Form to be executed by the City and the successful Bidder for the Work is a standard form of the City of Portland, Oregon. Such form, incorporated into these Bid Documents by reference only and not physically contained herein, may be reviewed by prospective Bidders at Procurement Services, City of Portland, 1120 SW 5th Avenue, Room 750, Portland, Oregon 97204, phone (503) 823-5047 or by contacting the Buyer for this project, Kelly Davis at 503-823-7574.

5.2.2 If the contract total is $50,000 or less, a purchase order may be used to confirm the City's acceptance of a bid.

5.2.3 The Bidder to whom the Contract is awarded shall, within ten (10) calendar days after receipt of Contract forms from the Chief Procurement Officer, sign and deliver to the Chief Procurement Officer all required copies.

5.2.4 At or prior to delivery of the signed Contract, the Contractor shall deliver to the Chief Procurement Officer a Performance Bond, a separate Payment Bond, any other bonds and policies of insurance or insurance certificates as required by the Contract Documents.

5.2.5 Failure or refusal to furnish bonds or insurance policies or certificates in a form satisfactory to the City within the time stated above shall be just cause for cancellation of the award, withdrawal of the Contract, and forfeiture of the Bid Guaranty.

## 6.0 PERFORMANCE AND PAYMENT BONDS

6.1 The forms for the Performance Bond and the Payment Bond, to be executed by the successful Bidder for the Work and delivered to the City within ten (10) days after notification by the City, are the standard forms of the City of Portland, Oregon. Such forms, incorporated into these Bid Documents by reference only and not physically contained herein, may be reviewed by prospective Bidders at Procurement Services, City of Portland, 1120 SW 5th Avenue, Room 750, Portland, Oregon, 97204, phone (503) 823-5047.

6.2 The Bonds, in an amount equal to one hundred percent (100%) of the Contract Sum, shall be satisfactory to the City and shall be executed by a corporate surety licensed to do business in the State of Oregon. The attorney in fact who executed the Bonds on behalf of the surety shall affix thereto a certified and current copy of his power of attorney and shall indicate the monetary limit of such power.

## 7.0 PREFERENCES FOR GOOD AND SERVICES NON-RESIDENT CONTRACTOR

7.1 ORS 279A.120 requires that, in all public contracts, the public contracting agency shall prefer goods or services that have been manufactured or produced in this State if price, fitness, availability and quality are otherwise equal. In determining

the lowest responsive bidder, the City shall add a percent increase on the bid of a nonresident bidder equal to the percent, if any, of the preference given to that bidder in the state in which the bidder resides.

7.2 Where a public contract is awarded to a non resident contractor and the contract price exceeds $10,000, the Contractor shall promptly report to the Oregon Department of Revenue on forms provided by the Department of Revenue, the total contract price, terms of payment, length of contract and such other information as the Department of Revenue may require before final payment on the contract can be made. For purposes of this subsection, a non-resident contractor is one who is not domiciled in or registered to do business in the State of Oregon.

## 8.0 LOCAL BUSINESS PREFERENCE

Residents of the State of Oregon and SW Washington benefit from optimizing local businesses and services, and the local employment opportunities they generate. As such the City desires to employ local businesses in the purchase, lease, or sale of any personal property, public improvements or services. Therefore the City shall prefer goods or services that have been manufactured or produced by a local business if price, fitness, availability and quality are otherwise equal.

## 9.0 WAGE RATES

9.1 State of Oregon, Bureau of Labor and Industries (BOLI) wage rates are required for all work on contracts that total $50,000 and above.

9.2 The Prevailing Wage Rates for this project will be the rates in the BOLI publication titled "Prevailing Wage Rates for Public Works Contracts in Oregon" effective on January 1, 2011, which are hereby incorporated into this contract by this reference. You can download your copy from www.oregon.gov/boli. If you need additional copies, contact Bureau of Labor & Industries, 800 NE Oregon St. #32, Portland, OR 97232; phone 971-673-0839.

9.3 **Effective January 1, 2008, the City of Portland is required to pay the Prevailing Wage Rate (PWR) fee of 0.1% of the contract price directly to the Oregon Bureau of Labor and Industries (Ref. HB 2021) on projects first advertised or solicited on or after January 1, 2008. Therefore, Contractor acknowledges that this fee has not been included in the bid amount for this project.**

9.4 The Contractor awarded the contract is required to post a Public Works Bond with the Oregon Contractors Construction Board (OCCB) unless exempt prior to start of work on the project.

9.5 Subcontractors awarded the contract are required to post a Public Works Bond with the Oregon Contractors Construction Board (OCCB) unless exempt prior to start of work on the project.

## 10.0 PROTEST OF CONTRACTOR SELECTION

Bidders are permitted to challenge the City's decision to award a contract. Portland City Code 5.34.700 thru 5.34.740 describes in detail the protest and appeal procedures when a bid process is officially protested.

For each formal bid project not exempted from the competitive bidding procedures of ORS 279C.410 Procurement Services shall post a Notice of Intent to Award upon determination of the lowest responsive and responsible bidder. The Notice of Intent to Award shall be posted both on the Bureau's Internet Web Page, and in Procurement Services office location at 1120 SW Fifth Avenue, Room 750, Portland, OR, 97204. If the proposed contract exceeds $500,000, the Notice of Intent to Award shall also be mailed to each Bidder.

A Bidder who is adversely affected or aggrieved by the award of contract shall have seven (7) calendar days from the issuance of the Notice of Intent to Award to file a bid protest. The protest must be filed in writing to the Chief Procurement Officer and must specify the grounds upon which the protest is based. To be valid, a protest must come from an actual Bidder for the contract who claims to be the rightful awardee. A protest is not valid if filed by a Bidder who cannot show that it would be awarded the contract if its protest were accepted.

The Chief Procurement Officer will review the protest and issue a written decision. If the Bidder disagrees with the decision of the Chief Procurement Officer, the Chief Procurement Officer may refer to the Contract Board of Appeals or City Council as he/she determines. The request for appeal must be filed with the Chief Procurement Officer within seven (7) calendar days from the date of the written decision. The request must describe the specific reason for the appeal request, and is limited to those matters that were raised in the original protest letter.

**CITY OF PORTLAND, OREGON**
**BID FORM**
**BUREAU OF ENVIRONMENTAL SERVICES**

TO THE CHIEF PROCUREMENT OFFICER:

The undersigned, having full knowledge of the quality of the material and labor to be performed, hereby proposes to perform all labor and furnish all materials necessary for the **Burlingame Trunk Sewer Improvement Project** for the unit prices set opposite the different items of the material to be furnished and the work to be done as herein below stated:

**112818**

| NO. | ITEMS OF WORK AND MATERIALS | SPEC REFERENCE | ESTIMATED QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| 1 | MOBILIZATION | 00210 | 1 | LS | | |
| 2 | TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC | 00225 | 1 | LS | | |
| 3 | PORTABLE CHANGEABLE MESSAGE SIGNS | 00225 | 11 | EA | | |
| 4 | FLAGGERS | 00225 | 1500 | HR | | |
| 5 | TRAFFIC CONTROL SUPERVISOR | 00225 | 305 | DAY | | |
| 6 | EROSION CONTROL | 00280 | 1 | LS | | |
| 7 | SEDIMENT FENCE, SUPPORTED | 00280 | 3200 | FT | | |
| 8 | INLET PROTECTION | 00280 | 15 | EA | | |
| 9 | BIOFILTER BAGS | 00280 | 12 | EA | | |
| 10 | CHECK DAM | 00280 | 4 | EA | | |
| 11 | POLLUTION CONTROL PLAN | 00290 | 1 | LS | | |
| 12 | CONTAMINATED MEDIA DISPOSAL | 00291 | 1200 | TON | | |
| 13 | VIDEO PIPE INSPECTION, MAINLINE SEWER | 00401 | 7161 | FT | | |
| 14 | VIDEO PIPE INSPECTION, LATERAL SEWER | 00401 | 330 | FT | | |

| NO. | ITEMS OF WORK AND MATERIALS | SPEC REFERENCE | ESTIMATED QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| 15 | TRENCH EXCAVATION, COMMON | 00405 | 19120 | CY | | |
| 16 | TRENCH EXCAVATION, ROCK | 00405 | 150 | CY | | |
| 17 | TRENCH BACKFILL, CLASS B | 00405 | 14740 | CY | | |
| 18 | TRENCH FOUNDATION STABILIZATION | 00405 | 200 | CY | | |
| 19 | ENGINEERED SHORING | 00405 | 1 | LS | | |
| 20 | DEWATERING | 00405 | 1 | LS | | |
| 21 | POTHOLE EXCAVATION | 00405 | 16 | EA | | |
| 22 | CIPP, 30 INCH PIPE | 00410 | 1644 | FT | | |
| 23 | CIPP, 36 INCH PIPE | 00410 | 222 | FT | | |
| 24 | REINSTATE SERVICE CONNECTION | 00410 | 3 | EA | | |
| 25 | PROTECT AND RESTORE EXISTING SWALE | 00415 | 1 | LS | | |
| 26 | INSERTA-TEE | 00445 | 16 | EA | | |
| 27 | 4 INCH PIPE, PVC ASTM D3034 SDR 26, BEDDING TYPE: D | 00445 | 36 | FT | | |
| 28 | 6 INCH PIPE, PVC ASTM D3034 SDR 26, BEDDING TYPE: D | 00445 | 142 | FT | | |
| 29 | 8 INCH PIPE, PVC ASTM D3034 SDR 26, BEDDING TYPE: D | 00445 | 26 | FT | | |
| 30 | 10 INCH PIPE, PVC ASTM D3034 SDR 26, BEDDING TYPE: D | 00445 | 23 | FT | | |
| 31 | 15 INCH PIPE, PVC ASTM D3034 SDR 26, BEDDING TYPE: D | 00445 | 312 | FT | | |

| NO. | ITEMS OF WORK AND MATERIALS | SPEC REFERENCE | ESTIMATED QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| 32 | 18 INCH PIPE, FRP ASTM D3262 SN 72, BEDDING TYPE: D; OR PVC AWWA C905 SDR 25, BEDDING TYPE: D | 00445 | 53 | FT | | |
| 33 | 18 INCH PIPE, PVC ASTM D3034 SDR 26, BEDDING TYPE: D | 00445 | 30 | FT | | |
| 34 | 30 INCH RCP WITH HDPE LINING ASTM C-76 CLASS V, BEDDING TYPE: B; OR FRP ASTM D3262 SN 72, BEDDING TYPE: D | 00445 | 409 | FT | | |
| 35 | 36 INCH RCP WITH HDPE LINING ASTM C-76 CLASS V, BEDDING TYPE: B; OR FRP ASTM D3262 SN 72, BEDDING TYPE: D | 00445 | 133 | FT | | |
| 36 | 48 INCH RCP WITH HDPE LINING ASTM C-76 CLASS V, BEDDING TYPE: B; OR FRP ASTM D3262 SN 72, BEDDING TYPE: D | 00445 | 2494 | FT | | |
| 37 | CONCRETE MANHOLES, 48 INCH, 0 - 8 FT DEEP | 00470 | 5 | EA | | |
| 38 | CONCRETE MANHOLES, 48 INCH, DEEPER THAN 8 FT | 00470 | 40 | FT | | |
| 39 | CONCRETE MANHOLES, LINED, 60 INCH, 0 - 8 FT DEEP | 00470 | 4 | EA | | |
| 40 | CONCRETE MANHOLES, LINED, 60 INCH, DEEPER THAN 8 FT | 00470 | 44 | FT | | |
| 41 | CONCRETE MANHOLES, LINED, 72 INCH, 0 - 8 FT DEEP | 00470 | 10 | EA | | |
| 42 | CONCRETE MANHOLES, LINED, 72 INCH, DEEPER THAN 8 FT | 00470 | 135 | FT | | |
| 43 | CONCRETE MANHOLES, LINED, 96 INCH, 0 - 8 FT DEEP | 00470 | 1 | EA | | |

| NO. | ITEMS OF WORK AND MATERIALS | SPEC REFERENCE | ESTIMATED QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| 44 | CONCRETE MANHOLES, LINED, 96 INCH, DEEPER THAN 8 FT | 00470 | 11 | FT | | |
| 45 | INSIDE DROP ASSEMBLY, 8 INCH, 0-8 FT DEPTH | 00470 | 5 | EA | | |
| 46 | INSIDE DROP ASSEMBLY, 8 INCH, DEEPER THAN 8 FT | 00470 | 6 | FT | | |
| 47 | CONCRETE INLET, P-200 | 00470 | 1 | EA | | |
| 48 | FILLING ABANDONED STRUCTURES | 00490 | 3 | EA | | |
| 49 | FILLING ABANDONED PIPES, 8-INCH | 00490 | 287 | LF | | |
| 50 | FILLING ABANDONED PIPES, 10-INCH | 00490 | 43 | LF | | |
| 51 | FILLING ABANDONED PIPES, 18-INCH | 00490 | 53 | LF | | |
| 52 | FILLING ABANDONED PIPES, 30-INCH | 00490 | 524 | LF | | |
| 53 | FILLING ABANDONED PIPES, 36-INCH | 00490 | 70 | LF | | |
| 54 | LOCAL FLOW DIVERSION | 00490 | 1 | LS | | |
| 55 | FANNO FLOW DIVERSION | 00490 | 1 | LS | | |
| 56 | REHABILITATE MANHOLE WITH POLYURETHANE COATING | 00490 | 207 | VF | | |
| 57 | PERMANENT PLUGS | 00490 | 20 | EA | | |
| 58 | DISCHARGE STRUCTURE | 00490 | 1 | LS | | |
| 59 | RECONSTRUCT MANHOLE BASE | 00490 | 1 | EA | | |
| 60 | TRENCH RESURFACING W/O BASE | 00495 | 1900 | LF | | |
| 61 | OWNER DIRECED PAVEMENT | 00495 | 200 | SY | | |
| 62 | TEMPORARY TRENCH RESURFACING | 00495 | 1230 | SY | | |

| NO. | ITEMS OF WORK AND MATERIALS | SPEC REFERENCE | ESTIMATED QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| 63 | AGGREGATE BASE | 00640 | 520 | CY | | |
| 64 | MONOLITHIC CURB AND SIDEWALKS | 00759 | 3050 | SF | | |
| 65 | CONCRETE ISLANDS | 00759 | 195 | SF | | |
| 66 | REMOVE AND REINSTALL EXISTING SIGNS | 00905 | 1 | LS | | |
| 67 | LAWN SEEDING | 01030 | 890 | SY | | |
| 68 | TOPSOIL | 01040 | 270 | CY | | |
| 69 | DECIDUOUS TREES, 3-1/2 INCH CALIPER | 01040 | 37 | EA | | |
| 70 | CONIFER TREES, 9 FT HEIGHT | 01040 | 20 | EA | | |
| 71 | SHRUBS, NO. 2 CONTAINER | 01040 | 21 | EA | | |
| 72 | BARK MULCH | 01040 | 30 | CY | | |
| 73 | PLANT ESTABLISHMENT WORK | 01040 | 1 | LS | | |
| | | | | | | |
| | | | | | **TOTAL BID** | $ |

**ADDENDA**
The undersigned acknowledges receipt of all addenda issued to this solicitation.

**PREVAILING WAGES**
Bidder acknowledges the requirements of this solicitation in regards to the State of Oregon Prevailing Wage requirements or the federal prevailing wage requirements or both as required by ORS 279C.838 or 279C.840 or 40 USC § 276A will be complied with. (HB 2041, § 25)

Effective January 1, 2008, the City of Portland is required to pay the Prevailing Wage Rate (PWR) fee of 1/10 of 1% of the total contract price directly to the Oregon Bureau of Labor and Industries (Ref. HB 2021). **Therefore, by signing this form Contractor acknowledges that this fee has not been included in the bid amount for this project.**

**RESIDENT BIDDER**
**All bidders must state whether they are an Oregon resident bidder or a non-resident bidder. As defined in ORS 279A.120, a resident bidder is one who has paid unemployment taxes or income taxes in the state during the 12 calendar months immediately preceding bid submission, has a business address in Oregon, and has stated in their bid to be a resident bidder.**
Check one: Bidder is (___) a resident bidder or is (___) a non-resident bidder.
**If a nonresident bidder, the bidder certifies residency of (insert name of state where the bidder is a resident):**_____

**ASSIGNMENT OF ANTI-TRUST RIGHTS**
The undersigned acknowledges if they enter into a contract they will be assigning to the Owner any Claim for relief that the Contractor has or may have in the future by reason of violation of 15 USC SS 1-15 or ORS 646.725 or ORS 646.730.

Date: _____

Name of Firm: _____

Street Address: _____

City of: _____ State _____ Zip _____

Name:_____
(Original Signature) (Title)

Name: (Print) _____

Phone _____ Fax _____

Email _____

Employer Identification Number _____

SIC or Type of Business _____

Construction Contractors Board Registration Number _____

City of Portland Business License Number _____

Firm is a Corporation _____ Partnership _____ Proprietorship _____

If Incorporated, Registered in the State of: _____

If a Partnership, list partners: _____

_____

If a Proprietorship, name of principal: _____

# BID BOND

**KNOW ALL MEN BY THESE PRESENTS** that we,_____, as principal, and _____, a corporation organized and existing under the laws of the State of _____and duly authorized to transact a surety business in the State of Oregon, as surety, are held and firmly bound unto the CITY OF PORTLAND, a municipal corporation of the State of Oregon, in the penal sum of_____Dollars ($_____) lawful money of the United States of America, for the payment whereof well and duly to be made, we and each of us, jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns, firmly by these presents.

**THE CONDITIONS OF THIS OBLIGATION ARE SUCH** that whereas the Principal has submitted, or is about to submit, a proposal irrevocable for the period specified in the proposal to the Obligee on a contract for _____**NOW, THEREFORE**, in the event the principal seeks to revoke his offer for any reason not authorized by law and not consented to by Obligee within the irrevocable period and if awarded the contract and the said Principal fails, neglects or refuses to enter into a contract to perform said work and furnish said labor, equipment and/or material, and to furnish performance and labor material bonds as required within the time specified, then the amount herein stated shall be declared to be forfeited and become due and payable to the City of Portland.

**SIGNED, SEALED, AND DATED THIS**_____day of_____, 20_____

_____
**Principal**

_____
**Address**

_____

**BY**_____
**Signature**

_____
**Print Name and Title**

_____
**Surety**

_____
**Oregon Agent for Service**

**BY**_____
**Attorney in Fact**

_____
**Address**

_____
**CORPORATE SEAL (PRINCIPAL)**

**CORPORATE SEAL (SURETY)**

**N O T E**

If Principal is operating under an assumed business name, there must also be set forth in the first paragraph of the bond, the names of all partners or the individual owning the business, and the bond must be executed by one of them.

If the Principal is a corporation, the bond must be executed by one of the officers authorized to execute bonds, showing his/her official title and the seal of the corporation.

The bond must be executed by an attorney-in-fact for the surety company, shown on the face thereof, the Oregon agent for service, and bear the seal of the surety company. A current copy of the Power of Attorney must be attached which lists the attorney-in-fact signing the Bid Bond. Where the bond is executed by a person outside of the State of Oregon, his/her authority to execute bonds should be shown.

# NON-COLLUSION AFFIDAVIT

**STATE OF**_____**Contract Bid No.** _____

**COUNTY OF**_____

I, **(Type/Print Name)**_____,state that I am **(Position Title)**_____**of** **(Name of Firm)**_____and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

1. The price(s) and the amount of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder, or potential bidder, except as disclosed on the attached appendix.
2. Neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and the price(s), not approximate amount, will not be disclosed before bid opening.
3. No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.
4. The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.
5. **(Name of Firm)**_____, its affiliates, subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency and have not in the last four (4) years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as described in the attached appendix.

I state that **(Name of Firm)**_____understands and acknowledges that the above representations are material and important, and will be relied on by **THE CITY OF PORTLAND, OREGON** in awarding the contract(s) for which this bid is submitted. My firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from **THE CITY OF PORTLAND, OREGON** of the true facts relating to the submission of bids for this contract.

_____

**(Signature)**

Subscribed and sworn to before me this_____day of_____**, 20____**

_____

**NOTARY PUBLIC**

My commission expires_____

# City of Portland - Equal Benefits Compliance Worksheet/Declaration

You are encouraged to submit the completed Equal Benefits Worksheet/Declaration with your bid or proposal response. If not submitted, you will be required to provide the form prior to contract award. The City cannot award a contract until this information is submitted.

**Offeror Information:**

Company Name: _____ Contact Person: _____

Phone Number: _____ Fax: _____ E-mail: _____

Approximate Number of Employees in the U.S.: _____ Fed. Tax ID Number _____

_____

Address

I declare under penalty of perjury under the laws of the State of Oregon that the information is true and correct, and that I am authorized to bind this entity contractually.

_____ _____

Signature Name *(please print)*

1. a. Do you have any employees? ☐ **YES** ☐ **NO**

   If "**YES**," continue to Question 1b and 2. If "**NO**," select **Option A – Full Compliance – No Employees.**

   b. Are any of your employees covered by a collective bargaining agreement or union trust fund? ☐ **YES** ☐ **NO**

2. Do you provide the same employee benefits to domestic partners as you do to spouses of employees?* ☐ **YES** ☐ **NO**

   **If the answer to Question 2 is "YES"**, select **Option B – Full Compliance.**

   **If you DO NOT provide benefits to spouses or the domestic partners of your employees**, select **Option C – No Benefits.**

* "Employee benefits" means any plan, program or policy provided by an employer to its employees as part of the employer's total compensation package. This includes but is not limited to the following types of benefits: bereavement leave; disability, life, and other types of insurance; family medical leave; health benefits; membership or membership discounts; moving expenses; pension and retirement benefits; vacation; travel benefits; and any other benefits given to employees, provided that it does not include benefits to the extent that the application of the requirements may be preempted by federal or state law.

**Option A – Full Compliance – No Employees**

☐ Has no employees.

**Option B – Full Compliance**

☐ Makes benefits available on an equal basis to its employees with spouses & its employees with domestic partners.

**Option C – Full Compliance – No benefits to spouses OR domestic partners**

☐ Does not make benefits available to the spouses or the domestic partners of its employees.

**Option D – Delayed Compliance**

☐ Offeror must request and receive authorization from Procurement Services to delay implementation of equal benefits prior to selecting this option. Authorization must be granted before the contract can be awarded. Attach the "Delayed Compliance Authorization" which allows you to select Option D. The Delayed Compliance Authorization form can be obtained from the following web site: http://www.portlandonline.com/omf/index.cfm?c=43774

☐ **Statement of NON-Compliance**

The above named Offeror does NOT comply and does NOT intend to comply with Portland City Code Chapter 3.100.050 through 3.100.056 and related rules.

# ASSIGNMENT OF ANTI TRUST RIGHTS

By entering into a contract, the Contractor, for consideration paid to the Contractor under the contract, does irrevocably assign to the City of Portland any claim for relief or cause of action which the Contractor now has or which may accrue to the Contractor in the future, including, at the City's option, the right to control any such litigation on such claim for relief or cause of action, by reason of violation of 15 USC SS 1-15 or ORS 646.725 or ORS 646.730, in connection with any goods or services provided to the contractor by any person, which goods or services are used, in whole or in part, for the purpose of carrying out the Contractor's obligation under this contract.

In the event the Contractor hires subcontractors to perform any of the Contractor's duties under the contract, the Contractor shall require the subcontractor to irrevocably assign to the City of Portland, as a third party beneficiary any right, title or interest that has accrued or may accrue to the subcontractor by reasons of any violation of 15 USC SS 1-15, ORS 646.725 or ORS 646.730, including, at the City's option, the rights to control of any litigation arising there under, in connection with any goods or services provided to the subcontractor by any person, in whole or in part, for the purpose of carrying out the subcontractor's obligations as agreed to by the Contractor in pursuance of the completion of the contract.

In connection with this assignment, it is an express obligation of the Contractor that it will take no action which will in any way diminish the value of the rights conveyed or assigned hereunder to the City of Portland. It is an express obligation of the Contractor to advise the City Auditor or the Office of the City Attorney of Portland, Oregon:

1. In advance, of its intention to commence any action on its own behalf regarding such claims for relief or causes of action;

2. Immediately, upon becoming aware of the fact that an action has been commenced on its own behalf by some other person or persons, of the dependency of such action; and

3. The date on which it notified the obligor(s) of any such claims for relief or causes of action of the fact of its assignment to the City of Portland.

Furthermore, it is understood or agreed that in the event that any payment under such claim is made to the Contractor, it shall promptly pay over to the City of Portland its proportionate share thereof, if any, assigned to the state hereunder.

## STATE OF OREGON FIRST-TIER SUBCONTRACTOR DISCLOSURE REQUIREMENTS

It is the Bidder's responsibility to determine all the documents that must be submitted to the City. For purposes of this document, "submitted" means "in the physical possession of Procurement Services."

### STATE OF OREGON FIRST TIER SUBCONTRACTOR DISCLOSURE FORM TO BE SUBMITTED BY ALL BIDDERS NOT LATER THAN 4:00 P.M. THE DAY THE BID IS DUE

In 2003, the Oregon Legislature revised ORS 279C.370, which provides, in part:

"Within two working hours after the date and time of the deadline when the bids are due to the public contracting agency for a public improvement, a bidder shall submit to the public contracting agency a disclosure of the first-tier subcontractors that: (A) will be furnishing labor or will be furnishing labor and materials in connection with the public improvement; and (B) will have a contract value that is equal to or greater than five percent of the total project bid or $15,000, whichever is greater, or $350,000 regardless of the percentage of the total project bid."

The disclosure of first-tier subcontractors applies to public improvements with a contract value of more than $100,000.

**The Bidder must disclose the following information about their first-tier subcontracts either in its Bid submission or within two (2) working hours after the date and time of the deadline when bids are due:**

1) The subcontractor's name
2) Dollar value
3) The category of work that the subcontractor would be performing.

If the bidder will not be using any subcontractors that are subject to the above disclosure requirements, the bidder is required to indicate **"NONE"** on the accompanying form.

**Failure to submit this form by the disclosure deadline will result in a non-responsive bid. A non-responsive bid will not be considered for award.**

***Note to Contractors who are not the low bidder:***

**If apparent low bidder is disqualified or otherwise not awarded the contract and the next low bidder failed to submit the disclosure form within two (2) hours after the date and time of the deadline when bids were due, that bidder will be ineligible to receive award of the contract.**

**STATE OF OREGON**
**FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM**

*This form must be submitted at the location specified in the Invitation to Bid within two (2) working hours after the date and time of the deadline when the bids are due.*

*List below the name of each subcontractor that will be furnishing labor or labor and materials and that is required to be disclosed by ORS279C.370, the dollar value of the subcontract and the category of work that the subcontractor will be performing.*

*Enter "**NONE**" if there are no subcontractors that need to be disclosed.*
*(ATTACH ADDITIONAL SHEETS IF NEEDED)*

**Project Name:** _____

**Bid Number:** _____ **Bid Closing - Date:** _____ **Time:**_____

| **SUBCONTRACTOR NAME** (Please Print) | **DOLLAR VALUE** | **CATEGORY/DIVISION OF WORK** (Painting, electrical, landscaping, etc.) |
|---|---|---|
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |
| **Name** | **$** | |

**Failure to submit this form by 4:00 p.m. on the day of the bid opening will result in a non-responsive bid. A non-responsive bid will not be considered for award.**

Form submitted by (Bidders Name):_____

Contact Name:_____ Phone No.:_____

# GOOD FAITH EFFORT
# DIVISIONS OF WORK (DOW)

**BID NUMBER: 112818**
**PROJECT: Burlingame Trunk Sewer Improvement Project**

## ATTENTION CONTRACTORS

At least seven (7) calendar days prior to the scheduled bid due date, Prime Contractors are required to contact a minimum of FIVE (5) MWESB firms plus all MWESB pre-bid attendees for each Good Faith Effort DOW checked below in which they intend to subcontract work.

Please go to the state's website below to locate potential M/W/ESB subcontractors for each DOW listed below. Click on Search by NIGP code, enter the NIGP code listed below for the DOW you need (e.g. 91038 for Asbestos Removal, etc.). If you have difficulty identifying potential M/W/ESB subcontractors please contact Procurement Services - Brenda Kern at 503-823-6889 or Angela Pack at 503-823-6883.

**Please note:** This project is located within the City of Portland and when searching for potential subcontractors we encourage you to contact subcontractors within the general area.

Office of Minority, Women, and Emerging Small Business web site:

http://www4.cbs.state.or.us/ex/dir/omwesb/

| | NIGP CODE AND WORK DESCRIPTION |
|---|---|
| ☐ | 91038 ASBESTOS REMOVAL |
| ☒ | 91395 ASPHALT PAVING |
| ☐ | 91313 BRIDGES |
| ☐ | 91427 CARPENTRY |
| ☒ | 91219 CLEARING/GRUBBING/MOWING/BRUSHING |
| ☒ | 91382 CONCRETE CUTTING |
| ☐ | 92519 CONCRETE PUMPING |
| ☒ | 91430 CONCRETE WORK |
| ☐ | 96247 CRANE SERVICE |
| ☐ | 91240 DEMOLITION |
| ☐ | 91216 DRILLING/BORING |
| ☐ | 91075 DRYWALL/SHEETROCK |
| ☐ | 91438 ELECTRICAL |
| ☒ | 91244 EXCAVATING |
| ☐ | 98815 FENCING |
| ☐ | 91444 FLOOR COVERINGS |
| ☐ | 91447 GLASS SERVICES |
| ☐ | 91223 GRADING |
| ☒ | 96239 HAULING SERVICES (TRUCKING) |
| ☐ | 92645 HAZARDOUS WASTE REMOVAL |
| ☐ | 91036 HVAC |
| ☐ | 91453 INSULATION |

| | NIGP CODE AND WORK DESCRIPTION |
|---|---|
| ☐ | 91227 IRRIGATION |
| ☒ | 98852 LANDSCAPING |
| ☐ | 91047 LEAD PAINT ABATEMENT |
| ☐ | 91455 MASONRY |
| ☐ | 91458 METAL FABRICATION |
| ☐ | 91461 PAINTING/WALLPAPERING |
| ☐ | 91468 PLUMBING |
| ☐ | 91473 ROOFING |
| ☐ | 96826 ROCK CRUSHING |
| ☒ | 91345 SEWER, WATER & STORM DRAIN WORK |
| ☒ | 90976 SITE CLEAN UP |
| ☐ | 91276 STRIPING |
| ☐ | 91479 STRUCTURAL STEEL (INSTALL/ERECT) |
| ☐ | 92586 SURVEYING |
| ☐ | 96878 TANK DECOMMISSION/REMOVAL |
| ☐ | 91483 TILE/TERRAZZO/MARBLE WORK |
| ☒ | 96884 TRAFFIC CONTROL SERVICES (INCLUDES TPDT) |
| ☐ | 96880 TRAFFIC SIGN INSTALLATION/REMOVAL |
| ☐ | 91356 UTILITIES |
| ☒ | 96894 WATERPROOFING |
| ☐ | 91485 WELDING |
| ☐ | 87090 WINDOWCOVERINGS |

# CITY OF PORTLAND
# GOOD FAITH EFFORT PROGRAM
# BIDDER CHECKLIST

This Checklist helps identify documents that shall be submitted by the Bidder to establish that Good Faith Efforts (GFE) have been made. However, it remains the responsibility of the Bidder to determine all the documents that shall be submitted. For purposes of this document, *"submitted"* means in the physical possession of the City of Portland, Procurement Services. All forms can be provided electronically upon request; OR available to download on the Procurement Services website:

**http://www.portlandonline.com/omf/purchasing**

**DUE DAY OF BID OPENING BY 4:00PM – FROM ALL BIDDERS**

☐ **FORM 1 - City of Portland - Good Faith Effort Program - Subcontractor and Self-Perform Work List -** Provide all required information:

*(The completed Form 1 shall be submitted even if you intend to self-perform ALL the work on this project.)*

- ✔ Bidder Name, Bid Number, Bid Amount, and Project Name
- ✔ Bidder shall list **ALL** GFE Divisions of Work and identify as Self-Performing or Subcontracting

Failure to submit Form 1 with the bid or by 4:00 p.m. on the day of the bid opening will result in the bid being non-responsive and the bid will be rejected.

**DUE DAY AFTER BID OPENING BY 4:00PM - FROM THE APPARENT LOW BIDDER**

☐ **FORM 2 – City of Portland - Good Faith Effort Program - MWESB Contact / Bids Received Log -** Provide all required information in each column as applicable.

☐ **Copy of solicitation letter or FAX sent to M/W/ESB Subcontractors**

Failure to submit Form 2 by 4:00 p.m. on the day after the bid opening will result in the bid being non-responsive and the bid will be rejected.

**DUE AFTER AWARD OF CONTRACT FROM CONTRACTOR**

☐ **FORM 3 - City of Portland – Monthly Subcontractor Payment and Utilization Report**

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Completed GFE Forms may be submitted in person or by fax as directed below.
The City of Portland is not responsible for delays or problems with fax transmission.

## Submit all required information to:

City of Portland, Procurement Services; 1120 SW 5th Avenue, #750; Portland, OR 97204
FAX: 503-823-6865

## Questions:

Please call Procurement Services at:
(503) 823-6883 (Angela Pack) / Email: Angela.Pack@portlandoregon.gov
or (503) 823-6889 (Brenda Kern) / Email: Brenda.Kern@portlandoregon.gov

# CITY OF PORTLAND
# GOOD FAITH EFFORT REQUIREMENTS

## Article I. PROGRAM DESCRIPTION

A. The City of Portland has a compelling government interest to ensure that its contracts provide employment opportunities for Oregon State certified minority, women, and emerging small businesses (M/W/ESBs) in order to address historical underutilization. Therefore, Bidders are required to submit documentation showing that Good Faith Efforts (GFE) have been made to contract with M/W/ESB Subcontractors.

B. On projects estimated at $200,000 and above, this program:

1) Is used to evaluate the Good Faith Efforts (GFE) required of all Bidders;
2) Is intended to assist the City in recording Subcontractor utilization on its projects;
3) Requires Bidders to perform GFE on **ALL** of their subcontracting opportunities (regardless of value); and
4) Is adopted for reasons other than the prevention of bid shopping

## Article II. ASPIRATIONAL GOALS

A. The City has adopted an M/WBE aspirational goal of 35% of all subcontracts on each construction project estimated at $200,000 and above. Each year the aspirational goal will be based on the prior year's actual utilization of M/WBE's and a review of available M/WBE Subcontractors.

## Article III. PRE-BID REQUIREMENTS

A. Bidders are required to make good faith efforts to contract with M/W/ESB Subcontractors for **ALL** GFE Divisions of Work (DOW) identified in these documents unless the work will be self-performed by the Bidder.

B. The GFE DOW are areas where the City believes subcontracting opportunities may exist. Bidders shall use the GFE DOW, which are different than the divisions of work that might be outlined in the technical specifications. Bidders shall notify the project Buyer at least seven (7) business days prior to the bid opening date if the Bidder believes that any identified GFE DOW is not applicable to the project. If the Bidder does not account for all GFE DOW, its bid will be deemed non-responsive for failure to follow the GFE procedures.

C. These requirements are contractual obligations and are included in the construction contract. Failure to comply may result in a finding of breach of contract, possible disqualification of the Bidder to bid on future contracts, or a claim for damages.

**ATTENTION CONTRACTORS**

Please go to the State's website below to locate potential certified M/W/ESB subcontractors for each DOW. Click on Search by NIGP code, enter the NIGP code for the DOW you need (e.g. 91038 for Asbestos Removal etc.). If you have difficulty identifying potential M/W/ESB subcontractors please contact Procurement Services - Brenda Kern at 503-823-6889 or Angela Pack at 503-823-6883.

Please note: This project is located within the City of Portland and when searching for potential subcontractors we encourage you to contact subcontractors within the general area.

**Office of Minority, Women, and Emerging Small Business web site:**
http://www4.cbs.state.or.us/ex/dir/omwesb/

D. **Who to contact**

For **ALL** GFE DOW identified in these documents (see Article III.A) that you will not be self-performing, Bidders shall contact:

1) Each M/W/ESB Subcontractor that attended a pre-bid meeting (if one was held) that specializes in a GFE DOW if that work will be subcontracted. If the M/W/ESB identified itself as another potential prime contractor at the pre-bid meeting, that M/W/ESB need not be contacted. A list of Subcontractors attending the pre-bid meeting will be available to all Bidders. ***AND***

2) In addition, the Bidder shall contact a minimum of five (5) M/W/ESB Subcontractors listed in each GFE DOW that will be subcontracted. If there are less than five (5) Subcontractors listed for a particular GFE DOW, Bidders shall contact **all** of the Subcontractors that are listed in that GFE DOW.

E. **When to contact**

Bidders shall make the first contact with each M/W/ESB Subcontractor at least seven (7) calendar days before bid opening. For example, if bids are opening on Thursday, the first contact shall be on the Thursday of the preceding week. If bids are opened on Tuesday, then the first contact shall be on the Tuesday of the preceding week.

F. **How to contact**

1) Bidders shall contact M/W/ESB Subcontractors by letter or fax to advise them of potential subcontracting opportunities.

2) Bidders shall follow up the letter or fax with telephone calls to each M/W/ESB Subcontractor contacted to determine if a bid will be submitted or if further information is required. Follow up telephone calls need not be made to a Subcontractor who responds to the first contact with a statement that the Subcontractor will not bid on this project or if a Subcontractor already has submitted a sub-bid.

G. **What information shall be provided**

Bidders shall ensure that M/W/ESB Subcontractors have an equal opportunity to compete for work by providing all subcontractors the same information and informing them of the date and time that sub-bids are due.

## Article IV. OPTIONAL GOOD FAITH EFFORTS

A. Bidders also should consider efforts such as:

1) Advertisements in community based newspapers (i.e. Skanner, Asian Reporter, El Hispanic, etc.)
2) Letters to Minority and Women Community Organizations
3) Alternative methods of participation in Minority, Women or Emerging small businesses through arrangements such as joint ventures, negotiated subcontract agreements and competitive bids
4) Purchase of construction materials and equipment from M/W/ESB suppliers

## Article V. SUBMISSION OF REQUIRED DOCUMENTATION

A. **FORM 1 (Subcontractor and Self-Perform Work List) - DUE DAY OF BID OPENING BY 4:00PM – FROM ALL BIDDERS**

Bidders shall submit Form 1 with their bid or by 4:00 p.m. on the day the bid is due. Failure to timely submit Form 1 will result in bid rejection.

Form 1 shall list **ALL** Subcontractors to be used on this contract regardless of the dollar amount. (This is more than what is required by the State of Oregon's first-tier subcontractor disclosure form). If this bid includes Bid Alternates for additional work, Bidders shall list **ALL** first-tier Subcontractors who will be used if the City elects to do the additional work.

Additionally, Bidders shall identify **ALL** GFE DOW to be self-performed. If the Bidder does not account for all GFE DOW, its bid will be deemed non-responsive for failure to follow the GFE procedures.

The City will not consider untimely or unsolicited subcontractor amounts in its award decision that do not comply with the Good Faith Effort Program.

B. **FORM 2 (Log) & SOLICITATION LETTER - DUE DAY AFTER BID OPENING BY 4:00PM FROM APPARENT LOW BIDDER**

1) **FORM 2 (Contact / Bids Received Log):** The apparent low Bidder shall submit Form 2, (or equivalent), by 4 p.m. the next business day following bid submission. Bidder shall provide all required information in each column as applicable.

2) **Solicitation letter or fax:** The apparent low Bidder shall submit one copy of the letter or fax sent to M//W/ESB Subcontractors to solicit bids for this project. If more than one form of letter or fax was sent, submit a copy of each form sent.

3) Failure to timely submit Form 2 will result in bid rejection. Failure to timely submit the solicitation letter or fax may result in bid rejection, at the City's discretion. Contractors shall submit additional information upon request if the City believes it needs to clarify the Bidder's GFE.

4) If for any reason the apparent low Bidder is not awarded the contract or its bid is rejected, the next apparent low bidder shall submit Form 2 and its solicitation letter or fax by 4:00 p.m. the next business day following the City's notification.

C. **FORM 3 (Monthly Subcontractor Payment and Utilization Report) DUE MONTHLY FROM CONTRACTOR**

The selected Contractor shall list the contract amounts and payment amounts to **ALL** Subcontractors (including MBE/WBE/ESB Subcontractors) and second-tier Subcontractors on Form 3. All first-tier Subcontractors with second-tier Subcontractors also shall submit Form 3 monthly. Monthly Subcontractor Payment and Utilization Reports shall be submitted by the 15th of each month once work has commenced.

## Article VI. ADDITION OR REPLACEMENT OF SUBCONTRACTORS AFTER BID SUBMISSION

A. The Bidder awarded the Contract shall not replace a M/W/ESB Subcontractor without the consent of the Chief Procurement Officer at any time. The Chief Procurement Officer shall be notified in writing immediately upon the need to replace an M/W/ESB Subcontractor. Permission will not be unreasonably withheld.

B. If **ANY** Subcontractor is **added** or **replaced** after the bid is submitted, the successful Bidder shall make good faith efforts to solicit bids from M/W/ESBs for the work to be performed. Documentation of these efforts is required, and shall be submitted to the Chief Procurement Officer or designee prior to any changes to be made. Contact the Chief Procurement Officer for any questions on this procedure.

## Article VII. ENFORCEMENT AFTER CONTRACT AWARD

The Owner's commitment to this program is reflected, in part, by the cost of administering the program. Failure to meet the requirements of this section of the contract negates such funding and impairs the Owner's efforts to promote contracting diversity and to provide fair and equal opportunities to the public as a whole as a result of the expenditure of public funds. Therefore, the parties mutually agree that failure to meet the requirements of this section of the contract, including but not limited to the submission of required documentation, constitutes a material breach of contract.

In the event of a breach of contract, the Owner may take any or all of the following actions:

A. Withholding Progress Payments

The Owner may withhold all or part of any progress payment(s) until the Contractor has remedied the breach of contract. In the event that progress payments are withheld, the Contractor shall not be entitled to interest on said payments. If a Subcontractor(s) is responsible for noncompliance with the Good Faith Effort Program requirements, the Owner may choose to withhold only their portion of the progress payment.

B. Liquidated Damages

The parties mutually agree that it would be difficult, if not impossible, to assess the actual damage incurred by the Owner for the Contractor's failure to comply with the Good Faith Effort Program. The parties further agree that it is difficult, if not impossible; to determine the cost to the owner when contracting opportunities are not provided. Therefore:

1) GFE Program Non-Compliance:

If Contractor fails to comply with the GFE provisions of this contract, the Contractor agrees to pay the sum of $1,000 for each violation. These damages are independent of any liquidated damages that may be assessed due to any delay in the project caused by the Contractor's failure to comply with this or other provisions of the contract.

2) Non-Utilization or Under-Utilization of Identified M/W/ESB Subcontractors:

The Owner has an expectation that if a Bidder is awarded a contract, and identifies that they intend to subcontract a portion of the project work in Form 1, the Contractor will actually use the identified M/W/ESB subcontractor(s). This expectation also includes utilizing the subcontractor(s) within a reasonable range of the subcontract amount identified in Form. 1. A reasonable range is within twenty percent (20%) of the subcontract amount. Exceptions to this requirement are for approved change orders, reductions in scope of work caused solely by the Owner, failure of subcontractor to complete work or breach of subcontract, and approved substitution requests. This section does not apply if the subcontractor is utilized more than the subcontract amount identified in Form 1.

The Contractor agrees that failure to comply with this section will result in Contractor paying a sum of $1,000 for each violation of this section.

3) Delay:

The Contractor agrees that any delay to the specified contract time as a result of the Contractor's failure to comply with the requirements of this section shall subject the Contractor to the amount of liquidated damages specified elsewhere in the contract.

C. Possible Debarment

Failure to comply with the requirements of this portion of the contract may lead to the Contractor's disqualification from bidding on and receiving other Owner contracts as provided in Portland City Code (PCC) 5.34.530.

D. Other Remedies

The remedies that are noted above do not limit any other remedies available to the Owner in the event that the Contractor fails to meet the requirements of the Good Faith Effort Requirements.

## Article VIII. REVIEW OF RECORDS

A. In the event that the Owner reasonably believes that a violation of the requirements of this section has occurred, the Owner is entitled to review the books and records of the Contractor and any Subcontractors employed on the project to which the requirements of this section are applicable to determine whether such a violation has or has not occurred.

B. In the event that the Contractor or any Subcontractor fails to provide the books and records for inspection and copying when requested, such failure shall constitute a material breach of this contract and permit the imposition of any of the remedies noted in Article VII, including the withholding of all or part of any progress payment(s).

**ATTACHMENTS:**

FORM 1: City of Portland - Good Faith Effort Program - **Subcontractor and Self-Perform Work List**
FORM 2: City of Portland - Good Faith Effort Program - **M/W/ESB Contact / Bids Received Log**
FORM 3: City of Portland – **Monthly Subcontractor Payment and Utilization Report**

**All forms are available on the Procurement Services website:**

**http://www.portlandonline.com/omf/purchasing**

# CITY OF PORTLAND
# GOOD FAITH EFFORT (GFE) PROGRAM
# SUBCONTRACTOR AND SELF-PERFORM WORK LIST
# (FORM 1)

NOTE: IF THE BIDDER IS NOT USING ANY SUBCONTRACTORS ON THIS PROJECT, THE BIDDER SHALL WRITE "SELF-PERFORMING ALL WORK" ON THE FORM

**Bidder Name:** **Total Bid Amount:**

**Bid Number:** **Project Name:**

**BIDDER SELF-PERFORMING:** Shall identify below **ALL** identified GFE Divisions of Work (DOW) to be self-performed. Good Faith Efforts are otherwise required. The City will not consider untimely or unsolicited subcontractor amounts in its award decision that do not comply with the Good Faith Effort Program.

**GFE DOW BIDDER WILL SELF-PERFORM** ***(GFE not required)***

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**BIDDERS SHALL DISCLOSE AND LIST ALL SUBCONTRACTORS,** including those M/W/ESBs that you intend to use on the project. If this bid includes Bid Alternates for additional work, follow the same instructions as above.

| **LIST ALL SUBCONTRACTORS BELOW** (Print Legibly) Use **correct legal name** of Subcontractor | **GFE AND OTHER DOW** (Painting, electrical, landscaping, etc.) Shall list **ALL** DOW performed by Subcontractors | **DOLLAR AMOUNT OF SUBCONTRACT** | If Certified MBE/WBE/ESB Subcontractor Check box ✓ | | |
|---|---|---|---|---|---|
| | | | MBE | WBE | ESB |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **Fax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **Fax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **ax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |

**Failure to submit this form with the bid or by 4:00 p.m. on the day of the bid opening will result in the bid being non-responsive and the bid will be rejected. Completed form may be faxed to: 503-823-6865. The City of Portland is not responsible for delays or problems with fax transmission.**

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

**Bidder Name:** **Total Bid Amount:**
**Bid Number:** **Project Name:**

| **LIST ALL SUBCONTRACTORS BELOW** (Print Legibly) Use **correct legal name** of Subcontractor | **GFE AND OTHER DOW** (Painting, electrical, landscaping, etc.) Shall list **ALL** DOW performed by Subcontractors | **DOLLAR AMOUNT OF SUBCONTRACT** | If Certified MBE/WBE/ESB Subcontractor Check box | | |
|---|---|---|---|---|---|
| | | | MBE | WBE | ESB |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **Fax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **Fax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **Fax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **Fax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **Fax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |
| **Name**<br>**Address**<br>**City/St/Zip**<br>**Phone#** **Fax #**<br>**OCCB#** **FED ID#** | | | ☐ | ☐ | ☐ |

# CITY OF PORTLAND
# GOOD FAITH EFFORT PROGRAM
# M/W/ESB CONTACT / BIDS RECEIVED LOG
# (FORM 2)

**Bidder Name:** **Bid Number:**

**Bidders shall record their contacts with MBE/WBE/ESB Subcontractors through use of this log (or equivalent) entering all required information. All columns shall be completed where applicable. Additional forms may be copied if needed.**

| NAME OF M/W/ESB SUBCONTRACTOR | GFE Divisions of Work (Use list provided for areas of subcontracting. (Painting, electrical, landscaping, etc.) | Date Solicitation Letter / Fax Sent | PHONE CONTACT | | BID ACTIVITY (Check Yes or No) | | | REJECTED BIDS (if bid received & not used) | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Date of Call | Person Receiving Call | Will Bid | Bid Received | Bid Used | Bid Amount | Reason Not Used (Price, Scope or Other. If Other, explain in Notes>>) | |
| | | | | | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | | | |
| | | | | | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | | | |
| | | | | | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | | | |
| | | | | | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | | | |
| | | | | | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | | | |
| | | | | | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | | | |
| | | | | | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | | | |

Failure to submit this form (or equivalent) by 4:00 p.m. on the day after bid opening will result in the bid being non-responsive and the bid will be rejected.
If an equivalent form is used, it shall include all information requested on this form as required. Completed form may be faxed to: 503-823-6865. The City of Portland is not responsible for delays or problems with fax transmission.

CITY OF PORTLAND
MONTHLY SUBCONTRACTOR PAYMENT AND UTILIZATION REPORT (FORM 3 - MUR)

1. Bid Number | 2. Contract Number | 3. Contractor Name

☐ I am the Prime
☐ I am a Sub submitting amounts I've paid to my subs

4. Prime Contract Amount | 5. Month End Date | 6. Project Name

7. Progress Report Number | 8. Are you being paid twice per month? YES ☐ NO ☐ | 9. Is this your Final MUR (all subs paid in full)? YES ☐ NO ☐

**SECOND TIER PAYMENTS TO SUBCONTRACTORS SHALL BE INCLUDED ON THIS REPORT**

| 10 | 11 | 12 | 13 | 14 | | 15 | |
|---|---|---|---|---|---|---|---|
| | | | | *MONTHLY AMOUNTS* | | *PROJECT TOTALS TO DATE* | |
| ALL SUBCONTRACTORS LISTED ON SUBPLAN **(from Form 1 at bid time)** | Check if 2nd-Tier Sub | ORIGINAL AWARD AMOUNT (On Form 1 at bid time) | **AMENDED SUBCONTRACT AMOUNT** | PAYMENTS MADE ***THIS MONTH ONLY*** | RETAINAGE | PAYMENTS MADE ***TOTAL-TO-DATE*** | RETAINAGE |
| | ☐ | | | | | | |
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***SUBCONTRACTORS ADDED AFTER PROJECT AWARD (Shall be EEO Certified with the City of Portland)**

| 16 | 17 | 18 | 19 | 20 | 21 | | 22 | |
|---|---|---|---|---|---|---|---|---|
| | | | | | *MONTHLY AMOUNTS* | | *PROJECT TOTALS TO DATE* | |
| SUBCONTRACTOR NAME | Check if 2nd-Tier Sub | STATUS MWESB? | **TYPE / NATURE OF WORK** | **SUBCONTRACT AMOUNT** | PAYMENTS MADE ***THIS MONTH ONLY*** | RETAINAGE | PAYMENTS MADE ***TOTAL-TO-DATE*** | RETAINAGE |
| | ☐ | | | | | | | |
| | ☐ | | | | | | | |
| | ☐ | | | | | | | |
| | ☐ | | | | | | | |
| | ☐ | | | | | | | |
| | ☐ | | | | | | | |

*** **CHANGES TO CONTRACT**: **Before replacing, substituting, or adding any subcontractor, please contact the Chief Procurement Officer / Project Manager** ***

*Please note: Instructions for completing this report are available on the next page.*
*BY SIGNING BELOW, I HEREBY CERTIFY THAT THE ABOVE LISTED FIRMS HAVE BEEN UTILIZED BY OUR COMPANY IN THE AMOUNTS REPRESENTED ABOVE AND THAT THE INFORMATION CONTAINED HEREIN IS COMPLETE AND ACCURATE.*

_____ _____
Authorized Signature of Contractor Representative | Date

**Submit with request for Progress Payment or by the 15th of the month to Project Manager & City of Portland, Procurement Services, 1120 SW 5th Av, Room 750, Portland, OR 97204 (fax: 503-823-6865)**

# INSTRUCTIONS FOR COMPLETING THE MONTHLY SUBCONTRACTOR PAYMENT & UTILIZATION REPORT

1. **BID NUMBER:** City of Portland Bid Number.
2. **CONTRACT NUMBER**: City of Portland contract number.
3. **CONTRACTOR NAME**: Name of submitting the MUR. Indicate by checking the box whether you are the Prime or a Subcontractor listing payments to your Subs.
4. **PRIME CONTRACT AMOUNT:** Total dollar amount.
5. **MONTH END DATE:** Indicate the month end date you are reporting payments for (i.e. 6/30/08; 07/31/08; 08/31/08, etc).
6. **PROJECT NAME**: As indicated on the contract documents.
7. **PROGRESS REPORT NUMBER**: Enter report No.1 for the first report submitted and subsequent numbers for reports submitted thereafter.
8. **ARE YOU BEING PAID TWICE PER MONTH?:** Indicate whether you are being paid twice per month per the City's Standard Construction Specifications.
9. **IS THIS YOUR FINAL MUR?**: Please check whether or not this is your final MUR, indicating that all Subcontractors have been paid.
10. **ALL SUBCONTRACTORS LISTED ON SUBPLAN**: Names of all Subcontractors (not suppliers) listed on the Contractor's original subcontract plan (Form 1) submitted at bid time.
11. **CHECK IF SECOND TIER SUBCONTRACTOR**
12. **ORIGINAL AWARD AMOUNT ( From Form 1 at bid time)**: Indicate the dollar amount shown on the Form 1 for each subcontractor at bid time.
13. **AMENDED SUBCONTRACT AMOUNT**: This amount should show the current subcontract amount as it changes throughout the project, reflecting additions or deletions of work.
14. **MONTHLY AMOUNTS:** Please list dollar amount of retainage with-held and actual payment amount (excluding retainage) for the month.
15. **PROJECT TOTALS TO DATE**: The cumulative retainage with-held and total payments (excluding retainage) made to date for each Subcontractor.

## SUBCONTRACTORS ADDED AFTER PROJECT WAS AWARDED

16. **SUBCONTRACTOR NAME:** Please list any Subcontractors not appearing on original subplan (Form 1).
17. **CHECK IF SECOND TIER SUBCONTRACTOR**
18. **STATUS**: Indicate the certification status of each Subcontractor listed (i.e. MBE, WBE, and ESB). Leave blank for non-certified Subcontractors.
19. **NATURE / TYPE OF WORK:** Briefly describe Subcontractors work (i.e. Landscaping, Electrical, Paving, etc.).
20. **SUBCONTRACT AMOUNT:** Indicate the dollar amount of the subcontract. If any changes during project, change to reflect current amount here.
21. See #14.
22. See #15.

**Completed form may be faxed to: 503-823-6865. The City of Portland is not responsible for delays or problems with fax transmission.**

# WORKFORCE TRAINING & HIRING PROGRAM
## Contractor Checklist

*This program applies to prime contracts of $200,000 or more and subcontracts of $100,000 or more*

The following Workforce Training & Hiring Program requirements are a summary of the key contractual obligations of contractors working on City projects, and projects with PDC funds, development agreements or Enterprise Zone benefits. It is the Contractor's responsibility to read and fully understand this section of the bid specifications and to comply with all provisions of the program, regardless of whether they appear on this checklist. The City administers this program for the Portland Development Commission and the Housing Authority of Portland.

**CHECKLIST:**

1. **Prime Contractor:**
   A. Submit Projected Hiring Needs form (Exhibit 2) to City within 15 calendar days after bid opening or prior to Contract award.
   B. Ensure compliance by all subcontractors with subcontracts of $100,000 or more, and provide them with a copy of the Workforce Training & Hiring Program specifications.

2. **Subcontractors, at all tiers, with contracts of $100,000 or more:**
   Submit Projected Hiring Needs form (Exhibit 2) prior to beginning work on the project or within 5 days of signing subcontracts, whichever occurs first.

3. **Prime Contractor & all subcontractors with contracts of $100,000 or more must:**
   **A. Before starting work on this project:**
   Submit proof of registration as a Training Agent with the Bureau of Labor & Industries (BOLI), Apprenticeship & Training Division. Not a BOLI registered training agent? Contact BOLI (971-673-0761) or City of Portland (503-823-6850) for information on how to become one.

   **B. Throughout the duration of the project:**
   1. Ensure that a minimum of 20% of labor hours in each apprenticeable trade performed by the Prime and subcontractors of $100,000 or more are worked by state registered apprentices.
   2. Make all reasonable and necessary efforts to employ a workforce that reflects the diversity of the city of Portland, including recruitment of a diverse workforce through the unions, the apprenticeship programs and other community resources, as described herein.
   3. Maintain written documentation of all requests for workers from the unions, apprenticeship programs, and community organizations.
   4. When an apprentice is hired: Notify the City's Contract Compliance Specialist assigned to the project.
   5. Submit the Monthly Employment Report (Exhibit 4) by the 5th of each month to the Owner's Project Manager and the Contract Compliance Specialist. This report can be submitted electronically (via email). For further information, please send an email to: mur-mer@portlandoregon.gov.

For additional information or questions, please contact the Contract Compliance Specialist assigned to the project or the City's Workforce Program Coordinator at 503-823-6850.

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## WORKFORCE TRAINING AND HIRING PROGRAM
## Specifications

### I. PURPOSE

A. General Program Description

The Portland City Council has directed that all Bureaus and Departments maximize apprenticeship and employment opportunities for minorities, women and economically disadvantaged workers in the construction trades (ref. City Ordinance No. 167374, Feb. 16, 1994 and County Ordinance No. 861, July 11, 1996). Their goals include a) ensuring that the City do business with contractors whose workforce reflects the diversity of the workforce found in the City of Portland, and b) that their contracting dollars provide fair and equal opportunities to the jurisdictions' diverse populations.

The Workforce Training & Hiring Program ("Workforce Program") is administered for the City of Portland, Portland Development Commission (PDC), and the Housing Authority of Portland by the City of Portland, Procurement Services. The Workforce Program applies to all prime contracts of $200,000 or more and to each subcontractor having a subcontract of $100,000 or more on the project. The Contractor and all subcontractors are encouraged to fulfill the program requirements even if their contracts are less than these amounts.

Contractors shall make reasonable efforts to ensure that their workforce reflects the diversity of the City of Portland.

One way contractors can make reasonable efforts to ensure that their workforce is diverse is to recruit, train and employ minorities and women whenever possible. This portion of the Contract establishes requirements regarding that recruitment, training and employment.

**For purposes of the Workforce Program specifications, the following definitions shall apply:**

The ***"Contract"*** shall mean the contract awarded as a result of these bid specifications.

***"Contractor"*** shall mean the Prime Contractor to whom a Contract is awarded, and any subcontractors with subcontracts of $100,000 or more.

The term ***"minorities"*** shall include members of either sex who are African-Americans, Hispanic Americans, Asians or Pacific Islanders, Native Americans or Alaskan Native Americans.

***"Owner"*** shall mean the government agency that awarded the Contract, or leveraged public involvement in the project through a loan, development agreement or Enterprise Zone program.

The ***"project"*** shall include all work performed pursuant to the Contract.

B. Organization of Program Requirements

The Workforce Program specifications are divided into several parts.

**Section II** - refers to the action the PRIME must take in order to be eligible for award of a contract.

**Section III** - lists the actions that must be taken by the PRIME to meet contractual obligations.

**Section IV -** refers to remedies available to the Owner if a PRIME fails to meet the requirements of the Workforce Program specifications.

**Section V** - refers to the Owner's ability to monitor compliance with the Workforce Program specification by examination of PRIME and subcontractor records.

## II. ACTIONS REQUIRED FOR AWARD

The PRIME shall thoroughly read this Workforce Program specification and commit to perform all requirements described herein. The PRIME shall submit Exhibit 2, Projected Hiring Needs prior to award of the Contract, or as otherwise designated. The Exhibit shall provide complete information. The Projected Hiring Needs must demonstrate how the workforce on this project will fulfill all program requirements, including utilization of apprentices.

## III. ACTIONS REQUIRED TO SATISFY CONTRACTUAL OBLIGATIONS

### A. Make Reasonable Efforts to Have Diverse Workforce

A PRIME must make all necessary and reasonable efforts to have a workforce that reflects the diversity of the City of Portland and is reasonably consistent with the availability of qualified women and minorities based on Equal Employment Opportunity data supplied by the City. This requirement is in addition to any other requirement of this portion of the Contract.

The PRIME shall demonstrate that it is an EEO employer with a diverse workforce, or that it is making serious efforts to become one, as follows:

1. The PRIME and each affected subcontractor shall submit a copy of its "A" level EEO certification letter from the City of Portland EEO Program. An "A" level EEO certification demonstrates that the Contractor is not underutilized by trade, race, and gender in its companywide workforce based on availability data from the 1990 census and the City's EEO statistical summary; or

2. Provide written documentation of its good faith recruitment efforts. If the Contractor is unable to verify that it employs a diverse workforce based on the standards described in the paragraph above, then the Contractor must follow the process for recruiting apprentices and journey workers described in Section III, subsections F and G of this specification. This process is considered by the City to be the minimum effort to recruit a diverse workforce.

   ***NOTE: A Contractor seeking an "A" level EEO certification may wish to consider utilizing the Recommended Good Faith Recruitment & Retention Practices, attached as Exhibit 1.***

3. The failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall not excuse the Contractor's obligations under this section of the specifications.

### B. Ensure Compliance By Certain Subcontractors

1. The PRIME shall ensure that each subcontractor having a subcontract of $100,000 or more, at all tiers shall comply with all of the provisions of the Workforce Program specifications. The PRIME shall include in its price all costs associated with this requirement. No change order will be executed in order for the PRIME to comply with the Workforce Program specifications.

2. The PRIME shall provide a copy of this Workforce Program specification to all subcontractors with contracts of $100,000 or more executed for the project.

### C. Register As A Training Agent

The PRIME shall register with the Oregon Bureau of Labor and Industries (BOLI) as a Training Agent and ensure that all subcontractors who have contracts in the amount of $100,000 or more are registered as Training Agents. However, registration as a Training Agent in a specific trade is not required if there are no training opportunities in that trade on the project, based on the maximum ratio allowed by BOLI.

1. Training programs approved by and registered with BOLI may be used to fulfill training requirements under the Workforce Program specifications. Other training alternatives must be approved by the City's Workforce Program Coordinator.

2. Training is intended to be primarily on-the-job training in apprenticeable crafts, and does not include

classifications such as flag person, timekeeper, office engineer, estimator, bookkeeper, clerk/typist, fire fighter, or secretary. Hours performed in crafts which are not apprenticeable occupations, such as truck driving, are exempt from the training requirements.

3. Exemptions to the training requirements must be approved by the Owner in writing prior to starting work on the project. Written requests for exemptions related to the training requirements will be considered by the Owner only for extreme circumstances during the course of the project, and must also be approved in writing. All requests to exempt all or any portion of the work on a project shall be submitted to the Contract Compliance Specialist for the project.

   Requests for exemptions must be approved by the City Workforce Program Coordinator.

D. Submit Documentation

The PRIME shall submit documentation regarding the following subjects to the Owner. The Owner's failure to object to documentation submitted by the PRIME or subcontractor shall not relieve them of the requirements of the Workforce Program specifications.

1. ***Training Agent Status***
   The PRIME and all required subcontractors listed on the First Tier Subcontractor Disclosure Form must submit proof to the Contract Compliance Specialist that they are registered Training Agents with BOLI prior to beginning any work on the project.

2. ***Subcontractor Workforce Information***
   Exhibit 2, Projected Hiring Needs, must also be submitted for each subcontractor listed on the First Tier Subcontractor Disclosure Form required to register as a Training Agent prior to beginning work on the project or within 5 calendar days after the execution of the applicable subcontract, whichever occurs first. Work by a subcontractor shall not begin prior to submission of such documentation.

3. ***Prime and Subcontractor Reports After Work Begins***
   The Monthly Employment Report (Exhibit 4) must be submitted by the PRIME and any subcontractor having a subcontract of $100,000 or more to the Contract Compliance Specialist by the 5th day of each month, with a copy to the Owner's Project Manager. The Contractor shall follow the submittal instructions on the report form. All hours subject to prevailing wage rates on public projects, in addition to supervisors, foremen, and superintendents, shall be reported on Exhibit 4.

4. A copy of certified payroll reports may be requested by the Owner to verify information in the Report. The payroll reports shall be provided within 7 days of the date when the Contractor receives the request for the payroll.

E. Use of Apprentices

The PRIME shall:

1. Ensure that a minimum of 20% of labor hours in each apprentice able trade performed on the project by the PRIME, and subcontractors with subcontracts of $100,000 or more, are worked by state registered apprentices throughout the duration of the project. The PRIME and subcontractors shall fulfill the 20% apprenticeship hour's requirement without exceeding the apprentice ratios approved by the applicable apprenticeship program.

2. Pay all apprentices the wages required by any applicable collective bargaining contract or pursuant to state or federal law and regulations.

3. Not use workers previously employed at journey-level or those who have successfully completed a training course leading to journey-level status to satisfy the requirements of these provisions.
4. Notify the Contract Compliance Specialist when an apprentice is hired for this project.

5. Count apprentice hours as follows:

   (a) Hours worked on the project by apprentices enrolled in state-approved apprenticeship

programs. If the Contractor is unable to fulfill its 20% requirement, then the Contractor may also use methods (b) and (c) below;

(b) Hours worked on the project by apprentices who are required to be away from the job site for related training during the course of the project, but only if the apprentice is rehired by the same employer after completion of training; and

(c) Hours worked on the project by graduates of state-registered apprenticeship programs, provided that such hours are worked within the 12-month period following the apprentice's completion date.

F. Use Apprenticeship Programs for Referrals

A Contractor that does not have an "A" level EEO certification must follow all of these steps in seeking apprentice referrals:

1. Contact the appropriate apprenticeship program or dispatch center to request apprentices who are enrolled in the apprenticeship program; and

2. Request female or minority apprentices from the union or open shop apprenticeship program if such an action will help meet Equal Employment Opportunity (EEO) certification requirements or remedy historical underutilization in the Contractor's workforce; and

3. Keep a written record of the request for apprentices, including name of contact person at apprenticeship program, phone, fax, date, time, job location, start date, etc.; and

4. Make reasonable and necessary efforts to recruit apprentice applicants from the Worksource Program at the Oregon Employment Department, and seek to enroll them into an apprenticeship program, if the apprenticeship program is unable to supply an apprentice (or if no women or minorities are available to meet EEO needs), and if the program is open for applications or allows direct entry from the Oregon Employment Department.

**NOTE: Contractors may contact the Contract Compliance Specialist for assistance regarding the apprentice referral process, or may utilize Exhibit 3, Request For Apprentice form, to document their efforts.**

G. Utilize Unions and Community Organizations When Recruiting For any Positions

When hiring, requesting, recruiting, or replacing workers for this project, the Contractor that does not have an "A" level EEO certification shall:

1. Make reasonable and necessary efforts to employ a diverse workforce, especially to correct any potential EEO certification problems. Such actions should include requests for minority and female applicants. Contractors are notified that direct hiring of employees (such as "walk-ons") without providing notification of that job opportunity, in accordance with paragraph G.2. below, may not constitute a reasonable effort.

2. Document its employment efforts. Documentation should be sufficient to establish the Contractor's efforts, and should include:
   a) Requests to union halls for signatory contractors;
   b) Requests to union or open shop apprenticeship programs;
   c) Requests to the Oregon Employment Department that assist contractors with recruitment and referral of workers.

3. Documentation will be requested by the Owner from contractors that are not "A" level EEO certified if it appears that the Contractor has not made reasonable and necessary efforts to acquire a diverse workforce. When requested, the Contractor shall provide that documentation to the Contract Compliance Specialist within 7 calendar days.

## IV. CONSEQUENCES OF NONCOMPLIANCE WITH WORKFORCE PROGRAM REQUIREMENTS

The Owner's commitment to this program is reflected, in part, by the cost of administering the program. Failure to meet the requirements of this section of the specifications negates such funding and impairs the Owner's efforts to promote workforce diversity and to provide fair and equal opportunities to the public as a whole as a result of the expenditure of public funds. Therefore, the parties mutually agree that failure to meet the requirements of this section of the specifications, including but not limited to the submission of required documentation, constitutes a material breach of the Contract.

In the event of a breach of this section of the Contract, the Owner may take any or all of the following actions:

A. Withholding Progress Payments

The Owner may withhold all or part of any progress payment or payments until the PRIME has remedied the breach of Contract. In the event that progress payments are withheld, the PRIME shall not be entitled to interest on said payments.

If a subcontractor(s) is responsible for noncompliance with the Workforce Program requirements, the Owner may choose to withhold only their portion of the progress payment.

B. Retain sums as damages for failure to comply with Workforce Program Specifications

The parties mutually agree that it would be difficult, if not impossible, to assess the actual damage incurred by the Owner for the PRIME's failure to comply with the Workforce Program specifications. The parties further agree that it is difficult, if not impossible, to determine the cost to the Owner when workforce opportunities are not provided. Therefore, if the PRIME fails to comply with the Workforce Program specifications of this Contract, the PRIME agrees to pay the sum of $250 per day for each day of missed apprenticeship hours or until the breach of Contract is remedied. Damages may be assessed for failure to meet the 20% apprenticeship training requirements by the PRIME and each required subcontractor in each trade employed. Damages will be calculated based on the training hours not provided at a rate of $250 per day. For example, if the Contractor was required to provide 200 hours of carpenter training (20% of 1,000 total carpenter hours), and the Contractor only provided 150 training hours, then the difference (50 hours) is divided by 8 (one day of work) to determine the number of days of undelivered training. (50/8 = 6.25 x $250 = $1,562.5).

Damages may also be assessed for failure to fulfill the inclusive hiring process described in Section III, subsections F and G.

These damages are independent of any liquidated damages that may be assessed due to any delay in the project caused by the Contractor's failure to comply with the Workforce Program specifications of the Contract.

C. Retain sums as liquidated damages for delay

The PRIME agrees that any delay to the specified contract time as a result of the PRIME's failure to comply with the requirements of these specifications shall subject the PRIME to the amount of liquidated damages specified elsewhere in the Contract.

D. Notification of Possible Debarment

By executing this Contract, the PRIME agrees that it has been notified that failure to comply with the requirements of this portion of the Contract may lead to the PRIME's disqualification from bidding on and receiving other Owner contracts.

E. Other Remedies

The remedies that are noted above do not limit any other remedies available to the Owner in the event that the PRIME fails to meet the requirements of the Workforce Program specifications.

## V. REVIEW OF RECORDS

In the event that the Owner reasonably believes that a violation of the requirements of the Workforce Program specifications has occurred, the Owner is entitled to review the books and records of the PRIME and any subcontractors employed on the project to which the requirements of these specifications are applicable to determine whether such a violation has or has not occurred.

In the event that the PRIME or any subcontractor fails to provide the books and records for inspection and copying when requested, such failure shall constitute a material breach of this Contract and permit the imposition of any of the remedies noted in Section IV above, including the withholding of all or part of any progress payment.

**ATTACHMENTS:**
Exhibit 1: Recommended Recruitment & Retention Practices
Exhibit 2: Projected Hiring Needs
Exhibit 3: Request For Apprentice form
Exhibit 4: Monthly Employment/Training Report
Exhibit 5: Apprenticeship Ratio Data

Oregon Employment Department
WorkSource Portland Metro East
19421 SE Stark Street
Portland, Oregon 97233
(503) 491-2242 – Phone
(503) 666-2230 – FAX

**Questions Regarding Apprenticeship:**
Bureau of Labor & Industries
Apprenticeship & Training Division
800 N.E. Oregon St. # 32
Portland, OR 97232
(971) 673-0761

**Questions Regarding the Workforce Training & Hiring Program:**
City of Portland / Procurement Services
1120 SW 5th Avenue, Room 750
Portland, OR 97204
(503) 823-6850 or (503) 823-6855
Fax: (503) 823-5539

## RECOMMENDED GOOD FAITH RECRUITMENT & RETENTION PRACTICES

A. Recruitment Efforts

Good faith recruitment efforts are those intense, aggressive, sincere, and result-oriented actions taken by the Contractor designed to accomplish the objectives of the City/PDC/HAP Workforce Training & Hiring, and Equal Employment Opportunity Programs. These efforts may assist the Contractor in achieving an "A" level EEO certification. Good faith recruitment efforts include, but are not limited to:

1. Work aggressively with Contractor's Joint Apprenticeship Training Committee (JATC) to recruit minorities, women and disadvantaged individuals. Provide evidence of these efforts.

2. Assist the JATC by conducting a workshop with minority and women employees to enlist their assistance as recruiters and request their ideas on how to increase employment of underutilized groups.

3. Support the efforts of the Contractor's JATC by giving all apprentices referred to the Contractor a fair chance to perform successfully, allowing for possible lack of previous experience. Recognize that the Contractor is responsible for providing on-the-job training, and that all apprentices should not be expected to have previous experience.

4. Participate in job fairs, school-to-work, and community events to recruit minorities, women, and disadvantaged individuals into the construction trades.

5. Allow scheduled job site visits by participants in community programs, as safety allows, increasing awareness of job and training opportunities in the construction trades.

6. Keep applications of those not selected for an opening. Contact when opening occurs.

B. Retention Efforts

The Contractor shall endeavor to retain minorities, women, and disadvantaged individuals by implementing steps such as the following:

1. Maintain a harassment-free work place.

2. Ensure that employees are knowledgeable about the company's policies if they need to report a harassment problem.

3. Make reasonable attempts to keep apprentices working and train them in all work processes described in the apprenticeship standards.

4. Review and disseminate, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions.

5. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

6. Take steps to reduce feelings of isolation among minorities and women to curb hostile attitudes and behavior (e.g., have several minorities and women at the job site, provide access to support group system).

7. Provide adequate toilet facilities for women on the job site.

8. Match minority, female, or disadvantaged apprentices who may need support to complete their apprenticeship programs with a journey-level mentor.

## Workforce Training & Hiring Program — Exhibit 2

## PROJECTED HIRING NEEDS

## 20% Apprenticeship Requirements

**This form must be completed thoroughly by the prime and each subcontractor with a subcontract of $100,000 or more.** Please state how you plan to perform the work on this project, indicating the number of journey workers and apprentices by trade. This workforce plan must demonstrate how your company will fulfill all Workforce Program requirements, including utilization of apprentices. **Complete all columns, with project-specific information. *Please include an email address for the person who will be submitting Monthly Employment Reports via email.**

BID#_____ PROJECT NAME: _____

Federal ID #_____ Contract Dollar Amt. _____ ☐ Prime Contractor ☐ Subcontractor

| Trade | Total # of Journey Workers | # of Apprentices | # of New Positions (indicate Journey or Apprentices) | Anticipated Start Date | Estimated Total Hours (all workers in each trade) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Please list the apprentices who will work on this project. If you need more space, attach an additional sheet of paper. The Workforce Program compliance staff must approve all apprentices on the project.

| Name of Apprentice | Trade | Race | Gender | Date of Hire | Staff use only (Initial: Approved, Notified, Docs) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

If no current apprentices, indicate when and how they will be hired.

Person in your company who does hiring: _____

COMPANY: _____ CCB# _____ PHONE: _____ FAX: _____

***Email Address of the individual who will be submitting Monthly Employment Reports via email:**

_____

Are you a registered Training Agent? ☐Yes ☐No Are you a ☐Union ☐Open Shop contractor?

With which JATCs are you registered to train apprentices? _____

Apprentice committee or union contact person who dispatches apprentices to your company:

Name: _____ Phone: _____ Fax: _____

Name: _____ Phone: _____ Fax: _____

PREPARED BY: _____ / _____ DATE: _____
(sign and print)

Prime contractor must complete and submit to Owner within 15 calendar days after bid opening or prior to award of contract, whichever occurs first.
Subcontractors with contracts of $100,000 or more must submit prior to beginning work on the project or within five (5) days of signing subcontract, whichever occurs first, to Prime Contractor. **Prime Contractor must submit to: Workforce Program, Procurement Services, 1120 S.W. Fifth Avenue #750, Portland, OR 97204**
**Phone (503) 823-6850 or FAX (503) 823-5539**

# Request For Apprentice

**The contractor may use this form to document efforts when recruiting apprentices.**

**FAX To:** _____ / _____
(Apprenticeship Committee) (Contact/ Dispatcher)

Fax Number : _____ Number of Pages _____

**Request From:**

Company Name _____ / _____
(Registered Training Agent) (Contact Person)

Phone _____ Fax _____

Date: _____ Time: _____

**Apprentice Request:**

As a registered Training Agent, I am using this form to request referral of an apprentice for employment with my company in cooperation with the City/County/PDC Workforce Training & Hiring Program. I would like to continue to diversify my workforce. Therefore, please refer ethnic minorities and women for my consideration. If I am unable to receive a referral from my apprenticeship program within a reasonable time, and my apprenticeship program is open for applications or allows direct entry, I may use this form to request a referral to the apprenticeship program from community recruitment resources.

Apprentice referral is needed by this date: _____ Work Starts: _____

Job Site Location: _____ Expected Length of Employment: _____

Project _____ Owner (City of Portland) _____

Number of Apprentices: _____ Trade/Occupation: _____

Number of Apprentices: _____ Trade/Occupation: _____

Minimum qualifications (if different from apprenticeship standards): _____

Safety needs: ___ Hard hat ___ Gloves ___ Hard-toed boots Other? _____

**Please fax this Request For Apprentice form to your apprenticeship committee.**
To document your good faith efforts, copies may also be sent to:
City Workforce Training & Hiring
Procurement Services
1120 SW 5th Avenue, Room 750
Portland, OR 97204
Phone: (503) 823-6850
FAX: (503) 823-5539

**For Apprenticeship Program Only**

*Please check the appropriate box and fax to City Workforce Program:*

☐ I was able to dispatch an apprentice to the project listed above.
Name of Apprentice: _____ Race _____ Gender _____

☐ I was unable to dispatch an apprentice to the project listed above because _____

_____

Fax this form with dispatch information to (503) 823-5539. Thank you.

**Exhibit 4**

# MONTHLY EMPLOYMENT REPORT

**Workforce Training & Hiring Program**

☐ **Prime** ☐ **Subcontractor**

**Federal ID #**_____

**CCB#** _____

**Project Name:** _____

**Bid #:** _____

**Check here if final report** ☐

The Monthly Employment/Training Report must be completed by the Prime and all subcontractors with contracts of $100,000 or more, and signed by a responsible official of the company. The Prime shall submit a report for its workforce on the project. Each subcontractor shall separately submit a report for its workforce on the project. It is the responsibility of the Prime to assure that all Monthly Employment/Training Reports are submitted in a timely manner.

**The reports are due on the 5th day of the month following each month of employment during the term of the contract.**

Either on the form below or on a contractor-provided form approved by the City/PDC Workforce Training & Hiring Program, complete all categories for each employee working on the project during the reporting period.

Dates from:_____to:_____ Company Name: _____ Phone: _____ Fax: _____

| NAME (PLEASE PRINT OR TYPE) | ZIP CODE | SOCIAL SECURITY NUMBER | TRADE (Specify if Supervisor, or Foreman) | LEVEL (Journey, Apprentice, Apprentice Grad) Grad hours are counted up to 1 yr. After graduation J or A or G | *RACE | SEX M/F | HOURS WORKED this PERIOD |
|---|---|---|---|---|---|---|---|
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| | | | | | | | |

**Submit to:** City/PDC/HAP Workforce Program
Procurement Services
1120 SW 5th Ave #750
Portland, OR 97204
FAX: (503) 823-5539

**Send copy to:** **Owner's Project Manager**

* Race includes the following minorities:
**AA** - African American - having origins in any of the black racial groups of Africa;
**H** - Hispanic American - person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish or Portuguese culture or origin;
**A** - Asian American - having origins in any of the original people of the Far East, Southeast Asia, Indian subcontinent or the Pacific Islands;
**NA** - Native American - American Indian or Alaskan Native, having origins in any of the original peoples of North America; as well as
**C** - Caucasian.

Signature: _____ Print Name: _____ Title: _____

**NOTE: Apprentice hours spent in the classroom during the course of the project can be submitted as hours worked.**

*Ratios may change pursuant to actions taken by the Oregon State Apprenticeship & Training Council/BOLI. For the purposes of this contract, the ratios approved by BOLI on the date the bid is advertised shall prevail.

| TRADE | APPRENTICE TO JOURNEY RATIO* | | |
|---|---|---|---|
| | 1st Apprentice | 2nd Apprentice | Max |
| Asbestos/Insulation Workers | 1/1 | 1/4 | |
| Brick/Marble/Terrazzo/Tile Finisher | 1/1 | 1/3 | |
| Bricklayer/Masonry | 1/1 | 1/3 | |
| Carpenter (Portland) | 1/1 | 1/1 | 1/1 for first three apprentices; 1/5 after |
| Carpet Installers/Floorlayers | 1/1 | 1/3 | |
| Cement Masons | 1/2 | 1/3 | |
| Drywall Applicator (Ext/Int Specialists) | 1/3 | | 1/3 for the first three apprentices; 1/5 thereafter |
| Drywall Finisher (Taper) | 1/1 | | 1/1 for first three apprentices; 1/5 thereafter |
| Electricians | | | |
| Inside | 2 apprentices for every three journey workers on the job or fraction thereof | Example:<br>Number of Journeymen<br><br>Maximum Number of Apprentice(s) to Journeymen<br>1 to 3<br>2 to 4<br>4 to 6<br>7 to 9 | Apprentices never to exceed number of apprentices on the job |
| Limited Energy/Limited Residential | 1/1 | 1/1 | |
| Construction Lineman | 1/1 | | |
| Limited Maintenance | 1/1 | 1/2 | |
| Stationary Engineer | 1/1 | 1/3 | |
| Elevator Contractor | 1/1 | 1/3 | |
| Environmental Control System (HVAC) | 1/1 | 1/1 | |
| Glass Installer (Glazier) | 1/1 | 1/3 | |
| Hod Carrier/Mason Tender | 1/1 | 1/5 | |
| Iron Worker | 1/1 | 1/4 | |
| Laborer (Construction) | 1/1 | 1/5 (1/3 open shop) | 1/10 Union – 10 max |
| Maintenance Mechanic | 1/1 | 1/3 | |
| Millwright | 1/1 | | 1/1 for first three apprentices, 1/5 after |
| Operating Engineer (Heavy) | 1/1-4 | 2/5-9 | 3/10-19 4/20-24 5/25-29<br>30 or more 1/for each 5 additional operators |
| Painting & Sandblasting | 1/1 | 1/3 | |
| Painting (Traffic Control) | 1/1 | 1/4 | |
| Pile Drivers | 1/3 | 1/5 | |
| Pipe Fitters | 1/1 | 1/5 | |
| Plasterers | 1/1 | 1/3 | |
| Plumber | 1/1 | 1/1 | 1/1 for first two apprentices, 1/3 after |
| Roofer | 1/1 | 1/1 | |
| Scaffold Erector | 1/1 | | 1/1 for the first five apprentices; 1/5 thereafter |
| Sheet Metal Worker | 1/1 | 1/1 | 1/1 for first two apprentices, 1/3 |
| Sheet metal Worker (Residential) | 1/1 | 1/1 | |
| Sign Maker/Erector | 1/1 | 1/1 | |
| Sprinkler Fitter | 1/1 | 1/1 | |
| Steamfitters | 1/1 | | 1/1 for the first two apprentices on the job; 1/3 thereafter |
| Terrazzo Worker | 1/1 | 1/3 | |
| Tile/Marble Setter | 1/1 | 1/3 | |

# PROJECT SPECIFICATIONS

# PROJECT

# SPECIFICATIONS

# CITY OF PORTLAND

BUREAU OF ENVIRONMENTAL SERVICES

SPECIAL PROVISIONS

FOR

Burlingame Trunk Sewer Improvement Project
From Southwest 31st Avenue to I-5 and Terwilliger on-ramp east of I-5
E09052

**CONSOLIDATED SPECIAL PROVISIONS**

The preparer of the consolidated special provisions for this Project:

By: _____ Date: 3/24/2011

# CITY OF PORTLAND

## BUREAU OF ENVIRONMENTAL SERVICES

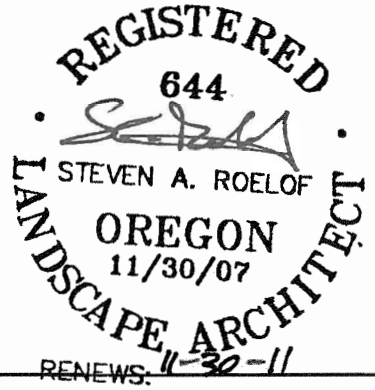
SPECIAL PROVISIONS

FOR

Burlingame Trunk Sewer Improvement Project
From Southwest 31st Avenue to I-5 and Terwilliger on-ramp east of I-5
E09052

**PROFESSIONAL OF RECORD CERTIFICATION(s):**

| | |
|---|---|
| REGISTERED PROFESSIONAL ENGINEER 13819 OREGON Sept. 17, 1982 PHILIP G. ROPPO<br>EXPIRES: 12/31/12 | Signing as the Professional of Record for the Special Provisions sections listed below:<br><br>00110, 00120, 00130, 00140, 00150, 00160, 00165, 00170, 00180, 00190, 00195, 00196, 00197, 00199, 00210, 00270, 00275, 00280, 00290, 00291, 00310, 00320, 00401, 00405, 00415, 00442, 00445, 00446, 00480, 00495, 00620, 00640, 00744, 00747, 00759, 00861, 00905, 00940, 00941, 00960, 01090, 02050, 02410, 02420, 02450, 02630, 02690, 02910 |

| | |
|---|---|
| | Signing as the Professional of Record for the Special Provisions sections listed below:<br><br>00410, 00470, 00490, 02220, 02425, 02451 |
| | Signing as the Professional of Record for the Special Provisions sections listed below:<br><br>00220, 00225 |
|  | Signing as the Professional of Record for the Special Provisions sections listed below:<br><br>01030, 01040 |

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# SPECIAL PROVISIONS

## WORK TO BE DONE

The Burlingame Trunk Sewer Improvement Project, involves the removal of a 30-inch sanitary sewer and enlargement, replacement, and rehabilitation of a 30-inch and 36-inch sanitary sewer along the following streets:

Multnomah Boulevard between SW 31st Ave and SW 22nd Ave;
and along I-5 between SW 22nd and SW Evans St.

Improvements involve enlarging approximately 2600 linear feet of 30-inch pipe to 48-inch pipe, replacing approximately 400 linear feet of 30-inch pipe, rehabilitating using cured-in-place pipe approximately 1900 feet of 30-inch and 36-inch diameter pipe and those items of work listed in the Proposal and as shown on the accompanying Plans. The Contractor shall perform all labor, and furnish all materials, equipment, and incidentals required to make each item complete. Work shall include, but not be limited to:

1. Removal and disposal of existing sewer in locations where replacement or enlargement is requested, installation of new and enlarged sewer pipe, cleaning and lining of sewer to be rehabilitated, and replacement, repair and rehabilitation of manholes.

2. Construct, maintain, and remove temporary work zone traffic control measures.

3. Construct, maintain, and remove erosion control measures.

4. Perform all removal of structures and obstruction, clearing and grubbing, and earthwork operations.

5. Construct drainage system including sewer pipes and manholes.

6. Restore areas disturbed by construction to original condition or better.

7. Construct, maintain, and remove diversion of flow systems.

## APPLICABLE SPECIFICATIONS

The Specification that is applicable to the Work on this Project is the 2007 edition of the "City of Portland Standard Construction Specifications".

All number references in these Special Provisions shall be understood to refer to the Sections and subsections of the Standard Specifications bearing like numbers and to Sections and subsections contained in these Special Provisions in their entirety.

## OWNER'S REPRESENTATIVE/ENGINEER

| | |
|---|---|
| Owner's Representative: | Ted Luyben<br>1120 SW 5th Ave, Suite 1000<br>Portland, Oregon 97204<br>503-823-5303 |
| Engineer: | Patty Nelson, P.E.<br>1120 SW 5th Avenue, Suite 1000<br>Portland, Oregon 97204<br>503-823-5271 |

## TIME FOR COMPLETION

See subsection 00180.50(d) for the time to complete all Work under the Contract.

The written Notice to Proceed will be given to the Contractor in accordance with subsection 00130.80.

The Owner considers on-site work to have commenced when the Contractor mobilizes equipment onto the Project site.

# PART 00100 – GENERAL REQUIREMENTS

## SECTION 00110 - ORGANIZATION, CONVENTIONS, ABBREVIATIONS AND DEFINITIONS

Comply with Section 00110 of the Standard Specifications supplemented and/or modified as follows:

**00110.10 Abbreviations**– Add the following:

**GCSP** - General Construction Safety Provisions

**OCIP** - Owner Controlled Insurance Program

**00110.20 Definitions** – Add the following:

**General Construction Safety Provisions** – A document included as part of the Specifications that establishes minimum safety standards for all work performed under the Contract.

**Owner Controlled Insurance Program** – The Owner's insurance program under which the Owner acquires certain Worker's Compensation, Employees' Liability, Commercial General Liability, Excess/Umbrella Liability, and Builders Risk Insurance for the Contractor and Subcontractors while performing operations at the Project Site or emanating from the Project Site. Another name for this is a "wrap-up" program.

**Pea Gravel** – Naturally occurring round gravel that will pass a 3/8-inch sieve and be retained on a No. 4 sieve.

## SECTION 00120 - BIDDING REQUIREMENTS AND PROCEDURES

Comply with Section 00120 of the Standard Specifications supplemented and/or modified as follows:

**00120.15 Basis of Bid** - In the last sentence delete the words "in writing of the Project".

## SECTION 00130 - AWARD AND EXECUTION OF CONTRACT

Comply with Section 00130 of the Standard Specifications.

## SECTION 00140 - SCOPE OF WORK

Comply with Section 00140 of the Standard Specifications.

## SECTION 00150 – CONTROL OF WORK

Comply with Section 00150 of the Standard Specifications supplemented and/or modified as follows:

Add the following subsection:

**00150.50(e) Utility Information:**

**(1)** Arranging for a utility company to remove, relocate, or adjust a facility is the responsibility of the Owner. The Contractor shall schedule work so as to afford the utility companies sufficient time and space to perform their work. Contact the Owner for information regarding these arrangements.

**(2)** The following organizations may be adjusting utilities within the work area during the life of this Contract with adjustment work estimated to be completed by the following time frame.

| Utility | Project Station | Estimated Completed Date (Time) |
|---|---|---|
| 1. NW Natural | 67+90 | June 15, 2011 |
| 2. NW Natural | 54+39 to 57+15 | June 15, 2011 |
| 3. Above Net | 57+50 to 58+80 | June 15, 2011 |
| 4. Level 3 | 59+50 to 66+75 | June 15, 2011 |
| 5. PWB - Vault | 63+98 | June 15, 2011 |
| 6. PWB – Fire Hydrant | 64+25 | June 15, 2011 |
| 7. PGE – Pole | 68+92 | June 15, 2011 |
| 8. Qwest – Phone Booth | 68+50 | June 15, 2011 |
| 9. PBOT – Traffic Loops | 51+20 | June 15, 2011 |

**(3)** The Contractor shall be responsible for all other utility adjustments to finish grade.

**(4)** Utilities and their field coordinators include:

| Utility Company | Contact Person | Telephone No. |
|---|---|---|
| Qwest Communications | Scott Miller | 503-242-4144 |
| Portland General Electric | Jamie Starkovich | 503-425-1625 |
| Comcast | Leroy Soumokil | 503-519-7649 |
| NW Natural | Ryan Van Gordon | 503-781-4294 |

| | | |
|---|---|---|
| City of Portland Water Bureau | Cherri Warnke | 503-823-6036 |
| Level 3 Communications | James Crooker | 503-553-4918 |
| City of Portland Signals/Lighting | Nancy Bock | 503-823-1094 |
| Integra | Robert Davidson | 503-453-8247 |
| PBOT | Craig Goodroad | 503-823-5168 |
| PBOT | Lisa Elbert | 503-823-5218 |

**(5)** There may be unavoidable delays due to utility companies or utility contractors working in the same construction zone. It is imperative for the Contractor to provide accurate work schedules to the Owner's Representative. Notify the Owner's Representative immediately when utility work causes delays or construction issues.

**(6)** The utility companies or utility contractors may be in the right-of-way working concurrently with this Contract. The Contractor's schedule and the schedules of the utility companies shall be coordinated and agreed upon prior to beginning construction. The Contractor shall work with the utility companies or the utility contractors so that all work on the project is completed within the Contract Time.

**(7)** The Owner does not guarantee the site conditions will remain the same after the utility companies or the utility contractors have performed their work. The Contractor shall perform an assessment of site conditions prior to beginning work and after the utility companies or utility contractors have completed their work to determine actual conditions.

**(8)** The Owner's Representative has the option to direct the Contractor to work in another area of the project in an effort to reduce conflicts and delays that may prevent the utility company or utility contractors from getting their work done.

## SECTION 00160 - SOURCE OF MATERIALS

Comply with Section 00160 of the Standard Specifications.

## SECTION 00165 - QUALITY OF MATERIALS

Comply with Section 00165 of the Standard Specifications supplemented and/or modified as follows:

**00165.04 Cost of Testing** - Replace this subsection with the following:

**00165.04 Cost of Testing** - The Project is administered by BES. BES will provide and pay for materials testing services for this project.

**00165.10(a) Field Tested Materials** – Add the following paragraph:

For this Project, use Section 5 of the MFTP. Field tested materials will be accepted on the Project according to the Type (D) testing program.

## SECTION 00170 - LEGAL RELATIONS AND RESPONSIBILITIES

Comply with Section 00170 of the Standard Specifications supplemented and/or modified as follows:

**00170.60 Safety, Health, and Sanitation Provisions:** Replace this subsection with the following:

**00170.60 OCIP Safety and Health:**

**(a) General Provisions:**

**(1)** This subsection outlines the minimum safety and health requirements applicable to this Project. These requirements include, but are not limited to, Oregon Revised Statutes, Oregon Administrative Rules, Oregon Occupational Safety and Health Regulations, Department of Labor and Industries, Oregon Department of Transportation, and other applicable federal, state, or local regulations.

**(2)** The Contractor shall comply with the Specifications and the General Construction Safety Provisions (GCSP). If any portion of these provisions or specifications conflicts with, or is less stringent than, any applicable federal, state, or local statutory safety regulation, the regulations shall apply.

**(b) Safety and Health Regulations** - Comply with all federal, state, and local safety and health regulations and laws including, but not limited to, the following:

**(1)** Oregon Revised Statutes – ORS 654

**(2)** Oregon Administrative Rules – OAR 437

**(3)** Oregon Occupational Safety & Health Administration (OR-OSHA)

- **a.** Division 1 – General Administrative Rules
- **b.** Division 2 – General Occupational Safety & Health Rules
- **c.** Division 3 – Construction

**(c) Public Safety and Convenience:**

**(1) General Rule** - The Contractor shall ensure the safety of the public during its performance of the Work and shall minimize any public inconvenience in addition to any other requirement imposed by law. These duties include, but are not limited to, the matters listed in (2) – (8) below.

**(2) Access** - The Contractor shall comply with the requirements of the approved Traffic Control Plan regarding closure of any street, roadway, alley or other pathway used by members of the traveling public. The Contractor also shall not unreasonably restrict access to public facilities, commercial property, fire hydrants, residential property, and other areas where the public can be expected to be present, such as sidewalks and streets without first obtaining approval from the Owner's Representative. Driveways shall be closed only with the approval of the Owner's Representative or after obtaining specific permission from the

property owner or owners. In addition, the Contractor shall not obstruct or interfere with travel over any public street or sidewalk without approval of the Owner's Representative.

**(3) Public Transit** - The Contractor shall not interfere with the normal operation of the streetcar, Tri-Met or other public transit vehicles unless otherwise authorized.

**(4) Work Site** - The Contractor shall keep the Project site safe in compliance with applicable law. Safety includes, but is not limited to: 1) providing an approved type of secured and adequate barricades or fences that are easily visible from a reasonable distance around open excavations; 2) closing up or covering with steel plates all open excavations at the end of each Working Day in all street areas and in all other areas when it is reasonably required for public safety; 3) marking all open work and obstructions by lights at night; 4) installing and maintaining all necessary signs, lights, flares, barricades, railings, runways, stairs, bridges and facilities; 5) observing any and all safety instructions received from the Owner's Representative; and 6) following all laws and regulations concerning worker and public safety. In the event that the law requires greater safety obligations than that imposed by the Owner, the Contractor shall comply with the law.

**(5) Emergency** - Emergency vehicles, including but not limited to police, fire, and disaster units shall be provided access to the work site at all times.

**(6) Cleanliness** - The Contractor shall, on a continuing basis, keep the surfaces of all roadways, sidewalks and other pathways used by the public free of dirt, mud, cold plane grindings, and other matters that the Contractor may place upon the road. The cost of performing such work shall be included in the Contractor's Bid and no additional payment will be made for performing this task.

**(7) Parking** - The Contractor shall make any necessary contacts with all applicable governmental bodies to arrange for the removal of parked automobiles, vehicles and other obstructions if they would interfere with the performance of the Contractor's work.

**(8) Accidents** - The Contractor's Project Manager or superintendent shall be in charge of accident prevention. Contractor shall take all actions necessary to prevent damage, injury, and loss to persons and property as a result of accidents.

**(d) Notices** - Supply road closures and traffic detour information, as well as associated closure/detour dates to the City of Portland Fire and Police Bureaus, and American Medical Response two weeks prior to the activity. FAX information 2 weeks prior to activity; phone information to provide last minute changes in routing/detour plans. The Contractor will also provide weekly updates on routing information, as needed. Contacts are as follows:

**(1)** Bureau of Emergency Communications (BOEC)
Phone: 503-823-0911
FAX: 503-823-4630

**(2)** Fire Liaison at BOEC
Phone: 503-823-3873
FAX: 503-823-3875

**(3)** Fire Bureau – Emergency Operations
Phone: 503-823-3830
FAX: 503-823-3710

**(4)** Police Bureau – Traffic Division
Phone: 503-823-2103

**(5)** American Medical Response (AMR)
1240 SE 12th Avenue
Portland, OR 97215
Contact: Communications Center
Phone: 503-231-6300
FAX: 503-235-1365

**(e) Site Safety and Security:**

**(1)** The Contractor shall designate a Primary Safety Representative for each Project location. The Primary Safety Representative shall be responsible for the administration of the Site Specific Safety and Health Plan. The Primary Safety Representative shall have the experience and qualifications as outlined in the GCSP.

**(2)** Contractor shall be responsible for all labor, materials, and equipment needed to secure the construction site at all times. This may include labor, lighting, fencing, alarm systems, and other miscellaneous materials to maintain security at all sites where the Contractor may be working, staging work and storing materials or equipment. The Contractor shall assure that only authorized personnel are at the job site.

**(f) Products** - Contractor shall develop a Site Specific Safety and Health Plan.

**(g) Contractor Furnished Safety Equipment** - The Contractor shall furnish all safety equipment required by the Site Specific Safety and Health Plan for the exclusive and permanent use of the Owner's Representative. If the equipment becomes damaged or inoperable the Contractor shall repair or replace the equipment at no additional cost to the Owner.

**00170.70 Insurance:** Replace this subsection with the following:

**00170.70 OCIP Insurance:**

**(a) General Provisions:**

**(1)** The Owner will provide certain insurance coverage for the Work at its expense through an Owner Controlled Insurance Program ("OCIP"). The objective of the OCIP is to provide the majority of the insurance coverage for the Contractor and Subcontractors of all tiers for construction work performed on the Project Site as defined herein.

**(2)** OCIP coverage will not extend to automobile liability insurance, contractors equipment insurance, professional liability, or for Contractor activities off the Project. The Contractor and all its Subcontractors of any tier are required to provide this insurance at their expense.

**(3)** Before preparing the bid, Bidders shall make the provisions of this subsection known to the following persons:

**a.** Persons who manage the Bidder's insurance, and/or the Bidder's insurance agent prior to their bidding Work on the Project.

**b.** Bidders intended Subcontractors, with instructions to pass this OCIP Project information to their Subcontractors.

**(4)** Under the OCIP, the Owner will pay all premiums for OCIP coverage.

**a.** Bidders shall deduct from their Bids all costs for insurance that would otherwise have been paid in the absence of the OCIP.

**b.** After Award of Contract, the Owner will provide the Contractor with information and forms necessary to enroll into coverage under the OCIP.

**(5)** For purposes of the OCIP the following definitions apply:

**a.** "Construction Safety Manager" is the Owner's employee assigned this responsibility, acting directly or through an assistant or representative.

**b.** "Contractor" is any person who has entered into a Contract with the Owner for the Work, and whose employees are actively performing such Work at the Project Site. Suppliers, vendors, material dealers, haulers, transporters, or others whose function is solely to make deliveries or removals, or supply materials or equipment to the Project Sites are not Contractor forces for purposes of the OCIP. Vendors, suppliers, materials dealers, or their subcontractors who install their product at the Project Site are Contractor forces for the purposes of the OCIP, but only for such on-site installation.

**c.** "Insured" is the Owner, and the Contractor and Subcontractors who have a contractual obligation to perform some part of the Work at the Project Site, and whose employees are actively performing such Work at the Project Site. To qualify as an Insured, such Contractor or Subcontractor must complete all forms contained in the OCIP Enrollment Manual, and receive certificates of insurance from the Owner evidencing completion of such enrollment and acceptance into the OCIP.

**d.** "Project Site" is the site of construction, including all facilities described in the Contract Documents. The Project Site includes the area inside the work limits shown on the Plans where the Contractor and its Subcontractors perform the Work. The Project Site also includes areas immediately adjacent thereto, including areas within boundaries of local roads and public easements in which Contractor and its Subcontractors perform the Work. In addition, the Project Site includes Contractor staging areas in close proximity to the Work limits, and which are used exclusively by the Contractor and its Subcontractors to perform the Work, but only if such area is so designated by the Owner in writing as part of the Project Site prior to Contractor beginning work at such staging areas. Private property adjacent to work areas shown on the Plans, or public rights-of-way adjacent thereto, are not part of the Project Site unless permission to occupy such property has been granted by the property owner in writing and such permission has been filed with the Owner's Representative.

**e.** "Subcontractor" is any individual, partnership, firm, corporation, or any combination thereof, with whom the Contractor enters into a subcontract to perform a part of the Work, and whose employees are actively performing such Work at the Project Site. Suppliers, vendors, materials dealers, haulers, transporters, or others whose function is solely to make deliveries or removals, or supply materials or equipment to the Project Site are not Subcontractor forces for purposes of the OCIP. Vendors, suppliers, materials dealers, or their subcontractors who install their product at the Project Site will be considered to be Subcontractors under the OCIP, but only for such on-site installation. The term "Subcontractor" includes every Subcontractor of any tier.

**(b) Insurance Coverage:**

**(1)** Owner Provided Insurance: The Owner will, at its sole expense, maintain the following types of insurance in force as a part of the OCIP. The Owner assumes all responsibility for the selection of insurers.

**a.** Statutory Workers Compensation: Coverage will be provided with limits and benefits in conformance with the Oregon Workers Compensation Act. Coverage includes occupational disease as defined by the Act.

**b.** Employer's Liability coverage will be provided with the following limits:

Bodily injury by accident: $1,000,000 for each accident.

Bodily injury by disease: $1,000,000 for each employee.

Bodily injury by disease: $1,000,000 maximum annual aggregate.

**c.** Commercial General Liability: Coverage will be provided on an "occurrence" basis on the standard ISO 1994 or equivalent policy form. The policy will include Premises and Operations coverage, and Completed Operations coverage extending for not less than five (5) years after the completion of Work and Acceptance by the Owner. Coverage will also include Personal Injury Liability, and contractual coverage for liability assumed under an "insured" contract as defined by the insurance policy. The policy will not contain exclusions for Broad Form Property Damage, Independent Contractors, or for the hazards commonly known as Explosion, Collapse, and Underground (XCU). Employees are insureds under the policy, and policy terms include "Separation of Insureds" as defined by the standard ISO Policy Form. Policy limits are:

Bodily injury and property damage: $2,000,000 for each occurrence subject to a deductible to be assigned to the Contractor and/or Subcontractor of any tiers [hereafter referred to as Contractor/Subcontractor] liable for the loss as follows:

**1.** For each existing individual underground and aboveground utility line and/or service, $5,000 of loss resulting in property damages liability arising from or aggravated by Work activities for the first occurrence, $10,000 for the second occurrence, and $15,000 for each occurrence thereafter.

**2.** For all other losses, the deductible shall be determined by the amount, in dollars, of the Contractor's/Subcontractor's contract/subcontract as specified below:

| Contract Amount | Deductible Amount |
|---|---|
| $0 - $250,000 | $1,000 |
| $250,001 - $1,000,000 | $2,500 |
| $1,000,001 - $5,000,000 | $5,000 |
| $5,000,001 - and greater | $10,000 |

Personal injury and advertising liability: $2,000,000 for each occurrence subject to a $10,000 deductible to be assigned to the Contractor.

General aggregate: $4,000,000 maximum for each annual period.

Products and completed operations: $4,000,000 maximum for each annual period.

If more than one Contractor/Subcontractor has a loss resulting from the same occurrence, the Contractors/Subcontractors shall share the deductible in the same proportion that each Contractor's/Subcontractor's loss is to the entire loss.

In the event of dispute by the parties over responsibility for or proportionate share of the loss, the Owner's Representative will be the adjudicator and the Owner's Representative's decision will be final.

The Commercial General Liability policy will be primary insurance for claims arising from the Contractor's/Subcontractor's Work under this Contract, and will be non-contributing with respect to any other insurance carried by the Contractor/Subcontractor for Work performed at the Project Site.

**d.** Excess Liability: Excess Liability insurance will be provided in a combination of layers which equal $50,000,000 per claim and annual aggregate. This insurance will be excess over the primary liability insurance policies provided and listed above. The excess liability limits will be shared among all eligible contractors and subcontractors enrolled in the OCIP.

**e.** Builders Risk: "All Risk" Builders Risk and Property insurance will be provided to cover physical loss of or damage to the Work, and to suitably stored materials, equipment, and supplies to be incorporated into the Work. Coverage extends to damage caused by the perils of earthquake and flood. A blanket waiver of subrogation will be provided among all enrollees in the OCIP.

The policy will not cover the Contractor's/Subcontractor's owned, rented, hired or leased construction type tools, or equipment used for construction.

The policy limit shall not exceed the project's construction value and will be subject to a deductible to be assigned to the Contractor/Subcontractor incurring the loss. The deductible shall be determined by the amount, in dollars, of the Contractor's/Subcontractor's contract/subcontract as specified below:

| Contract Amount | Deductible Amount |
|---|---|
| $0 - $250,000 | $1,000 |
| $250,001 - $1,000,000 | $2,500 |
| $1,000,001 - $5,000,000 | $5,000 |
| $5,000,001 - and greater | $10,000 |

If more than one Contractor/Subcontractor has a loss resulting from the same occurrence, the Contractors/Subcontractors shall share the deductible in the same proportion that each Contractor's/Subcontractor's loss is to the entire loss.

In the event of a dispute over fault or damage between the Contractor/Subcontractor and the Owner, the Owner's Representative shall serve as the adjudicator, and the Owner's Representative's decision will be final.

**f.** Contractor Pollution Liability: Contractor Pollution Liability coverage will be provided with limits of $10,000,000 each incident and in the aggregate, covering third party bodily injury and property damage arising from a pollution condition at the Project Site as defined by the policy.

**(2)** Contractor Furnished Insurance: The OCIP will not provide all the insurance protection needed or desired by the Contractor and its Subcontractors. Such other insurance as the Contractor and its Subcontractors may carry for normal business operations or to protect its interests shall be the responsibility of the Contractor or Subcontractors, and purchased at their own expense and risk. If the Contractor/Subcontractor elects to insure its construction equipment or other property, the Contractor/Subcontractor shall waive its rights of subrogation against the Owner, its officers, agents, employees, and other OCIP Participants.

Throughout the life of the Contract, the Contractor and all of its Subcontractors of all tiers shall maintain at its sole expense the following minimum insurance coverages and limits with policy forms and insurers acceptable to the Owner:

**a.** Automobile Liability Insurance for Contractor's/Subcontractor's activities <u>on</u> the Project Site and <u>off</u> the Project Site:

$1,000,000 combined single limit for bodily injury and property damage per occurrence for Contractor's/Subcontractor's owned, non-owned, and hired vehicles.

**b.** Workers Compensation and Employers Liability Insurance for activities <u>off</u> the Project Site:

Oregon statutory coverage and limits for Workers Compensation Employers Liability insurance with limits not less than:

$500,000 for each accident-bodily injury by accident.

$500,000 each employee-bodily injury by disease.

$500,000 annual aggregate-bodily injury by disease.

**c.** Commercial General Liability insurance for activities off the Project Site.

The policy shall not contain exclusions for Blanket Contractual, Broad Form Property Damage, Personal Injury, Premises-Operations, Products-Completed Operations, Independent Contractors, Fire Legal Liability, and Explosion, Collapse, and Underground (XCU) property damage liability. Policy limits shall not be less than:

$1,000,000 combined single limit for bodily injury and property damage per occurrence.

**d.** The insurance coverage obtained by the Contractor shall name the Owner, its officers, employees and agents as additional insureds, and shall not be terminated or canceled or materially reduced prior to the completion of the Contract without thirty (30) days written Notice to the Owner, with a copy of such Notice being sent to the City Auditor. For purposes of computing time, the first day of the thirty days written Notice shall begin on the day that the Notice is actually received by the City Auditor.

**e.** Prior to entry of any Subcontractor onto the Project Site, the Contractor shall provide the Owner with certificates of insurance in force evidencing insurance coverage of such Subcontractor with limits and conditions as described herein.

**f.** It is recommended that in lieu of excluding coverage for the Project from its ongoing liability insurance program, each Contractor and Subcontractor should have its General Liability and Umbrella Liability policies endorsed to the effect that insurance provided under those policies will be excess over valid and collectible insurance provided by the OCIP.

**(c) Review of Contractor Coverage Before Contract Execution:**

**(1)** Within 10 Calendar Days of the announcement of the intent to Award the Contract, the Contractor shall provide the City Auditor with certificates of insurance and additional insured endorsements in force for insurance specified herein showing the type, amount, class of operations covered, effective dates, and date of expiration of policies, and containing a provision that states substantially the following: "The insurance described in this certificate shall not be cancelled or materially altered without giving the Owner 30 days written Notice in advance of that action." Failure to comply with the reporting provisions of this Contract shall not affect the coverages provided to the City of Portland, the Owner and their officers, employees and agents.

**(2)** The City Attorney's office will review the certificates for approval. The City Attorney's office may reject any proposed certificate if the insurance proposed to be provided is not the same as the coverage required by the Contract Documents, and may reject the certificate if it is unclear. If the City Attorney's office determines that the certificates are unclear, the Contractor shall provide revised certificates that clearly show the insurance required by the Contract Documents has been obtained. Review or approval of the City Attorney's office of any insurance certificate does not excuse the Contractor from providing the insurance required by the Contract Documents.

**(3)** If the Contractor fails or refuses to provide the required insurance coverage or certificates in a form satisfactory to Owner within the time required, the Owner is entitled to take any and all of the following actions:

**a.** Reject the Contractor's Bid;

**b.** Award the Contract to someone other than the Contractor; and

**c.** Recover any costs suffered by the City as a result of taking the actions above from the Contractor or its Bid Bond.

**(d) Certificates and Policies** - The Owner will provide the Contractor and each of its Subcontractors with an original Workers Compensation and Employers Liability policy, and with appropriate certificates evidencing the Commercial General Liability, Excess Liability, and Builders Risk insurance coverage described in Paragraph (b)(1) above. The Commercial General Liability, Excess Liability, Builders Risk, and Pollution Liability insurance policies will be available for examination at the Owner's Representative's office.

**(e) Contractor Responsibilities** - The Contractor and its Subcontractors of all tiers shall cooperate with the Owner and the Owner's Representative with regard to OCIP administration and operation. The Contractor's and Subcontractors' responsibilities shall include, but shall not be limited to, the following activities:

**(1)** Complete and provide to the Owner's Representative all forms and exposure information necessary to enroll in the OCIP. The Contractor/Subcontractor will be an OCIP Participant upon completion of all enrollment requirements contained in this subsection and upon completion of all required forms set forth in the OCIP Enrollment Manual. This manual will be provided to the Contractor and its Subcontractors following Award of Contract. The Owner's Representative will issue to the Contractor/Subcontractor appropriate evidence of enrollment upon compliance with enrollment requirements. No Contractor/Subcontractor eligible under the OCIP shall commence work on the Project Site until its enrollment is completed and approved.

**(2)** Provide certificates of insurance for coverage required of the Contractor herein, and collect and submit certificates of insurance from all Subcontractors. The Contractor/Subcontractors shall name the Owner, and its officers, agents and employees as additional insureds under its insurance policies, and indemnify, save, and hold harmless the Owner, its officers, agents, and employees. The scope of the indemnification and defense shall be as provided by subsection 00170.72.

**(3)** Notify the Owner's Representative in advance of intent to award any subcontract. It is the Owner's intent to enroll into the OCIP all Contractors and Subcontractors other than those expressly excluded herein.

**(4)** Contractually bind each of its Subcontractors to the insurance, indemnification, hold-harmless and safety provisions of the Contract Documents, including the provisions of this subsection.

**(5)** Not violate or knowingly permit violation of any conditions of the OCIP policies of insurance and at all times satisfy the requirements of the insurance companies issuing them.

**(6)** Provide the Owner's Representative with accurate monthly payroll data (OCIP Project Site Payroll Report which will be provided at the time of Enrollment) and other necessary insurance related information on itself and its Subcontractors for this Project, and permit its books and records for this Project to be audited by the OCIP insurance company or companies or their respective representatives. The Contractor agrees to maintain separate payroll records for itself and its Subcontractors and to retain them for five (5) years after Acceptance of its Work under this Contract.

**(7)** Comply with the Owner's claim reporting and Project Site medical procedures as specified in the OCIP Enrollment Manual.

**(8)** Provide modified duty to all injured employees for all work-related injuries as specified in the OCIP Enrollment Manual and General Construction Safety Provisions.

**(9)** Comply with the Owner's General Construction Safety Provisions and Specifications, and cooperate with Construction Safety Manager in all inspections, accident investigations, and all other safety activities related to the Contract. Complete necessary reports related to safety inspections and accident investigations, for all Contract related activities, including all Subcontractor activities. Take prompt corrective action when safety and health deficiencies are noted from the Construction Safety Manager and from the Owner's Representative. The Contractor shall be fully responsible for the safety of its operations and for the safety of its Subcontractors' operations.

**(10)** Provide the Owner's Representative with a signed Notice of (Policy) Cancellation Request, for Contractor and each Subcontractor upon completion of its respective portion of the Work.

**(f) Contract Price and Assignment of Return Premium** - The Owner will provide the OCIP coverage listed above for the benefit of the Contractor and its Subcontractors at the Owner's expense. In consideration of the Owner providing OCIP coverages, the Contractor agrees to:

**(1)** Remove all applicable insurance costs from its Bid that would duplicate or provide similar insurance coverages as will be provided for the Contractor in the OCIP.

**(2)** Assign to the Owner all return premiums, dividends, refunds, discounts, and other credits due or to become due under the OCIP insurance policies. The Contractor and its Subcontractors agree to execute documents and agreements provided by the Owner's Representative necessary to accomplish this assignment.

**(g) Termination/Modification of the OCIP** - It is the Owner's intent to maintain the OCIP throughout the life of the Contract. However, circumstances may require termination or modification of the OCIP. If this occurs, the Owner will give thirty (30) days advance written notice to the Contractor, and, at the Owner's sole discretion, will provide replacement coverage or will require Contractor to obtain replacement insurance coverage as required herein or as otherwise may be directed by the Owner. If the Owner requires the Contractor to obtain replacement insurance, the actual, direct, auditable cost of such approved replacement insurance will be reimbursed as extra work. In this case, Contractor shall furnish written evidence of such insurance in force before the OCIP's actual termination date.

**(h) Insurance Coverage Not Provided by the OCIP:**

**(1)** Owner provided insurance does not cover suppliers, vendors, materials dealers, haulers, transporters, or others whose work location is off the Project Site, and who merely pick up or deliver materials, equipment, or supplies at the Project Site. However, if such suppliers, vendors, or materials dealers physically incorporate their product into the Work or contract with Subcontractors to physically incorporate their product into the Work on the Project Site, those employees or Subcontractors' employees working on the Project Site will be enrolled in the OCIP and will be covered by Owner provided insurance.

**(2)** The OCIP will not cover any fabrication, manufacturing, assembly, testing, or other operations away from the Project Site.

**(3)** Subcontractors engaged in asbestos abatement, abatement or remediation of environmental hazards, and/or commuting exposures to and from the Project Site will not be eligible for enrollment in the OCIP. Such Subcontractors shall carry Subcontractor furnished insurance as specified herein at their own expense or such other coverage as may be required in the Contract Documents.

**(4)** Notwithstanding other provisions of this subsection, the Owner reserves the right to exclude any Contractor or Subcontractor of any tier from the OCIP at its sole discretion. If the Owner requires any such Subcontractor to obtain insurance to replace any the Owner would otherwise provide, the actual, direct, auditable cost of such approved replacement insurance will be reimbursed as extra work. In this case, the Contractor or Subcontractor shall furnish written evidence of such insurance in force.

**(i) Waiver of Recovery and Subrogation** - The Owner and the Contractor shall cause their respective underwriters of insurance policies, as described in Paragraph (b) (2) above, to waive their rights of subrogation for claims for losses, costs, and expenses arising from the Work performed under this Contract, which one party may have against the other. This waiver applies only to personal injury, bodily injury, death, and property damage covered by Owner provided insurance as described herein and occurring in the course of the Contractor's performance under this Contract. The Contractor shall be responsible in ensuring that all tiers of Subcontractors also meet this Waiver of Subrogation requirement.

**(j) Miscellaneous Provisions and Requirements:**

**(1)** The cost of the premiums for insurance provided under the OCIP will be paid by the Owner, and the Owner will receive and pay, as the case may be, all adjustments in such costs, whether by way of dividends, audits, or otherwise.

**(2)** The Contractor recognizes and agrees that Marsh USA Inc. is the Broker of Record for the OCIP, and that the Contractor has the obligation to notify Marsh USA Inc. and request correction of any insurance-related deficiencies, omissions, or errors in the OCIP policies or certificates.

**(3)** Any portrayal of insurance policy coverage definitions, terms, and conditions contained in this contract shall not be a binding interpretation of coverage or conditions of the actual policies. Actual policy provisions shall in all cases take precedence over this subsection of the Specifications.

**(k) Liabilities and Obligations** - Insurance provided by the Owner for the Contractor and its Subcontractors is not intended to and will not in any manner limit or qualify the duties, liabilities, and obligations assumed by the Contractor under the Contract. Losses by and claims against the Contractor that are outside the coverage limits of the insurance policies to be provided by the Owner shall be borne by the Contractor.

## SECTION 00180 - PROSECUTION AND PROGRESS

Comply with Section 00180 of the Standard Specifications supplemented and/or modified as follows:

**00180.40(b) On-Site Work** - Add the following:

**(9)** An approved Site Specific Safety and Health Plan

Add the following subsection:

**00180.40(c) Specific Limitations** - Limitations of operations specified in these Special Provisions include, but are not limited to, the following:

| Limitations | Subsection |
|---|---|
| Cooperation with Utilities | 00150.50 |
| Cooperation with Other Contractors | 00150.55 |
| Interim Completion Time | 00180.50 |
| Final Completion Time | 00180.50 |
| Right-of-Way and Access Delays | 00180.60(e) |
| Traffic Restrictions | 00220.40 |
| Special Events | 00220.40(e) |
| Noise Control | 00290.30(d) |

Be aware of and subject to schedule limitations in the Standard Specifications that are not listed in this subsection.

**00180.41 Project Work Schedules** – Add the following subsections.

**(j)** The Contractor shall submit a Project Work schedule meeting the requirements of 00180.41(k) to the Owner's Representative. The Project Work schedule is intended to identify the sequencing of activities and time required for prosecution of the Work. The schedule is used to plan, coordinate, and control the progress of construction. Therefore, the Project Work schedule shall provide for orderly, timely, and efficient prosecution of the Work, and shall contain sufficient detail to enable both the Contractor and the Owner's Representative to plan, coordinate, analyze, document, and control their respective Contract responsibilities. The Project Work schedule shall include all contract milestone dates and reflect how the work required prior to a milestone date shall be completed prior to that date.

Contractor's activity related to developing, furnishing, monitoring, and updating these required schedules is Incidental.

**(k) Type "B" Schedule** - The Contractor shall do the following:

**(1) Initial Schedule** - Ten Work Days prior to the preconstruction conference, the Contractor shall provide to the Owner's Representative four copies of a time-scaled bar chart Project Work schedule showing:

- The priority and interdependence of all major segments of the Work;
- Expected beginning and completion date of each activity, including all staging;
- Elements of the Traffic Control Plan as required under 00225.05.
- Elements of the Diversion of Flow Plan as required under 00490.40(b);
- Work elements performed by or supplied by the Owner such as Owner-furnished equipment, testing by Owner or planting by Owner;
- Elements of utility relocation and adjustment including those listed under 00150.50(e).

The initial schedule shall show all Work intended for the first 60 Days of the Contract to the level of detail described in (2) below.

**(2) Detailed Schedule** - In addition to the above requirements, and within 30 Calendar Days after the Notice to Proceed, the Contractor shall provide the Owner's Representative four copies of a detailed time-scaled bar chart Project Work schedule indicating the critical course of the Work, including the following:

- Construction activities;
- Submittal and approval of Material samples and shop drawings;
- Procurement of critical Materials;
- Fabrication, installation, and testing of special Material and Equipment;
- Duration of Work, including completion times of all stages and their sub-phases; and
- Crew resources which identify and clearly depict Contractor's crew or subcontractor performing the Work associated with the scheduled activity.

For each activity, the Project Work schedule shall list the following information:

- A description in common terminology;
- The quantity of Work, where appropriate, in common units of measure;
- The activity duration in normal Work Days; and
- Scheduled start, completion, and time frame shown graphically using a time-scaled bar chart.

The schedule shall show the Work broken down into logical, separate activities by area, stage, or size. The duration of each activity shall be verifiable by manpower and Equipment allocation, in common units of measure, or by delivery dates.

The bar chart shall be prepared as follows:

- The length of bar shall represent the number of normal Work Days scheduled.
- The time scale shall be appropriate for the duration of the Contract.
- The time scale shall be in normal Work Days (every day except Saturday, Sunday, and legal holidays).
- The smallest unit shown shall be one Calendar Day.
- The first day and midpoint of each month shall be identified by date.
- Distinct symbols shall be used to denote multiple shifts, holiday, and weekend Work.

The bar chart drawing(s) shall include a title block showing the Contract name and number, Contractor's name, date of original schedule, and all update dates; and a legend containing the symbols used, their definitions, and the time scale, shown graphically. To ensure readability the bar chart shall be drawn on a reasonable size of paper up to a maximum of 36-inch x 36-inch, using multiple sheets when needed. Upon request, provide copies of the schedule and updates in electronic data files in a format readable by and compatible with Microsoft Project or Primavera software.

Within seven Work Days after submission of the Project schedule the Owner's Representative and the Contractor shall meet to review the Project schedule as submitted. Within 10 Days of the meeting, the Contractor shall resubmit to the Owner's Representative four copies of the Project schedule, including required revisions.

**(3) Review and Reporting** - The Project Work schedule may require revision as the Work progresses. Therefore, the Contractor shall monitor and when necessary revise the Project Work schedule as follows:

**a. Review with the Owner's Representative -** The Contractor shall perform ongoing review of the Project Work schedule and progress of the Work with the Owner's Representative. If the Owner's Representative or the Contractor determines that the Project Work schedule no longer represents the Contractor's own plans or expected time for the Work, a meeting shall be held between the Owner's Representative and the Contractor. At this meeting, the Contractor and the Owner's Representative shall review Project events and any changes for their effect on the Project Work schedule. After any necessary action has been agreed upon, the Contractor shall make required changes to the Project Work schedule.

The Contractor shall collect information on all activities worked on or scheduled to be worked on during the previous report period, including shop drawings, Material procurement, and Contract Change Orders that have been issued. Information shall include commencement and completion dates on activities started or completed, or if still in progress, the remaining time duration.

The Contractor shall develop detailed sub-networks to incorporate changes, Additional Work, and Extra Work into the Project Work schedule. Detailed sub-networks shall include all necessary activities and logic connectors to describe the Work and all restrictions on it. The restraints shall include those activities from the Project Work schedule that initiated the sub-network as well as those restrained by it.

The Contractor shall evaluate this information and compare it with the Contractor's project schedule. If necessary, the Contractor shall make an updated bar chart schedule to incorporate the effect changes may have on the Project completion time(s). For any activity that has started, the Contractor shall add a symbol to show the actual date the activity started and the number of normal Work Days remaining until completion. For activities that are finished, a symbol shall be added to show the actual date. The Contractor shall submit four copies of the updated bar chart to the Owner's Representative within seven Days after the progress meeting, along with a progress report as required by (b) below.

**b. Progress Report** - The Contractor shall submit a progress report to the Owner's Representative each month with the pay estimate request. The report shall include the following:

- Sufficient narrative to describe the past progress, anticipated activities, and stage Work;
- A description of any current and expected changes or delaying factors and their effect on the construction schedule; and
- Proposed corrective actions.

**(l) Specified Contract Time Not Superseded by Schedule Revisions** - The predicted completion date(s) for the Project Work schedule shall be within the specified Contract Time(s) or adjusted Contract Time or as shown on pending requests for adjustments of Contract Time. If the Contractor believes that additional Contract Time is due, the Contractor shall submit, with the updated Project Work Schedule, a request for adjustment of Contract Time according to 00180.60.

**(m) Float Time** - Float time shown on the Project Work schedule, including any time between a Contractor's scheduled completion date and the specified Contract completion date, does not exist for the exclusive use of either party to the Contract and belongs to the Project.

**(n) Schedules Do Not Constitute Notice** - Submittal of a Project Work schedule with supporting narrative does not constitute or substitute for any notice the Contractor is required under the terms of the Contract to give the Owner.

**(o) Owner's Representative Review** – The Owner's Representative review of the Contractor's schedules will not constitute a warranty or representation by the Owner that the Contractor can perform the Work according to such schedule. Review of the Project Work schedules and subsequent schedules by the Owner's Representative shall not relieve the Contractor of the responsibility for timely and efficient execution of the Contract.

**(p) Failure to Provide Schedule** - The Project Work schedule is essential to the Owner. The Contractor's failure to provide the schedule, schedule information, progress reports or schedule updates when required or requested may delay the Work and permits the Owner to take any actions necessary to protect itself and cause the schedule to be delivered, including, but not limited to withholding Contract payments.

Add the following subsection:

**00180.50(d) Contract Time** - Commence work within 10 Calendar Days of receipt of Notice to Proceed as defined in 00110.20. Complete all work within 305 Calendar Days after receipt of written Notice to Proceed.

The Owner has established the following project milestones:

- 10 weeks after receiving Notice to Procced: Fanno Bypass (diversion of flows from Fanno Pump Station) should be installed, tested, and fully operational.
- October 15, 2011: Complete (Final Completion) all Work requiring the closure of Interstate-5 traffic lanes, the closure of Interstate-5 on-ramp from SW Multnomah Blvd, and the closure of off-ramp to SW Multnomah Blvd from Interstate-5. Work includes, but is not limited to, installation of new pipe, cured-in-place pipe, testing, inspection, and restoration.

**00180.60(d)(1)(h) Adjustment of Contract Time** - Change 00180.80(e) to 00180.60(e).

**00180.80(b) Liquidated Damages** - Add the following paragraph:

**(6)** The liquidated damages for failure to complete the Work on time is $1,820 per Calendar Day.

## SECTION 00190 - MEASUREMENT OF PAY QUANTITIES

Comply with Section 00190 of the Standard Specifications.

## SECTION 00195 – PAYMENT

Comply with Section 00195 of the Standard Specifications supplemented and/or modified as follows:

Add the following subsection:

**00195.22 Fuel Cost Price Adjustment** - Despite the limitations of paragraphs (a) and (b) in subsection 00195.20, the amount of compensation to be paid to the Contractor may increase or decrease as a result of changes to the Monthly Fuel Price (MFP) for diesel fuel established by ODOT. This fuel escalation and de-escalation clause will work as follows:

**(a)** ODOT will establish a MFP each month. Generally speaking, the MFP for a given month will be the average weekly price obtained from the OPIS weekly listing dated the first Monday of that month for No. 2 diesel fuel for Portland, Oregon. Prices are based solely on rack and resellers' prices exclusive of freight, taxes, and special discounts. For information regarding the calculation of the MFP and for the actual MFP, go to ODOT's website at: http://www.oregon.gov/ODOT/HWY/ESTIMATING/asphalt_fuel.shtm. If for any reason ODOT changes the way it calculates the MFP the Owner and Contractor agree to be bound by ODOT's revised method.

**(1)** If the average weekly price is not posted by OPIS or is otherwise not available to the Owner for the first Monday of any month for any reason, the Owner may use the average weekly price posted by OPIS immediately before or after the first Monday of that month.

**(2)** If the average weekly prices cease to be available from OPIS for any reason, the Owner in its discretion will select and begin using a substitute price source or index to establish the MFP each month.

**(b)** A Base Fuel Price (BFP) for this project will be established. The BFP is the MFP published on ODOT's website for the month immediately preceding the bid opening date.

**(c)** Changes to compensation will occur based on a comparison of the MFP to the BFP, but only if the MFP is larger or smaller than the BFP by more than 10 percent. Therefore:

**(1)** If the MFP is within 10% of the Base, there will be no adjustment.

**(2)** If the MFP is more than 110% of the Base, then the following formula will be used: Adjustment Factor = (MFP) - (1.10 x Base)

**(3)** If the MFP is less than 90% of the Base, then the following formula will be used: Adjustment Factor = (MFP) - (0.90 x Base)

**(d)** Once the appropriate adjustment factor has been selected, a price adjustment to the contract will be made monthly for fuel cost changes to the items listed in paragraph 5 of this section. The price adjustment will be the adjustment factor multiplied by the amount of fuel determined to be used for the quantity of work performed during the month for each unit of measure listed below. For example, if the adjustment factor under paragraph (c) is 20 cents, and the fuel factor for general excavation is .29/cubic yard and the Contractor excavated 1000 cubic yards in the prior monthly pay period then the change in compensation would be as follows:

$0.20 (Adjustment Factor) x 0.29 fuel factor x 1000 cubic yards = $58.00

**(e)** Adjustment for fluctuations in the cost of fuel will apply only to the major fuel usage Pay Items shown in the following list and at the respective fuel factors listed:

| Item | Fuel Factor |
|---|---|
| General Excavation | 0.29 Gallons/Cubic Yard |
| Subgrade Stabilization (12-inch depth) | 0.33 Gallons/Square Yard |
| Trench Excavation | 0.29 Gallons/Cubic Yard |
| Other Excavation | 0.29 Gallons/Cubic Yard |
| Cold Plane Removal | 0.72 Gallons/Cubic Yard |
| Cold Plane Removal | 0.04 Gallons/Square Yard |
| Conc. Pvmt. Diamond Grinding | 0.04 Gallons/Square Yard |
| Aggregate Base | 0.69 Gallons/Ton |
| Shoulder Aggregate | 0.69 Gallons/Ton |
| Cement Treated Base | 1.00 Gallons/Ton |
| Bituminous Base | 2.93 Gallons/Ton |
| Level ___, ___inch Dense HMAC | 2.93 Gallons/Ton |
| Aggregate In Chip Seal | 0.69 Gallons/Ton |

| | |
|---|---|
| Emulsified AC Mixture | 1.00 Gallons/Ton |
| Concrete Pavement | 0.11 Gallons/Square Foot |
| Concrete Pavement | 1.00 Gallons/Square Yard |
| Concrete Walk/Driveway | 0.11 Gallons/Square Foot |
| Structures (precast) | 10.00 Gallons/$1000 |
| Structures (cast-in-place) | 19 Gallons/$1000 |

Total fuel requirements for constructing the selected Project items listed above have been estimated at approximately 24,189 gallons, based on fuel factors shown. This estimate is provided solely for the bidder's convenience.

The Contractor is cautioned to consider that its operations may require more or less fuel.

**(f)** If the Contractor elects to use an alternate fuel (natural gas, wood pellets, propane, or other) the estimated fuel requirements will not be revised. Fuel cost adjustments will continue to be made as specified above and will not be revised.

**00195.50(e)(9)** - In the first sentence, change "seven" to "ten"

## SECTION 00196 - PAYMENT FOR EXTRA WORK

Comply with Section 00196 of the Standard Specifications.

## SECTION 00197 - PAYMENT FOR FORCE ACCOUNT WORK

Comply with Section 00197 of the Standard Specifications supplemented and/or modified as follows:

**00197.20(a) Equipment Payment** - Replace the last sentence with the following:

Equipment use approved by the Owners Representative will be paid at the rental rates given in the most current edition of the Rental Rate Blue Books for Construction Equipment, Volumes 1, 2, and 3, published by EquipmentWatch, 181 Metro Drive, Suite 410, San Jose, CA 95110, phone 1-800-669-3282. FAX 1-800-224-3527, email: customerservice@equipmentwatch.com, website www.equipmentwatch.com.

## SECTION 00199 - DISAGREEMENTS, PROTESTS, AND CLAIMS

Comply with Section 00199 of the Standard Specifications.

# PART 00200 – TEMPORARY FEATURES AND APPURTENANCES

## SECTION 00210 - MOBILIZATION

Comply with Section 00210 of the Standard Specifications supplemented and/or modified as follows:

Add the following two subsections:

**00210.10 Project Signing** - Provide a minimum of two "Clean River Project" signs. Camera-ready artwork will be provided for the Project signage.

Provide Erosion Control Signage in accordance with 00280.05.

**00210.60 Clean River Signing** - Maintain signs in accordance with 00225.60.

**00210.90 Lump Sum Basis** - Add the following sentence.

Payment for the item "Mobilization" includes furnishing, installing, maintaining, moving, and removing the "Clean River Project" signage.

## SECTION 00220 - ACCOMMODATIONS FOR PUBLIC TRAFFIC

Comply with Section 00220 of the Standard Specifications supplemented and/or modified as follows:

**00220.02 Public Safety and Convenience** - Delete the third bullet.

Replace the fourth bullet with the following:

- Do not stop or hold vehicles more than 5 minutes, block driveways, intersections or connections for more than 5 minutes unless noted on the plans or otherwise authorized in writing.

Replace the first sentence of the thirteenth bullet with the following:

When it is necessary to restrict on-street parking, obtain the required permits 14 days in advance from the Permit Center, 503-823-7365.

Replace the last bullet (16) with the following.

- Notify the Owner's Representative in writing of all affected emergency services, school districts, and US Postal Service at least 14 days prior to street closure.

Add the following bullets to the end of this subsection:

- Provide notice to businesses and residents of upcoming construction at least 14 days, but no more than 4 weeks before construction is expected to begin in front

of their property. The notice will be on an approved form or letter. The notice shall include the Project name, the name and address of the Contractor, daytime and emergency phone numbers, daytime Project contact person's name, and an emergency contact person's name. If other means of delivery are not effective, the notice shall be hung on a business's or resident's building in a waterproof plastic bag.

- Coordinate work to accommodate any reasonable special needs of the businesses and residents. The Owner's Representative will make a final determination should a question arise whether a special need or request submitted to the Contractor is reasonable.

- In coordination with the Owner's Representative, provide notice to public agencies impacted by disruption or restriction of traffic or access to property as a result of project-related TCM.

- When construction related work adversely impacts access to Tri Met bus stops, the Contractor shall work with Tri-Met and the Owner's Representative to find acceptable alternative bus stop locations:

| Agency | Person Contacted | Telephone |
|---|---|---|
| | | |
| Portland Fire Bureau | General Number | 503-823-3873 |
| Portland Police Bureau | General Number | 503-823-4800 |
| Bureau of Emergency Communications | General Number | 503-823-0911 |
| TriMet | Shirley Block | 503-962-8117 |
| Portland Public School Transportation | Teri Brady | 503-916-6901 |
| Portland Bureau of Transportation and Maintenance | Dispatch | 503-823-1700 |
| Portland Traffic Signal and Street Lighting | Anne Hogan | 503-823-5292 |
| Oregon Department of Transportation | Jim Nelson | 503-229-5002 |
| City of Beaverton CONTACT-PCMS on their ROW | Jabra Khasho | 503-526-2221 |
| Washington County CONTACT-PCMS on their ROW | John Kuppler | 503-846-7941 |
| PBOT – Gibbs Street Pedestrian Bridge Overcrossing Project | Craig Goodroad | 503-823-5168 |
| ODOT – Iowa Street Viaduct Replacement Project | Jim Nelson | 503-229-5002 |

- Coordinate lane closures on I-5 during installation of CIPP with the ODOT Iowa Street Viaduct Replacement Project and the Gibbs Street Pedestrian Bridge Overcrossing Project through the Owner's Representative.

- When a project restricts the width, length, height, or weight of trucks through a work zone, submit written notification to the Owner's Representative at least 30 days before the restriction takes effect.

- 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. Install a "BUMP" (W8-1-48) sign approximately 100 feet before the backfilled area and a "ROUGH ROAD" (W8-8-48) sign approximately 350 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 the Contractor's expense. Do not use temporary steel plating to reopen the roadway.

- Where traffic detection loops are anticipated to be removed or disturbed, the contractor shall notify Lisa Elbert, 503-823-5218, a minimum of 72 hours prior to the loops being disrupted. When construction is complete, the contractor shall coordinate with PBOT to have them replace the loops.

- Use portable changeable message signs to provide appropriate work zone information to the public. Place signs and display messages as directed or approved. When signs are in use, protect them according to 00225.46(b) and the "Portable Changeable Message Sign (PCMS) Installation" detail shown on ODOT Standard Drawing TM800.

- Notify the Owner's Representative and PBOT (Craig Goodroad, 503-823-5168) in writing at least two weeks but no more than four weeks in advance of SW Multnomah Blvd construction to request a temporary speed limit reduction from 45 mph to 35 mph for SW Multnomah Blvd between SW Barbur Blvd and SW 31st Ave.

Add the following subsections:

**00220.04 Work Zone Notifications** - Provide the following work zone notifications for SW Multnomah Blvd between SW Barbur Blvd and SW 31st Ave, and Interstate 5 including any on-ramps or off-ramps:

**(a) Over-Dimensional Vehicle Restrictions** - When a project restricts the width, length, height, or weight of vehicles through a work zone or detours trucks around a work zone, notify the Motor Carrier Transportation Division (MCTD) by using the web based electronic version of the "Highway Restriction Notice-Size and/or Weight" form (Form No. 734-2357) and notify the Owner's Representative and PBOT (Eileen Dent, 503-823-7687) in writing at least 30 calendar days before the restriction or detour taken effect.

**00220.40(i) Lane Restrictions And Other Requirements By Location** –

**SW Multnomah Ave Ramps east of SW 22nd Ave to and from I-5 including I-5**

- All work shall be completed within a 45 consecutive day time period. This work shall not occur during the same time period as any work being performed on SW Multnomah Blvd between SW 31st Ave and SW 22nd Ave except where noted below and having prior approval by the Owner's Representative, PBOT, and ODOT.

- If necessary, PBOT and ODOT are OK with closing the Multnomah ramps for a maximum of 45 consecutive days.

- A Multnomah eastbound and westbound detour shall be provided.

See below for the I-5 lane and time restrictions by location specific.

**SW Multnomah between SW 31st Ave and SW 22nd Ave**

- No two work zones shall be closer than 1000 ft from each other at any time unless having prior approval from the Owner's Representative and PBOT.
- See below for Multnomah lane and time restrictions by location specific.

**SW Multnomah Blvd from SW 31st Ave to SW 30th Ave**

- Two 11-foot minimum width traffic lanes (one per direction) are maintained on Multnomah at all times, the traffic signal on Multnomah at 31st Ave shall be turned off with the intersection controlled by flaggers. Available work hours, Monday-Friday, 8 AM to 4 PM, and 7 AM to 6 PM on Saturday.
- At a minimum, maintain one 14-foot minimum width traffic lane for two-way traffic on Multnomah at all times. The traffic signal on Multnomah at 31st Ave shall be turned off with the intersection controlled by flaggers. Available work hours, Monday-Friday, 9 AM to 3 PM, and 7 AM to 6 PM on Saturday.
- No lane restrictions allowed on 31st Ave (north leg) at any time.

**SW 31st Ave (south leg), SW 30th Ave, and SW 28th Ave at SW Multnomah Blvd**

- If necessary, PBOT is OK with hard closing 31st Ave (south leg), 30th Ave, and 28th Ave at Multnomah during working hours at those intersections.

**SW Multnomah Blvd between SW 30th Ave to SW 25th Ave**

- Two 11-foot minimum width traffic lanes (one per direction) are maintained on Multnomah at all times. Available work hours, Monday-Saturday, 7 AM – 6 PM.
- At a minimum, maintain one 14-foot minimum width traffic lane for two-way traffic on Multnomah at all times. Available work hours, Monday through Friday, 9 AM to 3 PM, and 7 AM to 6 PM on Saturday.

**SW 25th Ave at SW Multnomah Blvd**

- Maintain a minimum of one 10-foot minimum width traffic lane for two-way traffic controlled by flaggers (one per approach) on 25th Ave at all times.

**SW Multnomah Blvd-North Side (westbound lane) between SW 25th Ave to SW 22nd Ave**

- Two 11-foot minimum width traffic lanes (one per direction) are maintained on Multnomah at all times. Available work hours, 9 PM to 6 AM, 7 days a week.
- At a minimum, maintain one 14-foot minimum width traffic lane for two-way traffic controlled by flaggers (one per approach) on Multnomah at all times. Available work hours, 9 PM to 6 AM, 7 days a week.
- See noise variance for other work restrictions during working hours.
- PBOT is OK with closing Multnomah on-ramp (one-way westbound approach) at SW Barbur Blvd between Barbur and 22nd Ave with local access only. During this time, a 10-foot minimum width traffic lane shall be installed through the median with a flagger controlling local traffic at that opening at 22nd Ave.
- SW 22nd Ave shall be open with no lane restrictions during this time.
- A Multnomah westbound detour route shall be provided and approved by the Owner's Representative, PBOT, and ODOT.

**SW Multnomah Blvd-South Side (eastbound and westbound lanes to and from I-5) at SW 22nd Ave**

- PBOT is OK with hard closing Multnomah (eastbound traffic lane) during working hours at SW 25th Ave and also closing Multnomah on and off ramps to and from I-5.
- SW Multnomah Blvd (one-way westbound approach) between Barbur and 22nd Ave shall be open with no lane restrictions during this time.
- See noise variance if applicable for other work restrictions during working hours.
- This work shall be completed during the same 45 consecutive day time period for the closure of the Multnomah ramps to and from I-5 including any work on I-5.
- A Multnomah eastbound and westbound detour route shall be provided and approved by the Owner's Representative, PBOT, and ODOT.

**SW Multnomah Blvd (Frontage Rd) Between SW 19th Ave and SW Barbur Blvd**

- PBOT is OK with closing Multnomah with local access only between 19th Ave and Barbur during working hours.
- Maintain a minimum of one 10-foot minimum width traffic lane for two-way traffic.

**Pacific Highway (I-5) Northbound and Southbound**

- I-5 shoulder work

1. Shoulder work in the southbound lanes shall occur during the same 45 day limit for ramp closure.

- Mainline I-5:

1. Hours shall be limited to Monday-Sunday, 9 PM to 6 AM
2. Contractor shall provide the necessary manpower and equipment to install the traffic control identified in the approved traffic control plans within one hour.
3. Contractor will not be allowed on I-5 mainline before 9 PM and shall be completely off the I-5 mainline by 6 AM on the days specified.
4. One week prior to performing the work on I-5, the Contractor shall meet with the Owner's Representative and the ODOT work zone traffic control inspector to review the approved traffic control plan and how the Contractor proposes to meet the Contract requirements within the time allowed. If the Contractor is unable to demonstrate this ability to the satisfaction of the Owner's Representative, the Contractor will be required to supplement the manpower and equipment at no additional cost to the Owner, until the desired result is achieved and approved by the Owner's Representative.

In addition, do not close any traffic lanes between:

- 3 PM on Fridays and midnight on Sundays without prior written consent from the Owners Representative, ODOT, (for State ROW) and PBOT.
- Noon on the day preceding legal holidays or holiday weekends and midnight on legal holidays or the last day of holiday weekends, except for Thanksgiving, when no lanes may be closed between noon on Wednesday and midnight on the following Sunday.

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

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

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

Roadways shall be free of barricades or other objects and all lanes opened to traffic during all the restrictive periods listed above unless prior approval from the Owners Representative, ODOT (for State ROW) and PBOT.

## SECTION 00225 - WORK ZONE TRAFFIC CONTROL

Comply with Section 00225 of the Standard Specifications supplemented and/or modified as follows:

**00225.00 Scope** - Add the following:

In case of conflict between the Plans, Standard Specifications and Special Provisions, the Special Provisions will take precedence.

**00225.02(d) Extended Traffic Queues** - In the second paragraph, change MUTCD W20-7b to MUTCD W3-4.

**00225.11 Temporary Signing** - Change "Quality Standards for Work Zone Traffic Control Devices" to "Quality Guidelines for Work Zone Traffic Control Devices".

**00225.11(a)(2) Type** – Delete the bullet that begins "3/4-inch medium density…"

**00225.18 Temporary Pedestrian Walkways** - In the first paragraph, delete the phrase "without knots" from the first sentence.

**00225.27 Flaggers** - Replace the third bullet with the following:

- A fluorescent yellow-green, orange, yellow, or bright white hardhat. Wear hardhats during flagging operations.

**00225.32 Traffic Control Supervisor (TCS)** – Delete the first sentence and 5 bullets. Replace the first sentence of the second paragraph with the following:

The Contractor shall designate a qualified individual to perform the duties of the Traffic Control Supervisor for the duration of the Project.

Replace the third sentence of the fourth bullet of the fourth paragraph with the following:

Inspect traffic control devices left in place for 24 hours at least once during non working hours and at least once per day while the traffic control is in place.

**00225.41(a) Orange Construction Speed Zone Signing** - Replace this subsection with the following:

**00225.41(a) Speed Signs** - Use speed signs on Multnomah between SW Barbur Blvd and SW 31st Ave as follows:

**(1) Advisory Speed Signs** - Install the advisory Type "O4" speed signs as directed.

When advisory Type "O4" speed signs are used, cover the appropriate Type "W1" speed zone signs with sign covers according to Section 00941. Uncover them when the

advisory Type "O4" speed signs are removed or covered. At the trailing end of the Project, install a Type "W1" speed zone sign with the original designated speed. If existing Type "W1" speed signs are 500 feet or less beyond the Project, additional signs are not required.

When there is no work on the Project or when directed, cover or remove the advisory Type "O4" speed signs and restore the original Type "W1" speed zone signs.

**(2) Regulatory Speed Signs** - Install and maintain the regulatory signs as directed.

When regulatory Type "W1" speed signs are used, cover the appropriate Type "W1" speed zone signs with sign covers according to Section 00941. When there is no work on the Project or when directed, cover or remove the regulatory Type "W1" speed signs and restore the original speed zone signs.

**00225.42(d) Impact Attenuators** - Replace the sixth bullet with the following sentence:

- For narrow site systems, pin or restrain the first two barrier sections as shown on ODOT Standard Drawing RD516.

**00225.43(h) Stripe Removal and Durable Strip Removal** - Replace the first paragraph with the following:

Remove striping by hydroblasting, steel shot blasting or grinding so the pavement surface is not damaged below a depth of 1/8-inch. Do not use paint or asphalt to cover existing stripes. Repair any damaged surfaces to the satisfaction of the Owner's Representative at no additional compensation.

**00225.46(a) Sequential Arrow Signs** – Delete the second bullet.

Add the following Section:

**00225.51 Lane Closure Set-up and Take-down** - Where shown on approved traffic control plans or directed by the Owner's Representative, the Contractor shall set up traffic control measures to close one or more lanes of a multi-lane facility. When this is to occur, the following sequence shall be followed:

- Advance warning signs are to be set up on the shoulder of the roadway opposite the lane to be closed
- Advance warning signs are to be set up on the same shoulder as the lane to be closed
- A truck mounted attenuator, with arrow board, is to be moved into place at the beginning of the closure taper
- Channelization devices are to be placed to mark the taper and the length of the closure as shown on the traffic control plan

Once the lane is closed, the TMA/arrow board may be adjusted to the plan location or removed as necessary.

If additional lanes are to be closed, this shall be done in sequence with previous lane closures using the same sequence of activities. A truck-mounted attenuator with arrow board is required during the process of closing each additional lane and may be replaced with an arrow board without attenuator after the lane is closed. Each closed lane shall be marked with a separate arrow board at all times according to the approved traffic control plan.

Traffic control for lane closures shall be removed in the reverse order of the installation.

Replace entire Section with the following:

**00225.80 General**:

- Measurement for "Traffic Control" will be the Contract Lump Sum amount. No measurement will be made for this item.
- Measurement for "Traffic Control, Portable Changeable Message Sign" will be measured on a per week basis for each sign unit installed by actual count were the units are installed and operational for the project duration.
- Measurement for "Traffic Control, Flagger" will be on a per hour unit price basis for Traffic Control, Flagger. Measurement will be made on the actual number of hours a flagging station is staffed by a certified flagger measured to the nearest quarter hour.

Replace entire Section with the following:

**00225.90 General**:

- Payment for "Traffic Control" will be the Contract Lump Sum amount, prorated monthly throughout the length of the Contract. Traffic Control shall include all material, signs, sequential arrow signs, tools, equipment, barricades, posts, pavement markers, striping, removal of striping, labor (excluding flaggers), barrels, flashing units, continuous safety supervision and all incidentals to fully comply with local traffic regulations. Traffic Control also includes the preparation of an approved Traffic Control Plan as specified in the Contract Documents, and attendance at all meetings in order to insure traffic safety and worker protection in all traveled project areas for the entire duration of the project.
- Payment for "Traffic Control, Portable Changeable Message Sign" will be full payment for furnishing, programming, and maintaining the equipment on site including maintaining all components of the device for the duration of the Project.
- Payment for "Traffic Control, Flagger" will be full payment for furnishing certified personnel, properly outfitted and equipped with flagging equipment necessary to safely perform traffic control. No payment will be made for temporary illumination required for nighttime flagger operations.

**00225.98 Traffic Control Supervisor (TCS)** - Add the following paragraph after the bullet list:

Quantities will be limited to those days authorized by the Owner's Representative and documented by a daily Traffic Control Report submitted by the end of the next working day.

## SECTION 00270 – TEMPORARY FENCES

Comply with Section 00270 of the Standard Specifications supplemented and/or modified as follows:

**00270.90 General** - Add the following at the end of the section:

If temporary fencing is not listed as a pay item, it is incidental work for which no separate payment will be made.

## SECTION 00275 – TEMPORARY PLATING

Comply with Section 00275 of the Standard Specifications supplemented and/or modified as follows:

**00275.10 Materials** - Change 02530.10 to 02530.20.

**00275.11 Plating Coating** - Replace this subsection with the following:

**00275.11 Plating Coating** - Use plating coatings from the CPL.

**00275.40 General** - In the third paragraph, change "35 degrees F and" to "35 degrees F or".

**00275.42 Plate Thickness and Span** - In the first sentence, change HS-21-44 to AASHTO HS20-44.

## SECTION 00280 - EROSION AND SEDIMENT CONTROL

Comply with Section 00280 of the Standard Specifications supplemented and/or modified as follows.

**00280.02 City Controlled Lands Erosion and Sediment Control Plan** - Replace the second paragraph with the following:

The Contractor may submit the ESCP that is included in the Project plans. To assist in the preparation or modification of the ESCP, refer to the current version of the City's Erosion and Sediment Control Manual along with Title 10 of the City Code.

**00280.05 Project Signing** – Replace this subsection with the following:

**00280.05 Project Signing** - Install a minimum of 2 erosion signs on the Project with the following information:

- "EROSION CONCERNS?", "Erosion Control Information" or other similar message
- Burlingame Trunk Sewer Improvement Project
- Contact Number BES 503-823-CODE (2633)

Use type G signs according to 00940.02. Confirm the above information before fabricating the signs. Place and mount the signs as shown. Orient the signs so they are visible to traffic, bicyclists, and pedestrians as appropriate. Install the signs before performing clearing, grading, and other land alteration activities.

**00280.90 General** - Add the following sentence to the paragraph that begins "Matting includes...":

It also includes the costs for seeding and fertilizing when it is required as part of the bonded fiber matrix application.

## SECTION 00290 - ENVIRONMENTAL PROTECTION

Comply with Section 00290 of the Standard Specifications supplemented and/or modified as follows:

**00290.20(d)(2) Inert Material** - Add the following paragraph to the end of this subsection:

Retain landfill disposal receipts for all non-inert solid waste generated from the Project site for at least one year after completion of the Project. Provide landfill disposal receipts to the Owner's Representative if requested.

**00290.20(e) Hazardous Waste Management** - Add the following paragraphs to the end of this subsection:

If the quantity of hazardous waste projected to be generated meets the requirements for a Conditionally Exempt Generator (CEG), in accordance with 40 CFR 261.5, store hazardous wastes on-site for no more than 180 days, with the total stored not to exceed 2,200 pounds at any one time. All hazardous waste containers shall be in good condition, sealed and labeled with the words "Hazardous Waste" and the accumulation start and end dates. All employees involved in the handling and/or management of hazardous wastes shall comply with the federal and State regulatory requirements for hazardous waste management. If the quantity of hazardous waste generated in a given month exceeds the CEG limits, immediately comply with the requirements for small and large quantity generators, as set forth below, and for the remainder of the calendar year. Within 30 days of such exceedance, complete additional documentation and training required as a result of this change in status.

If the quantity of hazardous waste projected to be generated meets the requirements for a Small Quantity Generator (SQG) or a Large Quantity Generator (LQG), prepare a Hazardous Waste Contingency Plan, in accordance with 40 CFR 262.34 and 265.51. Maintain a copy of the Contingency Plan on-site at all times during construction activities,

readily available to employees and inspectors. Employees shall receive hazardous waste training as specified in 40 CFR 262.34 and 265.16. On-Site storage of hazardous waste shall comply with the requirements of 40 CFR 262 and 265, OAR 340-102-034 and all other applicable federal, State and local laws and regulations. Submit monthly records of hazardous waste generation, transportation, and disposal to the Owner's Representative by the 15th day of the following month. A Certified Hazardous Materials Manager (CHMM) in good standing and with experience managing the hazardous wastes associated with the Project shall be available to oversee and direct hazardous waste management at the site.

If hazardous waste is to be treated on-site, all treatment activities shall comply with 40 CFR 262.34 and 268, and ORS 466.095. No on-site hazardous waste treatment may begin prior to receipt of the Owner's Representative's approval.

**00290.30 Pollution Control** - In the first paragraph that begins "Prevent, control and abate...", replace "ORS 279.318" with "ORS 279C.525".

**00290.30(d) Noise Control** - Replace the 12th bullet with the following:

- Comply with City Code 18.10.060 Construction Activities and Equipment which describes noise control regulations.
- Comply with the mandatory conditions of the May 10, 2010 Noise Review Board decision.

Add the following paragraph to end of this subsection:

Noise levels in excess of 85 dbA measured at 50 feet from the source (i.e., noise from sewer installation) are allowed only during regular working hours unless otherwise approved by special noise variance permit.

## SECTION 00291 - CONTAMINATED MEDIA

Comply with Section 00291 of the Standard Specifications supplemental and/or modified as follows:

**00291.03(a) Abbreviations**

Add the following:

**SSSHP - Site Specific Safety and Health Plan**

**00291.03(b) Definitions**

Add the following:

**Competent Person -** See 00170.60(b)(2). The Competent Person shall also serve as the Contractor's Safety Representative.

**00291.04 Disposal Facilities** – Add the following to the end of second paragraph:

The disposal permit will be obtained by the Owner.

Add the following paragraph:

Dispose of contaminated media after testing confirms acceptable levels of contaminant(s) at the following location(s):

| Media | Disposal Site |
|---|---|
| Petroleum | Hillsboro Landfill |
| Metals | Hillsboro Landfill |
| PCB's | Hillsboro Landfill |
| VOCs | Hillsboro Landfill |
| SVOCs | Hillsboro Landfill |
| Pesticides | Hillsboro Landfill |

**00291.05 Submittals -** Delete the first and second bullets. Replace the fourth bullet with the following:

- Name and qualifications of the Contractor's Safety Representative.

**00291.07 Health and Safety Plan**

Replace all references to "HASP" with "SSSHP". In the second sentence of the first paragraph, change the words "certified by a CIH in good standing" with reviewed and approved by the Competent Person". Replace all other references to "CIH" with "Competent Person".

**00291.08 Contaminated Media Disposal Plan** – Delete the fifth bullet.

**00291.31 Certified Industrial Hygienist -** Delete this section.

**00291.33 Qualifications of Safety Representative**

Change references to "HASP" to "SSSHP".

**00291.42 Known or Anticipated Contaminated Media** - See Burlingame Trunk Sewer Improvement, Executive Environmental Data Report, November 30, 2010.

**00291.43 Contaminated Media Management Zones and Decontamination -** Change references to "HASP" to "SSSHP".

**00291.44 Excavation and Handling -** Delete the third and sixteenth bullets.

**00291.45 Discovery of Unanticipated Contaminated Media -** Replace the word "HASP" with "SSSHP" in the last bullet.

**00291.90 General -** Insert the following paragraph at the end of this subsection:

Contaminated Media disposal fees will be paid by the Owner.

Work that is required under this Section that does not appear as a separately listed pay item in the Schedule of Items is considered to be incidental.

# PART 00300 – ROADWORK

## SECTION 00310 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Comply with Section 00310 of the Standard Specifications supplemented and/or modified as follows:

Add the following subsection:

**00310.41(f) Pavement Cores** - The following pavement cores were taken in the Project:

| CORE ID | ADDRESS or LOCATION | OFFSET | PAVEMENT THICKNESS & TYPE |
|---|---|---|---|
| BH-1 | SW 25th and Multnomah | 10.2' | 10" AC with 6" Base |
| BH-2 | SW 28th and Multnomah | 3.2' | 4" AC with 8" Base |
| BH-3 | 3015 SW Multnomah Blvd | 5.2' | 7" AC with 4" Base |
| B-2 | 1641 SW Multnomah Blvd | 6.5' | 4" AC with 20" Base |
| B-3 | SW 14th and Multnomah | 6.6' | 3" AC with 6" Base |
| B-4 | SW 22nd and Multnomah | 39.1' | 5" AC with 7" Base |
| B-5 | 3035 SW Multnomah Blvd | 8.4' | 6" AC with 5" Base |

**00310.43(b)** Add the following at the end of the section:

- Concrete sewer components that were used to convey live sanitary sewage must be disinfected prior to disposal. If Contractor elects not to disinfect, concrete becomes property of the Contractor in accordance with 00310.43(d).

**00310.83 Incidental -** Add the following subsection:

If there are no pay items listed in the Contract bid schedule, payment for removal and disposal work will be considered incidental.

## SECTION 00320 - CLEARING AND GRUBBING

Comply with Section 00320 of the Standard Specifications.

# PART 00400 - DRAINAGE AND SEWERS

## SECTION 00401 – VIDEO AND ELECTRONIC INSPECTION OF SEWERS

### Description

**00401.00 Scope -** This work includes the cleaning and inspection of sewers using video and related electronic equipment. The work may include locating live connections, documenting existing conditions, and providing information for evaluating conditions that may need repair after construction.

**00401.01 Abbreviations:**

**CCTV** - Closed Circuit Television

**CD-ROM** - Compact Disc Read Only Memory

**DVD** - Digital Video Disc or Digital Versatile Disc

**MPEG -** Moving Pictures Expert Group

**SVCD -** Super Video Compact Disc

**VCD -** Video Compact Disc

### Equipment

**00401.20 Mainline Inspection Equipment**

**(a) Camera and Lighting** - Use a digital color video camera capable of 360 degree pan and tilt, capable of operating in 100% humidity conditions, and equipped with high-intensity lighting that is appropriate for the sewer pipe size and material type.

Under good conditions (no fog in the sewer), the lighting and camera quality shall provide a clear, in-focus color picture of the entire inside periphery of the sewer up to three pipe diameter lengths away. The lighting shall provide uniform light, free from shadows or hot spots. The camera lighting shall be fixed in intensity prior to commencing the inspection and adjusted during the inspection as needed to optimize the image quality displayed on the video monitor.

**(b) Footage Meter** - The recorded video shall have an information banner that displays a footage meter showing the distance, in tenths of feet, the camera has moved from its starting point. Any other information displayed in the banner area shall not obstruct the forward camera view. The footage information on the recorded video shall correspond to the footage references in the written Video Inspection Log.

**(c) Reference Ball** - The video camera shall have a 1-inch steel reference ball mounted in front of the camera approximately one foot from the camera lens. Suspend the ball using a chain that allows it to serve as a depth reference when traveling and so it maintains continuous contact with the pipe invert. The reference ball shall be clearly visible at all times yet be positioned so as not to obstruct more than 10% of the forward camera view. The

reference ball is to be stopped at every wide joint to allow for comparison of the ball diameter to the joint width.

**00401.21 Lateral Inspection Equipment**

**(a) Push Camera** - A portable camera system that can be manually extended into lateral sewers for inspection purposes. The push camera shall have imaging capabilities similar to the camera used to inspect sewer mains.

**(b) Lateral Launch Camera** - A secondary camera component of a mainline sewer video inspection system that can be launched into a lateral connection while inspecting main line sewers. The Lateral Launch Camera must be capable of inspecting the length of the lateral from the mainline connection to beyond the edge of the right-of-way. The Lateral Launch Camera shall have imaging capabilities similar to the mainline camera.
**(c) Electronic Location Device** - A radio transmitter designed to easily travel inside a non-metallic pipe that can be detected from the surface to detect the sewers below ground horizontal and vertical position.

**Labor**

**00401.30 Video Personnel Qualifications** - Perform video inspection work with experienced personnel trained and/or certified in using remotely operated video equipment to recognize, locate, and accurately document sewer breaks, obstacles, defects, and service connections.

**Construction**

**00401.40 General Video Inspection -**

**(a) Notice and Access** - Inform the Owner's Representative a minimum of 48 hours before beginning cleaning or video inspection. Do not proceed with cleaning or video work without verbal consent from the Owner's Representative. Allow the Owner's Representative access to the video truck at all times to observe the video monitor and all other operations.

**(b) Cleaning** - Install a screen to catch debris at the downstream end of the pipe run. Clean the sewer pipe of obstructions that will impede video inspection. Avoid causing damage to pipe by the cleaning operation. Remove and properly dispose of solid debris resulting from the cleaning operation. Do not move the material from manhole section to manhole section.

**(c) Inspection** - After cleaning, pre-charge the sewer with clean water to assist in locating bellies and deformation of the pipe. Perform continuous video inspection as soon as possible after cleaning the pipe. Control the flow into the segment to be inspected. Video inspect sewers one segment at a time. Move the camera through the line in either direction at a moderate rate and stop, pan and/or tilt as necessary to permit proper documentation of the sewer's condition including the location of all lateral connections, additional connections to the mainline and other characteristics. Do not move the camera at a speed greater than 30 feet per minute.

Use tractors, manual winches, power winches, video cable, powered rewinds, or other devices that do not obstruct the camera view or interfere with proper documentation of the

sewer conditions and that allow the camera to be maintained at the approximate center of the pipe at all times. If, during the inspection operation, the camera will not pass through the entire pipe run, set up equipment so that the inspection can be performed from the opposite manhole. If, on second try, the camera fails to pass through the entire manhole section, ask the Owner's Representative for direction.

**(d) Narrative and Extent of Inspection** - Provide a running narrative description on each video inspection recording. Include the following minimum information in the narrative: the beginning and the end of the video, the site location, manhole identifications, the total footage of the sewer inspected, the company name, the operator's name and the date and time.

Inspect all joints, lateral connection(s), and any other noteworthy features within the sewer. Stop, pan, and/or tilt the camera at each location to fully inspect, document and describe in the narrative each inspected feature.

**(e) Footage Metering** – Before beginning video inspection, restore the footage meter to zero beginning from the middle of the manhole or provide a means to convert the meter reading to accurate aboveground distances. Provide accurate on-screen distance measurements in the video recording. Verify measurement for location of defects aboveground by means of a meter device. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device, and the accuracy shall be satisfactory to the Owner's Representative.

**(f) Recording Format, Storage Box, and Labeling** - Record using high-quality color video media such as DVD, CD-ROM or other approved media. Submit recordings playable on consumer DVD players and Microsoft Windows-based personal computers at resolutions of 352x240 or higher. Submit DVD recordings in standard MPEG-1 or MPEG-2 format. Submit CD-ROM recordings in standard VCD or SVCD format. Recordings shall be submitted in a plastic protective box, labeled to indicate the project number and name, date of inspection, sewer segment number, Contractor's name and whether it is a pre-construction or post-construction video. Label both copies of the video media and the boxes.

**(h) Continuity, Image and Audio** - Record continuously in color from the beginning to the end of each sewer segment. The sewer image shall be free of visual distortions, appears level and centered in the sewer being inspected. The audio portion of the composite video recording shall be sufficiently free from electrical interference and background noise to provide complete clarity of the narrative description.

**(i) Video Inspection Logs** - Provide one copy of all pre- and post-inspection video inspection logs and video recordings. Provide print location records that clearly show the location in relation to an adjacent manhole for each feature observed during inspection. Include other points of significance such as locations of building sewers, unusual conditions, roots, all connections, pipe material and size, and broken pipe.

**(j) Disposition of Report** - Deliver the video inspection recordings of each sewer segment to the Owner's Representative immediately after such work is completed. All accepted video recordings, operator logs, and any related information become the property of the City.

**00401.41 Pre-construction Video Inspection -**

**(a) Mainline Inspection -** Clean and complete video inspection of all existing mainline sewers and positively located each service connection to the mainline sewer according to 00401.

**(b) Lateral Inspection and Field Location** - Locate and video inspect each lateral from its mainline connection to the edge of the right-of-way or to a distance determined by the Owner's Representative. Use an Electronic Location Device such as the Aqua-Tronics Snooper to verify the path of the lateral. Use marker paint to record the alignment of the lateral on the ground. Indicate where the lateral connects to a building connection. Inspection must be completed and approved by the Owner's Representative at each lateral a minimum of 14 days prior to beginning any lateral work.

For open-trench work, inspect laterals using a hand-held Push Camera. Have a hand-held push camera and a locator device on site for the project duration, whether or not it is used to complete the service lateral Inspection.

For trenchless work in mains with a diameter of 18 inches and less, use a side launch lateral camera or another approved method. The Owner's Representative must be present to view inspection as it is performed. For mains larger than 18 inches, use a method approved by the Owner's Representative.

The Contractor may choose to excavate down to expose and locate a lateral pipe for inspection purposes. All excavation activity associates with completing lateral inspection is incidental to this work.

Record all information about its condition, service status (e.g. live or abandoned), length, distances to surface features, fittings and any obstructions.

**Finishing and Clean-up**

**00401.70 Post-construction Video Inspection -**

**(a) Inspection of Completed Work -** Video inspect all completed work according to 00401.40. Provide the original copy of the post-construction video recording to the Owner's Representative.

**(b) Corrections to Deficiencies in Work** - The Owner's Representative will review each delivered video recording and note any deficiencies. The Owner's Representative will issue a written notice to correct any identified deficiencies. Correct any identified deficiencies within 48 hours after receiving notification. Re-perform the video inspection of the sewer and submit the new video recordings for review and acceptance at no additional cost to Owner.

**Measurement**

**00401.80 Measurement -** The quantities of all video inspection will be measured by the foot. Measure pipes with sloped ends to the top of the sloped ends. Measure a mainline sewer from center of manhole to center of manhole. Measure a lateral sewer from its

connection at the mainline to the edge of the public Right-of-Way or a distance determined by the Owner.

**Payment**

**00401.90 Payment -** Video Inspection of sewer pipe will be paid at the contract unit price for "Video Pipe Inspection, _____".

Insert the type of inspection, "Mainline Sewer", "Service Lateral, Push Camera" or "Service Lateral, Launch Camera", in the blank.

There will be no payment for providing a Hand-held Push Camera and locator device on site at all times.

There will be no separate payment for locating service lateral connections to the existing sewer. This will be incidental to the video inspection work for the mainline sewer.

All excavation and restoration work to complete video inspection of lateral sewer is incidental to this work.

## SECTION 00405 - TRENCH EXCAVATION, BEDDING AND BACKFILL

Comply with Section 00405 of the Standard Specifications supplemented and/or modified as follows:

**00405.02 Definitions** - Add the following after the first sentence of the definition for Trench Excavation:

All material will also include existing pipe and manholes.

**00405.40(e) Potholing –** Add the following subsection:

Advance potholing of existing utilities shall be performed where shown on the drawings or whenever the drawings show existing utilities within 2-foot vertical or 2-feet horizontal from the proposed sanitary sewer. If advance potholing was not performed as required, the Contractor shall be responsible for any required re-installation or subsequent delays. Potholing shall be done at least 500 feet ahead of construction so that adequate time is available to prepare corrective actions for potential conflicts without delaying pipeline construction work. All information collected including depths, material, size and surveyed location shall be provided to Owner's Representative within 3 days of potholing activity. Any utility conflicts discovered by Contractor's potholing shall be immediately brought to the attention of the Owner's Representative.

**00405.41(f)(1) Engineered Systems –** Replace paragraph (1) with the following:

**(1) Engineered Systems** – Engineered Shoring is required for temporary earth support systems for trenches or excavations greater than 20 feet deep including bore pits, jacking pits, receiving pits, and shafts. Engineered Shoring is also required to protect existing power and traffic poles that are adjacent to excavations for pipe and manhole installation. Excavations shall be braced internally for positive support and not

cantilevered. Engineered shoring shall be designed for a maximum deflection at the top of the shoring of not more than ½-inch. Engineered Shoring is also required for areas subject to vibration, groundwater, utility crossings, or where required on the Drawings. Submit the following for each area where Engineered Shoring is required:

**00405.43 Dewatering –** Insert the following as the first paragraph:

When groundwater is known to exist or is expected to be encountered, Contractor is to submit a detailed Dewatering Plan showing location, size, and layout of pumps, wells, piping, appurtenant equipment, and points of discharge and disposal to be used to keep excavations free of water. This is to be submitted prior to construction. Conform to dewatering requirements set forth elsewhere in the standard specifications.

**00405.45(b) Flexible Pipe Bedding** - Replace the first paragraph with the following:

**(b) Bedding for Flexible Sewer Pipe (Class D Bedding)** - Unless otherwise specified, bed flexible sewer pipe with 3/4" - 0" aggregate placed a minimum of 4 inches under the pipe, between the sides of the pipe and the undisturbed trench walls, and to the top of the pipe zone which is 12 inches above the top of the pipe.

**00405.84(a)(1) Length** - Replace paragraph (1) with the following:

**(1) Length** - The length will be the horizontal distance measured along the centerline of the trench. Measurement will be continuous through manhole or structure locations.

**00405.90 General** - Replace this subsection with the following

**00405.90 General** - The accepted quantities of trench work will be paid at the Contract price per unit of measurement for the following items

| | **Pay Item** | **Unit of Measurement** |
|---|---|---|
| (a) | Trench Excavation, _____ | Cubic Yard |
| (b) | Pothole Excavation | Each |
| (c) | Trench Backfill | Cubic Yard |
| (d) | Engineered Shoring | Lump Sum |
| (e) | Dewatering | Lump Sum |

Payment will be payment in full for furnishing, placing and compacting all materials, and providing all equipment, labor, and incidentals necessary to complete the work.

For item (a), the type of excavation will be inserted in the blank (Common, Rock, Boulder or Concrete). This work includes any additional excavation required for installation of manholes, inlets, pipe, or other structures in rock or concrete. Other than as provided in 00405.82(a) and (b), such additional excavation is considered incidental to the work and no separate or additional payment will be made.

Under item (b), if another method is used than described, no additional payment will be made. All other pothole excavation work performed by the Contractor for its sole use is considered incidental to the work with no additional payment.

For item (c), the class of backfill will be inserted in the blank according to 00405.14.

Item (d) includes all costs for designing, providing, constructing, maintaining, and removing the shoring system.

Item (e) includes all costs to collect excess water and remove it from all excavations and all costs to permit, collect, convey, store, and dispose of the water, including mobilization, construction, operation, disassembly, and demobilization of the collection, storage, and disposal system.

## SECTION 00410 – PIPE LINING

Section 00410, which is not a Standard Specification, is included in this Project by Special Provision.

**00410.00 Scope** - This work consists of rehabilitating existing pipes by furnishing and installing pipe liners by cured-in-place lining as shown.

**00410.01 Definitions –** Add the following

**Cured-In-Place Pipe (CIPP)** - Inserting a resin impregnated tube into an existing pipe, expanding it, and curing it to form a new lined pipe and in accordance with ASTM F1216.

**Gravity Pipe** - Pipe designed to convey fluids under conditions where the hydraulic gradient and free-water surface are coincident.

**00410.02 Submittals** - Submit the following for review 60 days prior to CIPP installation (and subsequent ODOT lane closures). Submit all required submittals in a single package.

(a) Documentation showing the installer meets the installation qualifications listed in 00410.30.

(b) Certification by the lining system manufacturer that the installer is fully licensed and certified as competent to perform the work.

(c) A list of the key qualified personnel who are assigned to and will work on this project, including certification of worker training for key personnel involved with installing CIPP liners (crew supervisor, heat exchange equipment (e.g., boiler) operator, wet out technicians, etc.). The insertion equipment operator technician's experience and verifiable references. Include contact numbers for foreman and crew supervisors.

(d) Certified test reports demonstrating that the exact resin/liner combination to be used for this project meets the requirements for initial structural properties (performed in accordance with ASTM F1216, ASTM D638, and ASTM D790) and chemical resistance (performed in accordance with ASTM F1216-Appendix X2).

(e) For reinforced or composite CIPP, if Contractor intends to prepare smaller sample lengths than those specified in 00410.71, submit span-to-depth ratios used for tests in 00410.02(d), a letter or other documentation from the testing laboratory that no shear effects were observed during the testing, and that a 16:1 ratio or other smaller span-to-depth ratio is acceptable. This ratio will be used for future testing.

(f) Certified test reports demonstrating that the exact resin and comparable liner to be used for this project has been tested for long-term flexural modulus of elasticity and long-term flexural strength (i.e. 10,000 hour creep testing performed in accordance with ASTM D2990 for design conditions applicable to this project). Load shall be equivalent to 0.25% of the initial flexural modulus of elasticity as determined by ASTM D790, minimum. If the liner used for testing is not the exact liner to be used on this project, submit a detailed description of the physical properties of both the liner used in the test and the liner to be used for this project to demonstrate that the two liners are comparable in terms of physical properties.

(g) Certified test results demonstrating that the resin/felt matrix shows no undulations after the specified number of cycles, per the Darmstadt test method or equivalent. If test data is unavailable, submit letter certifying an additional 1.5 mm layer will be added to the finished interior of the CIPP per 00410.03.

(h) Catalog data, and manufacturer's technical data showing complete information on material composition and dimensions of system components of the tube and resin system. Provide proposed thickness of any coating that will be on the interior or exterior of finished CIPP. Include manufacturer's recommendation for handling, storage, insertion, curing, trimming, finishing, and repair of liner damaged during wet-out, shipping, and installation.

(i) Infrared spectography test results per ASTM E1252 showing chemical fingerprint of resin to be used on the project.

(j) Certification that any bond-enhancing compound used to increase the bond between resins and carbon/fiberglass-reinforced tube is suitable for use in aqueous environments.

(k) Hydrophilic end seal material to be used and method of installation.

(l) Detailed description of the wet out process. Include manufacturers wet-out recommendations including the roller gap, material feed speed and vacuum requirements for each liner size and thickness. If wet out occurs off-site, provide certification by the person in responsible charge that the entire wet out process including handling and delivery to the site followed the defined procedures.

(m) Calculations for the volume of resin to be used for each segment including the calculated amount of excess resin necessary to account for liner material properties, changes in the resin's physical and chemical characteristics due to polymerization and the structural condition of the gravity pipe. Volumes should also be listed on wet-out logs which shall be submitted upon delivery of the CIPP.

(n) Resin manufacturer curing requirements including contingency plans if cure temperatures are not reached or are too high, and a list of appurtenant materials and accessories to be furnished. The resin manufacturer's documentation shall also include maximum allowable time for handling the impregnated tube prior to insertion and the maximum allowable elapsed time from insertion to exotherm.

(o) Minimum and maximum allowable installation pressures and speeds, and minimum and maximum allowable curing temperatures, pressures, and curing durations and speeds, all certified by the resin and tube manufacturers. Identify proposed locations of thermocouple wires or temperature sensors.

(p) Detailed narrative description and sketches to describe all proposed manhole preparation, modification, preservation, and restoration activities. Include design of a restraint system capable of restraining the CIPP in ACX 675, ACX676, and ACX677 to ensure that the CIPP will not burst and that the section of restrained CIPP in ACX676 will meet the strength requirements to handle the design loads as listed in this Section when manhole ACX676 is abandoned.

(q) A detailed schedule by each hour of each of the steps of the CIPP installation across Interstate-5. Schedule should indicate coordination with traffic control and working hour manhole access constraints. Provide on the hourly schedule milestones of critical installation steps. Milestones should will also be used in the field to indicate when the time and access constraints will be exceeded if the milestones are not reached.

(r) Detailed method for samplings, including recommended location and size of each sample, method of removal, and if core sampling is approved, the method of liner repair when core samples are taken. If ultrasonic pulse echo methods are used to measure thickness, submit information on the proposed instrument, required calibration, and an above-ground test that demonstrates the instrument and methodology provide level of accuracy required.

(s) Contingency Plan, including methods and equipment to be used to repair unacceptable liner defects and for availability and accessibility of backup equipment such as air compressors and lateral reinstatement cutters.

(t) An engineering design stamped by a Profession Engineer in the State of Oregon of the proposed CIPP liner according to 00150.35 and which meets the requirements of 00410.03. Detailed calculations shall confirm the liner thickness for the proposed resin system. List all assumptions, design criteria, and material characteristics.

(u) Property owner notification records, five calendar days prior to beginning installation.

After completion of CIPP installation, submit curing logs for each installation, listing at a minimum the temperature of the hot water, steam, and/or interior of the liner, the temperature of external thermocouples, and pressures at a minimum of every 15 minute increments or as recommended by the resin and tube manufacturers, whichever is less.

**00410.03 Design Parameters** - Follow the design consideration of the ASTM F1216 and meet the following conditions and parameters:

| Condition | Parameter |
|---|---|
| Service Life | Greater than 50 years |
| Pipe Conditions | See Table 2 |
| Load Conditions | Continuous |
| Soil | 135-pound/cubic-foot |
| Traffic | HS-20 |
| Groundwater Elevation | See Table 2 |
| Maximum Design Thickness | See Table 2 |
| Pipe Ovality | See Table 2 |
| Modulus of Soil Reaction | 700 psi |
| Enhancement Factor | 7.0 |

Long-term Flexural Strength .....See Table 1 or unless otherwise demonstrated by regression analysis, per this specification
Modulus of Elasticity.....See Table 1 or unless otherwise demonstrated by regression analysis, per this specification
Maximum Allowable Deflection .....5%
Factor of Safety .....2.0
Resin Migration Allowance.....8%
Abrasion Resistance.....A maximum abrasion loss of 0.35 mm after 200,000 cycles per Darmstadt test method or having an additional sacrificial interior layer of resin/felt.

**Table 1.**

| Characteristic | Test Method | Reinforced Tube, Polyester Resin (minimum) | Nonreinforced Tube, Polyester Resin (minimum) |
|---|---|---|---|
| Flexural Strength | ASTM D790 | 5,000 psi | 3,500 psi |
| Flexural Modulus of Elasticity | | | |
| Short-term | ASTM D790 | 800,000 psi | 300,000 psi |
| Long-term | ASTM D2990 | 400,000 psi | 150,000 psi |

The flexural modulus and flexural strength used in the design shall be the values as rated for the specified service life and as submitted in 00410.02. The data points from 1000 hours to 10,000 hours of the Long-term Flexural Modulus shall be extrapolated using a log-log scale linear regression analysis to determine the minimum service life performance of the resin-tube. Calculations shall be submitted for approval before fabrication of the CIPP.

If abrasion resistance does not meet the design parameter listed above or if abrasion resistance data is unavailable, provide an additional sacrificial inner layer of 1.5 mm. Sacrificial layer must be a part of the initial CIPP tube.

Table 2 provides information for each manhole-to-manhole pipe segment. The maximum required thicknesses were based on the minimum Design Parameters described in 00410.03.

**Table 2.**

| Segment Upstream and Downstream Manholes | Inside Pipe Diameter (inches) | Invert Depth (feet) | Groundwater Level (feet) Above Invert | Ovality (%) | Deterioration Level | Maximum Allowable Thickness* (mm) |
|---|---|---|---|---|---|---|
| ACX650 to ACX651 | 29.60 | 19.3 | At surface | 2.1 | Partially | 12.0 |
| ACX651 to ACX652 | 29.63 | 21.2 | At surface | 1.7 | Partially | 12.0 |
| ACX652 to ACX722 | 29.47 | 29.0 | 20.0 | 1.7 | Partially | 12.0 |
| ACX722 to ACX687 | 29.60 | 29.0 | 20.0 | 1.6 | Partially | 12.0 |
| ACX687 to ACX686 | 29.77 | 18.0 | At surface | 2.6 | Partially | 12.0 |
| ACX682 to ACX673 | 29.47 | 20.7 | At surface | 2.9 | Partially | 13.5 |
| ACX673 to ACX675 | 29.53 | 21.6 | At surface | 2.2 | Fully | 28.5 |
| ACX675 to ACX676 | 29.77 | 25.3 | At surface | 2.1 | Fully | 28.5 |
| ACX676 to ACX677 | 29.87 | 30.8 | At surface | 3.3 | Fully | 28.5 |
| ACX677 to ACX870 | 35.43 | 44.4 | At surface | 6.6 | Fully | 45.0 |

*If resins are used which have different physical properties than Table 1, submit for review detailed calculations of the proposed liner thickness as well as values for the parameters included in Table 1.

## Materials

**00410.10 Tube** - Furnish CIPP tubing that consists of one or more layers of absorbent non-woven felt fabric meeting the requirements of ASTM F1216, Section 5.1.

Fabricate the tube to a size that when installed, conforms to the internal circumference and length of the original pipe. Make allowance for circumferential or longitudinal stretching during inversion. Provide flexible tubing exhibiting the following characteristics:

- Shall be homogeneous across the wall thickness containing no intermediate or encapsulated elastomeric layers.
- No part of the tube shall be less than 100 percent saturated by resin.
- Shall have a relatively uniform thickness that when compressed at the installation, pressures will be equal to or exceed the calculated design thickness.
- Shall not contain material that may cause delamination in the cured CIPP.
- Shall be coated with an impermeable, flexible material on the outside layer of the tube (before inversion).
- The felt content of the liner shall be determined by the Contractor, but shall not exceed 15 percent of the total impregnated liner volume.
- Seams shall be shall be stronger than the non-seamed felt material and must be fully saturated with resin regardless of joining method. Do not utilize overlapped layers of felt in longitudinal seams that cause lumps in the final product.

**00410.11 Resin** - Furnish CIPP resins meeting the requirements of ASTM F 1216, Section 5.2. The resin installed CIPP liner system shall produce a CIPP that will comply with the structural requirements specified and be inert with respect to the flow media in standard gravity sewer applications.

Provide resin that is compatible with the rehabilitation process, is able to cure in the presence or absence of water, and has an initiation temperature for cure as recommended by the resin manufacturer. Provide a thermosetting polyester or vinylester resin and a catalyst system compatible with the installation process. No PET/Isophthalic polyester resin is allowed. Polyester resins may be either isophthalic acid or teraphthalic acid, but not combinations of both.

Fiberglass or carbon-fiber reinforced felt shall utilize a suitable bond enhancing compound to increase the bond between resins and other materials.

Use a sufficient quantity of resin for tube impregnation to fill the volume of air voids in the tube with additional allowance for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. Use a serial vacuum impregnation process. Use a roller system to uniformly distribute the resin throughout the tube.

Color the resin with a pigment compatible with the resin system, as specified by the resin manufacturer, and reviewed by the City.

**00410.12 Finished CIPP** - When cured, the liner shall form a continuous tight-fitting liner that is chemically resistant to chemicals found in normal sanitary sewer flows. The liner shall be fabricated to a size that when cured will tightly fit the pipe being rehabilitated.

**00410.13 Hydrophilic End Seal Material**

The hydrophilic waterstop end seals shall be bands that are 20 mm wide, 5 mm high, with a double bump on one side and flat on the other side. Manufacturer: Hydrotite Style DS-0520-3.51, by Greenstreak, Inc. or equal.

**Labor**

**00410.30 Personnel** - Perform installations with installers who are qualified, fully licensed, and certified by the manufacturer of the CIPP product system to be used on the Project. In addition, the installer shall have installed at least 50,000 feet of the CIPP product system.

For each method of installation and curing used on this project, the Contractor shall have a history of at least 150,000 linear feet of CIPP work in 21" to 54" sewers and using the specific method of installation and curing being used.

For each method of installation and curing used on this project, the CIPP Work shall be supervised by a foreman having previously supervised a minimum of 50,000 linear feet of CIPP in 21" to 54" sewers and using the specific method of installation and curing proposed.

Crews and key personnel shall not work more than a maximum of 16 hours per 24-hour day. Provide written verification that relief crews and key personnel are available, if hours are exceeded.

Staff this project with the key individuals who meet the above requirements and who will be available for the project duration. Failure to produce the listed individuals shall be cause for terminating the Contract or for delaying the Project until said individuals are available. Delay

claims caused by such failure shall NOT be allowed. Contract time shall NOT be extended due to the above-mentioned personnel being unavailable to work on this Project.

## Construction

**00410.40 General** - Handle and store all liner material to ensure that the material is not torn, cut, exposed to direct sunlight, or otherwise damaged. Before installing the liner, inspect to verify its condition with the City. If any part of the liner material becomes torn, cut or otherwise damaged before or during insertion, it shall be repaired or replaced at no additional cost before proceeding further.

Prior to insertion, provide data on the maximum allowable stresses and elongation of the tube. Mark the exterior of the manufactured tube along its length, at regular intervals not to exceed five (5) feet. These marks shall be used as a gage to measure elongation during insertion.

Liner tubes that experience an overall elongation that exceeds five percent (5%) will be rejected and replaced. For pipes with slopes greater than 10%, the Owner reserves the right to accept CIPP that exceed the 5% elongation as long as the Contractor has demonstrated in the submittals that the CIPP has been custom-manufactured to account for the elongation.

**00410.42 Water and Electric Service** - No electrical service will be provided to the project area. Obtain temporary power or supply generators to furnish all electric power required for installation. Obtain a permit and pay all fees required from City of Portland Bureau of Water Works for use of any hydrant and water used during installation. An air gap must be provided between pipes connected to the fire hydrant and project-related equipment as required by the Water Bureau hydrant permit.

**00410.43 Pipe Preparation** - Prior to installation of CIPP, flush and clean all parts of the existing gravity pipe system per Section 00401 to remove all debris and obstructions.

Remove all existing lateral taps protruding into the host pipe. Pipe may need additional cleaning and video inspection to assure that shavings are removed prior to liner installation. Removal of protruding taps that are not shown will be considered incidental to the work.

For pipe segments found to have any actively leaking defects that would be categorized as Runners or Gushers by the Owner's Sewer Defect Rating Codes, grout leaking joint(s) with approved acrylate, acrylimide, or urethane grout until the pipe segment is free from the excessive infiltration.

**00410.44 Pre-Installation Video Inspection** - After cleaning, inspect the existing gravity pipe by video inspection according to 00401. Provide the video and inspection at least seven calendar days prior to beginning CIPP installation operations. Some conditions noted in the inspection report may need to be corrected before continuing with the pipe rehabilitation.

**00410.45 Receiving and Insertion Locations** - Locate all manholes or pits to suit the pipe lining operation. Use existing manholes where practical. Remove manhole inverts, benches, and channels to permit access for installation equipment. Enlarge the input and output pipe openings if required to accommodate the maximum outside diameter size of the

insertion equipment. Do not put undue stress on existing structures. Reinstall inverts and reconstruct benches and channels in accordance with the City Standard Specifications after pipe liners have been installed.

All existing manhole cones, slabs, grade rings, frames, and covers that are removed shall be replaced at no additional cost to the Owner. Some manholes, as shown on the Drawings, are cast-in-place manholes that may require saw-cutting if sections of the manhole require removal. Prior to any modification to existing structures, coordinate with the Owner's Representative on the proposed modification and subsequent repair of existing manholes.

Remove existing manhole steps in manholes. Holes resulting from removal of existing steps shall be repaired in an acceptable manner. Application of an internal rehabilitation coating in manholes is not permitted until after the CIPP has been installed. Replacement of steps is not required.

In areas where new manholes are not being installed or existing manholes are not available, excavate and restore pits at no additional cost. This may include providing a new manhole if an existing manhole is removed or damaged.

**00410.47 Installation** - Install CIPP according to ASTM F1216 Section 7 and the manufacturer's recommendations. For liners that are cured using hot water or steam, only water inversion/water cure will be allowed for pipe diameter larger pipe diameter equal to or less than 18-inches water inversion/water cure, air inversion/steam cure will be allowed.

**(a) General** - Where practicable, liners may be installed in continuous runs through manholes where there are two or more continuous gravity pipe segments requiring lining, especially to connect several short segments with continuous lining.

Do not allow the temperature of water discharged from processing liners to exceed the level allowed by State or local requirements.

Furnish one additional operational robotic cutter assembly train and key spare components on-site on a continuous basis as a "stand-by" unit in the event of primary equipment breakdowns.

**(b) Pipe Liner End Seal** - Install continuous or properly trimmed hydrophilic waterstops at the ends of the new pipe liner to the rehabilitated host pipe connection to prevent water movement between the two systems. Insert at each structure opening approximately three inches from structure wall. Trimmed waterstop edges shall be butted up side-by-side against each other at the crown of the pipe with a minimum overlap of three inches. Waterstops with any gap between the edges of the overlap will not be accepted. For structures with outside drops, install two sets of hydrophilic waterstops approximately one inch and four inches upstream of the drop and either trim back and remove CIPP to the upstream side of the drop opening or reinstate the drop opening through the CIPP. Perform sealing at no additional cost.

**(c) Wet Out** – The liner tube shall be impregnated ("wet out") with resin under controlled conditions using distribution rollers and vacuum to thoroughly saturate the liner tube prior to its dispatch for installation. No field wet out allowed. Transport and store the impregnated

liner tube at the site in such a manner that it will not be damaged, exposed to direct sunlight, or result in any public safety hazard.

Keep a log of the resin volume actually used in the wet out process and, prior to insertion, submit the wet-out log to the City per 00410.02. The minimum resin volume used for each wet-out process shall be as required to fill all voids in the tube material at nominal thickness and diameter. This volume should be adjusted with an additional allowance of excess resin, per 00410.03, to allow for any change in resin volume due to polymerization, and for any migration of resin into the cracks and joints in the original host pipe. Submit a process record that verifies that the resin impregnation yield matches the required quantity for the liner diameters and thickness.

Provide 5-working day advance notice, for each scheduled wet-out.

The City reserves the right to check, verify or inspect all phases of production and testing of materials from manufacturing, shipping, wet-out installation and cure to finished product. All information will be reviewed before accepting the wet out liner for installation. Any departure from the submitted procedures shall be cause for rejection.

**(d) Insertion -** Transport and store the resin-impregnated tube per the resin manufacturer's recommendations until it is installed in an existing line by the technique/process as submitted and approved. Comply with submittals pertaining to transport and storage time per Standard Specification Section 00150.35 Working Drawings and Other Submittals as amended herein.

The impregnated liner shall be inserted through an existing manhole or other approved access point. Lubricant may be added to aid in the installation process provided the manufacturer recommends the lubricant and application method. Follow the manufacturer's standards during the installation so as not to over stress the felt fiber and cause damage or failure of the liner prior to cure. Make allowance for circumferential stretching during installation. Extend tail end of the liner for taking field samples, where practical. If recirculation hoses are used during the curing process, extend the end of such hoses and liner beyond the end of the host pipe and into the downstream structure or provide detailed narrative on how complete cure will be accomplished in the CIPP turn-back. Segments of resin impregnated liner that have been placed in the existing pipe and are then found to be too short shall be removed without curing and discarded at no additional cost. Removal of the uncured liner shall be accomplished in such a way as to minimize the amount of resin allowed to escape and shall be in accordance with required submittals. Capture and cleanup all escaped resin.

The pressure head used during the installation process shall be sufficient to hold the liner tight to the pipe wall, produce dimples at all service connections and the two access structures, and prevent wrinkles in the cured liner. The same head shall be great enough to prevent infiltration from entering the pipeline during the curing process. Pressure head shall be maintained sufficiently long enough to allow pockets of water to exfiltrate through the host pipe and prevent lifts in the liner and resin washout. Maintain the pressure required to hold the flexible tube tight against the host pipe, per manufacturer's submittal, until the cure has been completed.

Cover exposed CIPP in intermediate structures to be abandoned with cut PVC pipe and sandbags to prevent overstretching or insufficient curing.

**(e) Curing -** After installation of the wet out liner is complete, use a suitable source of hot water and recirculation system capable of delivering the required amount of heat uniformly throughout the segment for a complete cure of the resin. Submit and comply with curing temperatures as set forth herein.

See Section 00410.71 for sampling requirements at intermediate manholes.

Fit the heat source with suitable monitors to gauge the temperature of the incoming and outgoing heat supply. Remote sensing devices (i.e., thermocouples) shall be placed between the impregnated tube and the invert and the crown of the host pipe at each manhole to determine the temperatures during the resin cure process. Record temperature(s) from each remote sensing device(s) at least every 15 minutes. Document temperatures from start of cure to completion of cure on curing logs. If access to thermocouple locations is limited or restricted (i.e., I-5), provide data loggers in those locations which can remotely transmit the thermocouple readings or automatically record the temperatures in 15 minute increments. Download the data at every possible opportunity and submit the curing data with the curing logs to the Owner's Representative.

Comply with previously submitted data and information pertaining to curing temperatures and duration. Keep and submit a continuous temperature record at all monitored locations, for the duration of the curing and cool down process. Should curing temperatures be below the resin manufacturer's recommendations as submitted, extend curing time in accordance with the resin manufacturer's recommendations. Should curing temperatures be above the resin manufacturer's recommendations, modify the curing process in accordance with the resin manufacturer's recommendations. Prevent excessive temperatures that could scald or bubble the liner. The rate of temperature rise during heating shall not exceed resin manufacturer's recommendations.

Initial cure may be considered completed when the exposed portions of the felt tube appear to be hard, and the remote sensing device(s) indicate the cure temperatures recommended by the resin/catalyst system manufacturer.

**(f) Cool Down -** Initiate a controlled cool-down to cool the hardened pipe to a temperature below 100 degrees Fahrenheit, in accordance with resin manufacturer's recommendation, before relieving the static head or pressure in the lined pipe and returning normal flow back to the system. The rate of temperature fall during cooling shall not exceed resin manufacturer's recommendations. Take care in the release of the pressure so that a vacuum will not develop that could damage the newly installed CIPP.

Provide curing logs immediately to the City upon completion of cool-down.

**00410.48 Service Line Reconnection** - Reinstate all service line connections after the liner has been fully cured. Use an approved internal cutting device and video camera to restore service connections to the full diameter of the service. Qualified individuals with experience in successful internal lateral reinstatement and grouting service connections are to perform the internal lateral reinstatement. Restore laterals to not less than ninety-five (95%) or more than one hundred (100%) percent of their original capacity.

After cutting the lateral connection, grout the joint at the liner to prevent flow entering the pipeline from the small annular space between the liner and the host pipe. Use CIPP resin

compatible grout. Restore or correct, without any delay, all missed or faulty reconnections, as well as any damage to property owners caused by failure to reconnect the services.

**00410.49 Manhole and Structure Connections** - No earlier than 48 hours after the cool-down period, perform final trimming and sealing of the liner at access structures to provide watertight pipe and structure seals. Exceptions to this requirements in highly restricted areas, such as I-5, will be granted by the City in writing. Neatly and smoothly trim the finished ends of the liner to within one inch of access structure wall. Provide a smooth transition between the existing structure channel invert and the liner using cementitious or other approved material to prevent settling of sediments or debris from catching on the liner or ponding of any standing water in the access structure. Seal all holes and voids in manhole and structure walls immediately surrounding the new liner with a chemical grout compatible with the resin mixture of the liner. Proposed methods and materials shall be reviewed and approved prior to sealant application.

## Finishing, Clean Up and Testing

**00410.70 General** - Provide a smooth transition between the existing structure channel invert and the liner using cementitious or other approved material to prevent settling of sediments or debris from catching on the liner or ponding of any standing water in the access structure.

**00410.71 Sampling and Testing Requirements**

**(a) Samples** - All samples submitted for testing and the test to be done on them will be individually labeled and logged to record the following information:

- Owner's Project Number and Name
- Name of Contractor
- Sample Number. Consecutively number samples
- Segment Number of sewer as shown
- Street location or physical address
- Contractor-designed thickness
- Date and time of sample, and location and name of person taking sample and their employer.

**(b) Restrained and Plate Sample Preparation and Collection** - For each installed liner segment, as designated, obtain samples for material properties testing.

In the case where a single installation lines multiple consecutive pipe segments, only a single sampling location is required. For installations where the liner is installed through an intermediate manhole and where possible, the sample shall be taken from the restrained CIPP in the intermediate manhole.

For each installation of CIPP less than 21-inches diameter or equivalent, collect a restrained pipe sample by placing a section of PVC pipe of the same diameter as the existing host sewer pipe at intermediate manholes or on the tail end of the liner in the access structure.

For installations where the liner is installed through an intermediate manhole, the sample shall be taken from the restrained CIPP in the intermediate manhole. The length of PVC pipe and sample shall be as required per Table 3. Run the impregnated tube through the pipe and cure the CIPP under restrained conditions.

For each installation of CIPP greater than or equal to 21-inches in diameter or equivalent, extend the CIPP as far as possible into the tail end manhole and restrain the CIPP using quarter sections of PVC and sandbags or other method of restraining the CIPP against installation pressures. For installations where the liner is installed through an intermediate manhole, the sample shall be taken from the restrained CIPP in the intermediate manhole. Where the installation setup prevents successful sample preparation at intermediate or terminal manholes, coordinate with the Owner's Representative prior to wet-out the preparation of plate samples from the same tube and resin as the CIPP at the time of wet-out. Document plate sample preparation on wet-out logs. Each plate sample shall be sized appropriately for testing of all required quality control tests. Cure the plate sample at the same time and under the same conditions as the installed CIPP as required by ASTM F1216.

The Contractor shall provide two samples large enough to prepare 6 individual test specimens of the size required for testing per ASTM F1216. The Owner will take the sample and cut, prepare, and test 6 individual specimens. The Contractor shall provide an additional sample or, if the first sample is large enough, the City will retain the remainder of the sample for an additional 6 samples for future testing.

When sampling is not possible at all, the sample test results from the most comparable installation will be used (e.g., similar weather, diameter, date of liner manufacture, etc.).

For each installation location, deliver samples immediately to the Owner's Representative upon completion of cool-down and sample removal from the pipe. The Owner's Representative shall retain custody of the sample as soon as the sample is removed from the manhole or downtube. Deviation from this requirement shall be cause for additional sampling from the actually installed pipe and subsequent repairs at the Contractor's expense. Any additional samples that the Contractor wishes to possess shall be prepared without damaging the liner and performed at no cost.

**Table 3. Sampling Locations and Sample Size and Quantity**

| Segment Upstream and Downstream Manholes | Maximum Allowable Thickness (mm) | Minimum Sample Size* (LxW, inches) |
|---|---|---|
| ACX650 to ACX651 | 12.0 | 16 x 10 |
| ACX651 to ACX652 | 12.0 | 16 x 10 |
| ACX652 to ACX722 | 12.0 | 16 x 10 |
| ACX722 to ACX687 | 12.0 | 16 x 10 |
| ACX687 to ACX686 | 12.0 | 16 x 10 |
| ACX682 to ACX673 | 13.5 | 20 x 12 |
| ACX673 to ACX675 | 28.5 | 24 x 20 |
| ACX675 to ACX676 | 28.5 | 24 x 20 |
| ACX676 to ACX677 | 28.5 | 24 x 20 |
| ACX677 to ACX870 | 45.0 | 36 x 24 |

* Sample size assumes maximum allowable thickness and a uniform non-reinforced felt tube. Sample sizes are based on ASTM D790 recommendations using a minimum 16:1 span-to-depth ratio plus 2 inches and a maximum 4:1 span-to-width ratio. If CIPP thickness designed and approved is less than the maximum allowable, sample size may be reduced accordingly if approved in writing by the City and the testing laboratory where the samples will be tested. If uniform reinforced or composite felt tubes are utilized, larger sample sizes will be required if shear effects are observed during testing on samples with a 16:1 ratio.

**(c) Resin Sample** - Obtain one liquid resin sample from each liner section prior to installation (4-oz. catalyzed resin). Using the resin sample, an infrared spectography chemical fingerprint shall be run per ASTM E1252 and compared to the submitted fingerprint, per Section 00410.02, to verify the resin used is the resin submitted for use on this project.

**(d) Field and Laboratory Testing** - The physical properties of the installed CIPP shall be verified through field sampling and laboratory testing.

**Field Testing – Thickness:** Test results shall consider any residual CIPP liner coating, material, or preliner when measuring thickness. For restrained samples, thickness shall be measured in accordance with ASTM D5813/D3567. The thickness will be measured at three spots on three samples from each installation. The resulting nine measurements will be averaged.

If restrained samples are not available (e.g., plate samples are used), thickness shall be taken at locations of greatest head pressure (e.g., at the lowest point of the CIPP installation). Thickness shall be measured by taking a minimum of three evenly spaced one inch cores a minimum of 12-inches up the finished CIPP from the existing manhole wall. Cores shall be repaired by using patches created from the same felt tube material used in the original installation with an epoxy resin approved for use in CIPP. Repair patches must fill the cores completely and a second oversized patch of 1.5 mm thickness must be placed over the repaired hole to ensure a watertight seal. Proper surface roughening of the original CIPP surface must be performed prior to placement of the oversized patch.

An alternate method of measuring thickness may be performed within the installed CIPP by ultrasonic pulse echo method per ASTM E797. No less than sixteen measurements equally spaced circumferentially must taken up in the CIPP a minimum of 12" from the existing manhole wall. Pulse-echo instruments must be calibrated above-grade daily using a calibration block comprised of the same existing pipe material and CIPP materials installed. Personnel from the City of Portland's Testing Lab must be present to verify the calibration prior to using the ultrasonic pulse echo method on CIPP installed below I-5.

**Laboratory Testing**

- Short-Term Flexural Properties - The sample will be used for testing and verifying the Modulus of Elasticity and Flexural Strength properties of the cured liner. Follow the procedures previously described for sample preparation and collection.

The Owner will pay for and perform all initial materials testing at the Owner's Materials Testing Laboratory or an approved third party laboratory. All testing shall be in accordance with applicable ASTM test methods to confirm compliance with the physical properties specified in this Section 00410. Certified copies of all test results will be provided.

**(e) Conformance Standards and Remediation** - Regardless of the resin/carrier tube system used, the completed liner shall meet or exceed the following properties.

- Measured cured liner thickness within the tolerances listed below,
- Resin in finished CIPP is as specified, submitted, and tested using infrared spectography,
- Initial modulus of elasticity (ASTM D790),
- Initial flexural strength (ASTM D790), and
- Actual installed safety factor of 2.0 (see 00410.91).
- Zero leakage through the liner.
- No separation of the liner from the existing pipe or delamination of CIPP layers.

Values of any of these parameters that are under the values stated in the Project Specifications or submitted information are not acceptable.

In case of failure of any of these physical properties as a result of the flexural modulus and flexural strength testing, the additional specimen provided to the City at the time of installation shall be tested by the City as necessary. Should the second samples fail, the liner shall be brought into satisfactory compliance by one of the following methods: 1) reduction of payment per 00410.91, or 2) removal and replacement of the original liner at no additional cost to the City if the safety factor is calculated to be below 1.0.

Installed thickness of the CIPP shall generally be within minus 5 percent and plus 10 percent of the nominal thickness, or no greater than 1.5 mm of the accepted nominal thickness. If the thickness of the liner exceeds 1.5 mm of the accepted nominal thickness, the liner shall be rejected and removed at no additional cost to the Owner. Since thickness of CIPP of directly correlated with physical properties, if the installed thickness is below the

nominal thickness, tolerance to the lower limits will be accounted for by calculation of installed CIPP's true safety factor per 00410.91.

The contact tolerance is 3.0 mm as measured at the downstream end of the CIPP installation. Where any space or gap between the outside surface of the liner and the inside surface of the existing pipe exceeds 3.0 mm, the liner fit will be deemed deficient and annular space grouting from either end of the CIPP will be required.

The finished CIPP shall be continuous over the entire length of the Project, including manhole inverts, and shall be free from visual defects such as foreign inclusions, dry spots, lifts, delamination, pinholes, and other deformities. Observed groundwater infiltration of the liner shall be zero. Wrinkles or other discontinuities in the finished liner pipe which cause a deformity that reduces more than 2% of total cross-sectional area or have a height greater than 2% of the host pipe inside diameter and any other defects which affect the integrity or strength of the CIPP are unacceptable. Wrinkles that develop in bends that are greater than 3% of the original host pipe inside diameter are also unacceptable. Wrinkles, lifts, or bumps that exceed these tolerances shall be ground down and patched with the same felt material as the original CIPP and an approved epoxy CIPP resin. If a composite or non-homogeneous reinforced CIPP is used and grinding of such wrinkles would structurally impact the CIPP to levels less than required, the City reserves the right to grind out the entire circumference in the location of deficiency and replace with a cured-in-place point repair of the same composite or reinforced tube and an approved epoxy resin. The City also reserves the right to require the Contractor to excavate and perform an open-cut point repair if a cured-in-place point repair would cause an unacceptable hydraulic restriction.

Soft spots, visible leakage, or localized areas of delamination shall be removed by cured-in-place point repair as previously required or open-cut point repair.

**00410.72 Post-Installation Video Inspection** - After completing each manhole to manhole section of pipe liner installation, service reconnections, finish work, and final cleaning, perform a video inspection of the pipe no earlier than 48-hour after completion of cool-down and make a written report according to 00401. Provide printed reports and the original video.

CIPP installation shall not be considered substantially complete until the video inspection tapes are received, reviewed, and accepted.

**00410.73 Repairs** - Repair leaks and remove and repair wrinkles, blisters, dry spots in resins, and other defects in the finished pipe as directed, and at no additional cost. The Contractor shall be responsible for costs of additional testing required to confirm compliance with these requirements. Obtain approval for method of repair, which may require field or workshop demonstration

**00410.74 Warranty Inspection** - The City shall conduct a CCTV inspection of the CIPP prior to the expiration of the Contractor warranty.

## Measurement

**00410.80 Measurement** - Work performed under this Section will be measured according to the following:

**(a) Pipe Liners** - The quantities of installed pipe liners will be measured on the length basis. The length will be measured, with no deduction for structures or fittings, along the pipe flow line from center to center of manholes, inlets, structures, special sections, or the ends of pipe, whichever is applicable. Video inspection, both for the pre-installation and post-installation inspection, will be considered incidental to this item.

**(b) Service Connections** - The quantities of service line reconnections will be measured on the unit basis, regardless of size.

## Payment

**00410.90 Payment** - The accepted quantities of work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

| Pay Item | Unit of Measurement |
|---|---|
| (a) CIPP Liner, __-inch | Foot |
| (b) Reinstate Service Connection | Each |

In item (a), the nominal size of the existing pipe will be inserted in the blank.

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 additional testing, cleaning, and video inspection required as a result of correction of unsatisfactory work.

**00410.91 Payment Deduction** - The Contract unit price may be reduced based upon owner-performed sample test results in accordance with 00410.71(d) and 00195.50(m). If deficiencies in measured physical properties are determined, they will be reported to the Contractor and the Owner shall conduct testing on the second sample prepared in accordance with 00410.71(b). Should results of the additional testing confirm deficiencies, a payment deduction will be made based upon the criteria below:

Physical Properties

**(a) Liner Thickness** – Liner thickness is as measured per 00410.71(d). Liner thickness is directly correlated with long-term design life, so the combination of thickness coupled with physical properties shall be grounds for reduced payment.

**(b) Long-Term Flexural Modulus** – The City will calculate long-term flexural modulus for each liner installed by using the actual short-term flexural modulus as tested in accordance with 00410.71(d) multiplied by the submitted long-term flexural modulus as submitted in Paragraph 00410.02(d) and divided by the short-term flexural modulus as submitted in Paragraph 00410.02(e). If plate samples were used to determine the actual installed short-term flexural modulus as required in 00410.71(d), a 0.80 reduction factor will be used in

determining long-term flexural modulus. The following two paragraphs are used for illustrating this calculation:

For installed CIPP where restrained samples are taken and tested:

$$E_L(field) = E_S(per\,00410.71(d)) \times \frac{E_L(per\,00410.02(e))}{E_S(per\,00410.02(d))}$$

For installed CIPP where plate samples are taken and tested:

$$E_L(field) = 0.80 \times E_S(per\,00410.71(d)) \times \frac{E_L(per\,00410.02(e))}{E_S(per\,00410.02(d))}$$

Reduction in payment will based on calculated actual safety factor of installed CIPP using the governing thickness equation from ASTM F1216-Appendix X1 and inserting the actual installed and measured thickness per 00410.71(d) and calculated long-term flexural modulus, $E_L$(field).

***Payment = Length Installed x Contract Unit Price x (Actual Safety Factor/2.0)***

No additional payment shall be made for CIPP exceeding required safety factor of 2.0. Payment will be based on the Contract Unit Price. The City reserves the right to require the Contractor remove and replace the CIPP if the safety factor is below 1.0.

## SECTION 00415 - VEGETATED STORMWATER FACILITIES

Comply with Section 00445 of the Standard Specifications supplemented and/or modified as follows:

Add the following subsection:

**00415.82 Protect and Restore Existing Swale** – Contractor will protect the existing swale and plantings where identified on the plans. Areas disturbed by construction activities will be restored to its original condition in accordance to the reference drawings provided with the Plans. All materials, equipment, and labor will be measured on a lump sum basis to complete swale rehabilitation in its entirety.

**00415.90 General** - Add the following pay item:

| Pay Item | Unit of Measurement |
|---|---|
| (d) Protect and Restore Existing Swale | Lump Sum |

## SECTION 00442 - CONTROLLED LOW STRENGTH MATERIALS

Comply with Section 00442 of the Standard Specifications.

## SECTION 00445 - SANITARY, STORM AND CULVERT PIPE

Comply with Section 00445 of the Standard Specifications supplemented and/or modified as follows:

**00445.10 Materials –** Add the following:

Fiberglass Reinforced Polymer (FRP) Pipe ..... 02425
Manhole and Reinforced Concrete Pipe (RCP) HDPE Liner ..... 02451

Where alternative pipe materials are specified, such as HDPE-lined RCP or FRP pipe, only one of those alternative pipe materials may be used on the project. Pipe materials may not be mixed.

**00445.43(b) Concrete Pipe** – Add the following after subsection (5):

**(6) HDPE Liner –** Weld HDPE liner at all joints after completion of successful testing of joints. Welding shall be accomplished by electrofusion of recessed cap strips per the HDPE-liner manufacturer's installation instructions unless otherwise approved by the Owner's Representative. After completion of welding, test integrity of weld using a vacuum weld test machine that tests the entire circumference of the joint at a single time. All welding must be performed by welders who have successfully completed the training program provided by the HDPE liner manufacturer. Any extrusion welding required must use weld rod made of the same resins used for the manufacture of the liner. Comply with all applicable requirements.

Log all welding activities, including but not limited to, date and location, welding personnel, and Contractor approval.

**(7) Service Lateral Connections to the Mainline –** Connect service laterals to mainline sewer pipe by using Inserta-Tees that extend the entire thickness of the pipe wall. Holes for the Inserta-Tees must be drilled per the Inserta-Tee manufacturer's instructions.

**00445.43(k) Fiberglass Reinforced Pipe** – Add the following after the paragraph:

Contractor must provide evidence of installation in the United States, of at least 5,000 lineal ft. of the comparable size and stiffness of FRP piping and its in-service condition. Installation shall be per the Fiberglass Reinforced Pipe manufacturer's recommendations.

**(1) Service Lateral Connections to the Mainline –** Connect service laterals to mainline sewer pipe by using Inserta-Tees that extend the entire thickness of the pipe wall. Holes for the Inserta-Tees must be drilled per the Inserta-Tee manufacturer's instructions.

**00445.72(a) General** - In the sentence of the second paragraph, change the word "may" to the word "shall".

Add the following after the second paragraph:

For flexible pipe, perform mandrel testing no sooner than 30 days after the pipe has been installed and backfilled.

**00445.72(d)(1) General** - In the fourth sentence of the first paragraph, change 0.0625 to 0.1.

**00445.73 Deflection Testing** – Delete the fourth sentence and replace with the following:

For pipes less than 30", the diameter of the mandrel shall be 95% of the inside pipe diameter. For pipes with a nominal diameter of 30" and greater, the diameter shall be 96.5% of the inside pipe diameter. The mandrel shall be a device with cylindrical or elliptical sections mounted to a common shaft. The mandrel shall conform to the following:

- The proof-test mandrel shall be custom fabricated for the type, diameter, and deflection requirements of this project. A submittal shall be provided on the proof-test mandrel prior to its use.
- The proof-test mandrel shall be manufactured of aluminum or steel with a minimum of nine arms to pass through the pipe without substantial resistance. The proofing device shall be manufactured to a tolerance of +/- 0.01 inch to meet the project tolerances. The device shall be manufactured by Cherne Industries, Hurco Technologies, or approved equal.
- The mandrel shall have proofing arms mounted on a steel shaft with pulling eyes on each end. All components shall be sized for the anticipated loads associated with mandrel testing plus a factor of safety of at least 2. The mandrel shall be capable of being pulled in either direction. Non-metallic woven rope or water shall be used to pull the proof-test mandrel. Do not attempt to pull the mandrel through ductile iron fittings.

Pass the pull-through device through each run of pipe, either by pulling it through or flushing it through with water. If the device fails to pass freely through a pipe run, the pipe shall be repaired at the Contractor's expense. A repair plan shall be submitted and approved by the Owner's Representative prior to beginning repairs. Re-testing the pipe after the repair shall be at the Contractor's expense.

Laser profiling may be substituted for mandrel testing at no additional cost to the City.

**00445.74 Television Inspection of Sanitary and Storm Sewers** – Replace this subsection with the following:

Complete video inspection of all finished sewers no sooner than 30 days after installation and backfilling.

**00445.81(a) Pipes** – Replace the third paragraph with the following:

Disconnecting and reconnecting an existing service lateral will be measured on a unit basis and include all fittings, pipe, bedding, backfill and all materials required to complete the installation. Reconnection will be to the edge of the sewer main pipe trench unless existing service lateral is found to be structurally compromised.

Lateral service connections to large diameter sewers 30" and larger shall be accomplished with Inserta-Tee® or approved equal per Section 02491. Fittings shall be installed according to the manufacturer's instructions. Use core hole drilling bits as required by the compression fitting manufacturer.

Each service connection must pass a water tight test by isolating either the pipe section or testing the pipe segment from manhole to manhole. Unless otherwise specified or shown on the Drawings, lateral service connections to sewers smaller than 30" shall be accomplished through the use of manufactured tee fittings.

**00445.81(i) Concrete in Blocks** - Add the words "as shown" to the end of the sentence.

**00445.84 Television Inspection** - Delete this subsection..

**00445.91 Pipes and Appurtenances** - Replace this subsection with the following:

**00445.91 Pipes and Appurtenances** - The accepted quantities will be paid for at the Contract price per unit of measurement for each of the pay items listed in the Proposal. Payment will be payment in full for furnishing and placing all materials, equipment, labor, and Incidentals necessary to complete the work as specified.

**(a) Pipes** - Payment for pipes will be made at the Contract unit price per foot for the following item:

___ inch Pipe, _____, Bedding Type: _____

Payment for pipes will include bedding, pipe and pipe zone backfilling, compacting, joint materials, joining, fittings, field closures, connections to existing structures, pre-installation and post-installation television inspection, and testing.

Payment for trench excavation and backfill will be according to 00405.

**(b) Appurtenances** - The following items, when in the Schedule of Items, will be paid for at the Contract price for the unit of measure installed as specified:

| | Pay Item | Unit of Measurement |
|---|---|---|
| (a) | Inserta-Tee | Each |
| (b) | Concrete Closure Collars | Each |

Payment for item (a) the service connection will include flexible couplings to connect the existing lateral to the new lateral, coring into the sewer pipe, full pipe wall thickness depth Insert-Tees, and all materials, equipment and labor necessary to connect the existing lateral to the new lateral and to the new main sewer pipe.

**00445.94 Television Inspection** - Delete this subsection.

## SECTION 00446 – ELECTRONIC LOCATION AND VISUAL IDENTIFICATION OF SEWERS

Comply with Section 00470 of the Standard Specifications supplement and/or modified as follows:

**00446.10(a) Marker Balls** - At the end of the first sentence add the following words "for all work unless otherwise directed."

## SECTION 00470 - MANHOLES, CATCH BASINS, AND INLETS

Comply with Section 00470 of the Standard Specifications supplement and/or modified as follows:

**00470.01 Cast-In-Place and Precast Construction** - Add the following sentence:

Precast concrete inlets shall not be used in the roadway.

**00470.10 General** - Add the following sentence:

Manhole and Reinforced Concrete Pipe HDPE Liner..... 02451

**00470.11 Precast Concrete Manholes and Bases** – After the second paragraph, insert the following:

Manholes to receive HDPE liners, as shown on the Drawings, shall be precast with integrally cast HDPE liners per 00470.48 and 02451.

**00470.15 Pipe Stubouts** – After the first paragraph, add the following:

For pipe stubouts for connections to existing collector sewers 15-inches or smaller, use SDR 26 PVC per ASTM D3034 unless otherwise approved by the Owner's Representative.

Add the following subsection:

**00470.20 Manholes in Sidewalks & Cross Walks** - If manholes are placed in sidewalks or cross walks with a grade over 4% in any direction, the surface of the manhole lid shall be modified to produce a non-slip surface having a static coefficient of friction between 0.8 and 1.0 as determined by ASTM C 1028.

Add the following subsection:

**00470.48 Manholes with HDPE Liner**

(a) General - Manhole liner systems shall consist of HDPE liner material which is integrally cast into manhole components and welded together after installation of the manhole. The entire manhole interior shall be lined, including the underside of the flattop, walls, and base. All liner system assembly joint product components (i.e., barrels, bottoms, and pipe boots) shall be welded together to form a complete manhole liner.

The preformed structural liner shall be manufactured and installed to protect manhole surfaces from corrosion and further deterioration in the manhole. There shall be no exposed mortar or concrete inside the liner collar surface at the precast manhole flat top slabs and at any manhole section joints. Pour the manhole bench and flow channel over the top of the integrally cast liner.

Ensure that the preformed liner completely seals the manhole as required, and that no holes or cracks in the liner are left unsealed, which would allow gases or fluids to flow behind the preformed liner.

**(b) Handling and Storage** - Unload, handle, and store HDPE-lined materials in accordance with liner manufacturer's published recommendations.

It shall be Contractor's responsibility to inspect materials prior to instillation to insure no cracked, broken, or otherwise defective materials are used.

Do not drop or impact the preformed liner. Use of chains or cables in contact with the HDPE liner surface is prohibited.

**(c) Certified Precast/Installer -** The liner shall be installed by a precaster approved by the HDPE liner system manufacturer. The training outline for the certification program shall be submitted to the Owner's Representative for review. Provide evidence that the personnel performing the product installation for each project received the manufacturer's training for approval.

**(d) Manufacturer's Representative -** The Manufacturer's Representative is a representative authorized to act on behalf of the company regarding technical and commercial issues. The Manufacturer's Representative shall provide field inspections. The Manufacturer's Representative shall be present for precasting of the first three manholes and first 15% of pipe that will have integrally cast HDPE liner. The Manufacturer's Representative shall verify in writing that the proper procedures and equipment are used by the installer and that the liner is being installed per the manufacturer's recommendations.

If the Manufacturer's Representative does not approve the lining, the Contractor shall make allowances for the Manufacturer's Representative to remain on site until the proper procedures and equipment are being utilized and that the product meets the requirements of these provisions.

All welding must be performed by welders trained by the liner manufacturer with a minimum of 2 years of welding and installation experience with the exact product.

**(e) Required Submittals** - The following submittals shall be provided in accordance with Section 00150:

**(1) Shop Drawings -** Shop drawings and equipment data.

**(2) Product Data and Details -** Product data and details of preformed structural liner conforming to the specified requirements.

**(3) Material Certificates** - Provide material certificates for all manhole rehabilitation material and appurtenances in lieu of material laboratory test reports. Obtain from the

manufacturer or fabricator the appropriate certification, based on manufacturer's routine quality control tests, that the materials meet the standard ASTM specifications. Material Certificates shall be signed by the material manufacturer and the precaster, certifying that each material item complies with, or exceeds, the specified requirements. Material certifications shall be submitted to the Owner's Representative for review and approval, prior to delivery of the materials to the Site.

**(4) Details -** Details showing how debris sumps and all pipe penetrations shall be lined to assure water and airtight seals.

**(5) Manufacturer Information -** Manufacturer of welding equipment and the manufacturer recommended procedures and guidelines. Trial seams must be performed and approved by the Owner's Representative prior to welding the liner materials being installed.

**(6) Manufacturer Certification -** Manufacturer's letter of approval attesting that the precaster and welder has received the proper training, is qualified, and approved by the Manufacturer to install the products specified herein.

**(7) Written warranty** - Provide a two-year written manufacturer warranty from the lining manufacturer for the entire lining system, including all repair material, weld material, primers, and the liner composite.

**(8) Liner System Installation Plan** - A Lining System Installation Plan shall be prepared that includes a description of the following quality control procedures:

**a.** Duties of the Manufacturer's Representative

**b.** List of installation and testing equipment to be used, including inspections confirming satisfactory condition of equipment.

1) Details of installation of the liner.
2) Details on welding procedures.
3) Detailed environmental provisions.
4) Detailed scheduling provisions for environment considerations such as work at night.
5) Testing procedures.

**c.** Drawings showing design and construction details of all structural manhole liners, including details of welded joints and stubs or openings for the connection of influent inside drop sewers

**(9)** Manufacturer's specification containing instructions and quality control procedures meeting the following requirements.

**a.** Instructions must be written and published by the manufacturer for the purpose of giving complete instruction for the use and installation of the proposed liner for the conditions for which the liner is specified herein.

**b.** Instructions shall include at a minimum; surface preparation and special equipment.

**c.** Limitations, exceptions, precautions, and requirements that may adversely affect the performance of the lining shall be clearly and completely stated in the instructions. If the manufacturer's requirements differ from these Specifications, the instructions shall clearly state where deviations are required.

**d.** Submit report per ASTM D6392. In absence of report, field fabricate 10 samples and perform testing in accordance with ASTM D6392.

**(f) Manhole Liner Preparation -**

**(1) Liner Surface**: Interior surfaces of liner shall be completely free from pinholes, cracks, pits, or defects, which are detrimental to the intended use of the liner. No liner sections shall have holes or openings, which will permit the passage of liquid or gases through the liner wall to the mortar/ concrete. There shall be no exposed mortar/concrete through inside liner surface to include (but not limited to) riser section joints, adjustment liner section joints, pipe penetrations and cast iron frame. All mechanical anchor attachments through liner surfaces must be sealed with an elastomeric sealant as noted in this Section or as approved by the liner manufacturer.

**(2) Sheet Material -** The bulk material must be cut to the proper dimensions and wrapped around an inner form and secured using mechanical devices such as banding or wire. Bands should be located in the interstitial space between studs to prevent crushing or tilting of the embedment studs. Seams can be welded prior to placing metal reinforcement cage to prevent migration of concrete between overlapped longitudinal seams. The seams are to be either overlap welded or butt welded when overlap welding is not possible.

When butt welding, the joint should have a maximum gap of 0.2-inch. The weld should be made by applying an extrusion bead to the back of the butt joint or by some other method acceptable to prevent concrete from migrating between overlapped surfaces. After the forms have been stripped, a second extrusion weld bead is then applied over the butt joint on the smooth face of the liner.

In order to facilitate an overlap weld, it will be necessary to remove the studs on the underlying portion of the liner that is to be welded. Care should be taken not to damage the parent liner when removing the studs. The overlap should consist of approximately a four inch overlap fused together by an extrusion weld or some other acceptable method to prevent the concrete from migrating under the overlapped sheet. Once forms are removed the internal overlap should also be extrusion welded.

**(g) Top-Slab Installation -** The lined top slab shall have an OD corresponding to the OD of the manhole barrel sections.

Weld joints between manhole riser liner and integrally cast liner on the underside of the precast top slap.

**(h) Pipe Penetrations and Inside Drops** - All manhole wall penetrations shall have an internal HDPE boot for HDPE-lined RCP and an external HDPE boot for all other pipe materials. Weld all joints between the HDPE boot and the interior manhole wall liner per the manufacturer's recommendations.

External HDPE boots shall be a minimum of 6-inches long with a welded on flange. Internal HDPE boots shall be a minimum of 3-inches long with a welded on flange. Flange shall be 3-inches in width and welded onto the integrally cast liner on the manhole wall. External Boots shall be sized to fit over the existing pipe plus two strips of butyl mastic sealant or two 1/8-inch beads of HDPE adhesive. Two stainless steel (316SS) compression bands shall be used to ensure a watertight fit of the boot onto the carrier pipe.

Drop pipes shall be extended to the proper length to receive the inside drop piping using HDPE, PVC pipe, or stainless steel pipe, per the Drawings.

2-inch square by 1/2-inch thick butyl rubber washers shall be used between the stainless steel anchor bolt head/washer and the interior surface of manhole liner to prevent corrosion at the anchor bolt penetrations.

**(i) Testing**

**(1) Manhole Testing**: Successful vacuum testing of precast manholes must be performed prior to welding of the HDPE liner.

**(2) Visual Testing**: The Owner's Representative will perform visual inspection after completion of manhole installation.

**(3) Vacuum Box Testing** -Vacuum box test all lap welds, such as cap strips. The vacuum box equipment and test procedure shall conform to this specification and the liner manufacturer's specifications. Apply soapy water solution to the seam area to be tested. The vacuum box, equipped with a transparent viewing window, shall be centered over the seam area and a vacuum of 5 pounds per square inch shall be drawn. The seam area shall be visually monitored for any soap bubbles for 15 seconds. Seam testing shall continue by overlapping a minimum of 3 inches between each test interval. All defects shall be marked for repair.

The vacuum box testing will be performed by the approved welder or Manufacturer's Representative in the presence of the Owner's Representative.

**(4) Spark Test -** Spark test all welds and surfaces for holes. The spark tester used shall provide a minimum of 20,000 volts and a maximum of 35,000 volts. Any weld to be spark tested will require a copper wire to be laid in the weld area prior to the weld. If pinholes are found, repair the welds as recommended by the manufacturer and retest. All retesting and repair work shall be at the Contractor's expense.

The spark testing will be performed by the approved welder or Manufacturer's Representative in the presence of the Owner's Representative.

**(j) Bench and Flow Channel** - After successful installation of the installation and testing of the manhole and testing of the liner welds, cast-in-place the new manhole bench and flow channels, per the Special Provisions.

**(k) Quality Control** - The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Owner's Representative. At the time of inspection the material will be examined for compliance with the requirements of this specification.

Field fabricate three specimens for testing. Test samples using a tensiometer in shear and peel modes. Each specimen shall be 1-inch wide with the grip separation rate of 2 inches per minute. All peel tests shall result in film tear bond (FTB) value. The FTB is defined as a failure of one of the bonded sheets before compete separation in the bonded area.

**(l) Cleanup -** Upon completion of lining and manhole installation, remove surplus materials, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any overspray, splashes, splatters or other lining-related damage. Surfaces damaged resulting from this clean up shall also be cleaned, repaired, and refinished to the original or required condition.

**00470.73(b) Vacuum Testing** – Add to the end of this subsection the following:

Manhole of diameters greater than those listed shall conform to the minimum test times on Table 1 of ASTM C1244 for each particular manhole diameter and installation depth.

**00470.81 Manholes and Inside Drop Assembly over 8 Feet Deep** - Replace this subsection with the following:

**00470.81 Manholes over 8 Feet Deep** - Measurement for a manhole over 8 feet deep will be from 8 feet below the top of the manhole frame and cover to the manhole invert at the center of the manhole to the nearest 0.1 of a foot.

**00470.90 General** - Replace this subsection with the following:

**00470.90 General** - The accepted quantities will be paid for at the Contract unit price for one or more of the following items:

| | **Pay Item** | **Unit of Measurement** |
|---|---|---|
| (a) | Concrete Manholes, _____inch, 0-8 ft | Each |
| (b) | Concrete Manholes, _____inch, Deeper than 8 ft | Foot |
| (c) | Concrete Manholes, Lined, _____inch, 0-8 ft | Each |
| (d) | Concrete Manholes, Lined, _____inch, Deeper than 8 ft | Foot |
| (e) | Concrete Inlets, Type _____ | Each |
| (f) | Inside Drop Assembly, _____inch, 0-8 ft Depth | Each |
| (g) | Inside Drop Assembly, _____inch, Deeper than 8 ft | Each |

In items (a), (b), (c), and (d) the diameter of the manhole or assembly will be inserted in the blank, with a separate pay item provided for each size. Non-lined manholes shall have plastic steps. HDPE-lined manholes shall have no steps. Manholes with cast-in-place

bases and precast riser sections, as called out on the Drawings, will be paid for under appropriate Items (a) through (d).

In item (e), the type of structure will be inserted in the blank, with a separate pay item provided for each type.

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

There will be no separate payment for performing required acceptance testing. Materials and labor for connecting existing sewers to new manholes, protection and/or replacement of existing storm and sanitary pipes during manhole installation will be considered incidental to manhole costs.

Resurfacing work will be paid for according to Section 00495.

Manhole pipe stubouts and manhole connections to existing sewers will be considered incidental.

## SECTION 00480 - DRAINAGE CURBS

Comply with Section 00480 of the Standard Specifications.

## SECTION 00490 - WORK ON EXISTING SEWERS AND STRUCTURES

Comply with Section 00490 of the Standard Specifications supplemented and/or modified as follows:

**00490.10 General** – Add the following to the list of materials:

Polyurethane Coating.....02200

Add the following subsection:

**00490.40(b) Diversion of Flow** – Two Sewer Diversion Plans are required. These include flow diversion for the local flows expected in the existing Burlingame Trunk (Local Bypass) and flows from Fanno Pump Station (Fanno Bypass).

Reference the following information to assist with preparing a Sewer Diversion Plan. The Contractor is solely responsible for the bypass system design. Burlingame Trunk flows listed below include one pump set in operation from the Fanno Basin Pump Station between ACX648 and ACX870.

| Upsream MH | Downstream MH | Average Dry Weather Flow (gpm) | Peak Dry Weather Flow (gpm) | Annual Average Maximum Flow (gpm) |
|---|---|---|---|---|
| AMP342 | ACX219 | 300 | 400 | 1800 |
| ACX219 | ACX224 | 300 | 400 | 1800 |
| ACX224 | ACX228 | 300 | 400 | 1800 |
| ACX228 | ACX380 | 400 | 500 | 2000 |
| ACX380 | ACX271 | 400 | 500 | 2000 |
| ACX271 | ACX278 | 400 | 600 | 2100 |
| ACX278 | ACX282 | 500 | 600 | 2100 |
| ACX282 | ACX638 | 500 | 700 | 2400 |
| ACX638 | ACX641 | 500 | 700 | 2400 |
| ACX641 | ACX648 | 500 | 800 | 2600 |
| ACX648 | ACX650 | 1900 | 6200 | 8000 |
| ACX650 | ACX651 | 1900 | 6200 | 8000 |
| ACX651 | ACX652 | 1900 | 6200 | 8000 |
| ACX652 | ACX722 | 2000 | 6200 | 8000 |
| ACX722 | ACX687 | 2000 | 6200 | 8000 |
| ACX687 | ACX686 | 2000 | 6200 | 8000 |
| ACX686 | ACX744 | 2000 | 6200 | 8000 |
| ACX744 | ACX682 | 2000 | 6200 | 8000 |
| ACX682 | ACX673 | 2000 | 6200 | 8000 |
| ACX673 | ACX675 | 2000 | 6300 | 8100 |
| ACX675 | ACX676 | 2300 | 6900 | 9100 |
| ACX676 | ACX677 | 2300 | 6900 | 9100 |
| ACX677 | ACX870 | 2400 | 6900 | 9200 |
| ACX633 | ACX641 | 60 | 100 | 300 |
| ACX642 | ACX641 | 10 | 10 | 20 |
| ACX692 | ACX641 | 10 | 10 | 20 |
| ACX694 | ACX651 | 10 | 10 | 20 |
| ACX685 | ACX686 | 10 | 10 | 20 |
| ACX672 | ACX673 | 50 | 100 | 200 |
| ACX665 | ACX674 | 10 | 10 | 20 |
| ACX707 | ACX674 | 400 | 600 | 1000 |
| ACX674 | ACX675 | 400 | 600 | 1000 |
| ACX879 | ACX677 | 30 | 40 | 200 |

The Fanno Bypass will require a bypass system that shall be maintained after work has been completed between Manhole 11 and ACX870. The plans provide a conceptual layout showing the Fanno Bypass from the discharge structure at SW 31st and SW Multnomah down to new proposed Manhole 11 at SW 22nd Ave. The flows will vary depending on the number of pumps running. The operating pressures are expected to be 40 psi with surge pressures at approximately 80 psi. The City may operate up to three pump sets at the Fanno Basin Pump Station. The maximum capacity of the pump station is 10,800 gpm.

**00490.40(b)(1) Diversion of Flow** – Replace the last sentence with the following:

The plan shall contain, at a minimum, the following information:

a. A plan view of the diversion facilities on a site map

b. Pump types, sizes, capacities, and placement, for both primary and standby pumps.

c. Diversion pipe size, type, and placement above and below ground.

d. Design calculations proving the adequacy of the system and selected equipment.

e. Power supplies, including standby power source.

f. Method of damming the flow.

g. Staffing plan including name and telephone number of the attendants.

h. Odor control plan.

i. Noise control plan.

j. Traffic control plan for bypass piping.

**00490.40(b)(3) Diversion of Flow** – After the subsection (d), add the following:

e. All pumps, generators and other equipment shall be placed on a new plastic tarp to protect against spills of petroleum products used by the equipment.

f. At each project site the Contractor shall have the entire bypassing system in place and tested before bypassing any sewage.

g. The bypass pumping system shall be designed to normally maintain the wastewater flow below the top of the existing pipe(s) at the point of suction.

**00490.40(b)(4) Diversion of Flow** – Replace last sentence with the following:

Pump the flow in an enclosed hose or pipe that is adequately protected from traffic, and redirect the flow into a sanitary gravity pipe system for sewage flow and into a storm gravity pipe for storm drainage flow. Bypass piping, fittings, and all accessories shall withstand twice the maximum pressure of the bypass pumping system or 50 psi, whichever is greater. Test the bypass pumping system prior to being placed in service to ensure there are no leaks and that the test pressure can be held. Any discovered leaks must be addressed and the entire bypass pumping system must be retested. The Contractor shall use a maximum velocity no higher than ten (10) feet/second at any bypass flow rate.

Dumping, spilling, backup, or free flow of sewage on private property, gutters, streets, sidewalks, or into storm gravity pipes is not allowed. The Contractor is liable for all cleanup, damages, and resultant fines in the event of a spill. After the work is completed, return flow to the gravity pipe and remove all temporary equipment.

The Contractor shall include in their traffic control plan bypass equipment and piping. The traffic control plan shall show how vehicles and pedestrians will be protected from injury resulting from bypass operations.

Contractor will be required to keep all driveway access to adjoining properties accessible to the public and fire and emergency vehicles. Designs for maintaining access will be prepared by the Contractor and submitted to the Owner's Representative for approval.

**00490.40(b)(5) Diversion of Flow** – After the last sentence add the following:

Pump out or otherwise positively drain all locations, a minimum of once every 24-hours, where the gravity pipe service is disconnected from the main gravity pipe for more than one day. Use more frequent pumping in locations where flows exceed the capacity of temporary storage provided.

Bypass or contain all gravity pipe service lateral connections from the time of disconnection to the time of reconnection by means of mechanical pumps and manifold system or by a bladder tank system, capable of holding adequate sewage from each gravity pipe service connection for a period of 24-hours. Empty or pump each bladder each 24-hour period and properly dispose.

Make temporary tie-ins and remove the bypass plugs between the relined section and the existing system at the end of each working day.

**00490.40(b)(6) Diversion of Flow** – Replace the second sentence with the following:

Provide a standby bypass pump connected to the bypass pumping system. Provide bypass pumping consisting of furnishing, installing, and maintaining all power, primary and standby pumps, appurtenances, and bypass piping required to maintain peak project flows and services. A standby power source must be available at all times. Notify the Owner's Representative 24-hours prior to commencing the bypass pumping operation.

Have personnel on site to monitor pumped flow diversion system continuously during working hours. During non-working hours, the system must be fitted with an auto-dialer notifying the Contractor of alarm levels. Contractor must be on site within 15 minutes of receiving an auto-dialer call.

**00490.40(b)(7) Diversion of Flow** – Replace the second and third sentences with the following:

Comply with City noise control ordinance and any noise variance requirements, if applicable. If an additional noise variance is required, secure the noise variance at no additional expense to the City.

Add the following subsection:

**00490.40(b)(12) Diversion of Flow** – Pipes outside of the discharge structure that carry the Fanno flows shall be 24-inch DR17 (minimum) HPDE pipe with butt-fused joints in accordance with Section 02410. Bypass pipes inside the discharge structure shall be steel.

The Contractor shall be solely responsible for the proper design and selection of the Fanno Bypass, including but not limited to, ability to withstand dead and live loads, operating and surge pressures and all other stresses related to the transport, air vacuum release and restraint design, materials and assembly, installation, and operation of the Fanno Bypass.

The Contractor shall submit an air vacuum release and restraint design that has been approved and stamped by a licensed Oregon Engineer as part of the Flow Diversion Plan. A trench section detail depicting bedding and backfill requirements and offsets to other utilities shall also be submitted as part of the Flow Diversion Plan. Contractor is responsible for verifying location of existing utilities, selecting proper alignment and materials, and obtaining all necessary approvals for the Diversion of Flow, including obtaining all necessary permits (e.g., Street Opening permit). A copy of the street opening permit shall be submitted prior to approval of the Flow Diversion Plan.

The alignment of the bypass pipes shall meet requirements listed in Division 52 of the Oregon Administration Rules (see Attachment D). Deviations from these requirements will require approval from the City of Portland, the Portland Water Bureau, and DEQ.

Upon completion of work, remove and dispose of bypass pipe in the discharge structure at SW 31st and SW Multnomah, in MH-11, and any above-ground piping. Buried sections of HDPE pipe may be abandoned in place

**00490.44 Filling Abandoned Pipes, Manholes and Catch Basins**- Replace this subsection with the following:

**00490.44 Filling Abandoned Pipes, Manholes, and Catch Basins**

**(a) General** - For structures to abandoned in the improved areas, fill all existing manholes and structures shown to be abandoned with bedding sand, graded for street use and meeting the requirements of Section 02620.10.

For manhole ACX-676 to be abandoned in Interstate-5, install approved CIPP restraint system and install CIPP. After successful completion of CIPP installation, fill ACX-676 with street use bedding sand meeting the requirements of Section 02620.10 up to 2-feet below grade. Cover in-place the top of the bedding sand with two mats of non-woven filter fabric and fill the remaining 2 vertical feet up to the existing frame with CLSM in a single lift.

For manhole ACX-674 to be abandoned in Interstate-5, plug all abandoned pipes with permanent plugs. Fill ACX-674 with street use bedding sand meeting the requirements of Section 02620.10 up to 2-feet below grade. Cover in-place the top of the bedding sand with two mats of non-woven filter fabric and fill the remaining 2 vertical feet up to the existing frame with CLSM in a single lift.

Frames for manholes located in the I-5 freeway will be left in place. After completion and acceptance of the work, reinstall existing covers and completely weld circumferentially the covers to the existing frame. Tack welding will not be sufficient.

For all other manholes or structures to be abandoned in the unimproved roadway or landscaped areas, remove structures to a minimum of 3 feet below subgrade and fill remaining structure with pea gravel or granular material meeting the requirements of Section 02630.

Cover and fill or plug all abandoned pipes with permanent plugs. Cover in-place pea gravel with two mats of non-woven filter fabric, extended at least one foot beyond the outside walls of manhole, sump, or basin. The landscaped or unimproved roadway sections shall be backfilled with approved materials meeting the requirements of 00330.13. The last one foot of backfill shall use materials as shown.

**(c) Permanent Plugs** - Provide permanent plugs where sumps, manholes, inlets, pipes and other sewer appurtenances are removed or abandoned. Also provide plugs where shown. The minimum length of concrete plug shall be 8 inches. All plugs shall be watertight and capable of withstanding all internal and external pressures without leakage. Clean the interior surfaces of all pipes to be cutoff or abandoned, as approved. For pipes greater than 12 inches in diameter, fill with CLSM or as specified. Construct a concrete plug in each end of all pipes 18 inches or less in diameter. For 21-inch and larger pipe, the plug may be constructed of common brick or concrete block. Cover the exposed face of block or brick plug with mortar.

Add the following subsections:

**00490.60 Polyurethane Manhole Coating** – Add the following section:

**(a) Scope** – This work consist of installation of a high-build, solvent-free polyurethane coating, to make manholes structurally sound, corrosive resistant, and to prevent infiltration and exfiltration. Contractor shall provide all labor, materials, equipment, power, water, and incidentals as necessary.

The extent of Work is shown on the Drawings. Field verify interceptor, manholes, collection sewers, and all other utility locations prior to any work.

**(b) Manufacturer's Product Support** - Provide a representative employed by the manufacturer having technical training in admixture and manhole wall liner design and construction available for consultation on site during the repair work.

**(c) Design Calculations** – Submit design calculations for coating thickness. Calculations shall demonstrate product is capable of withstanding hydrostatic pressure as a stand-alone monolithic liner. Groundwater level for manholes shall be as specified in 00410.

**(c) Qualifications**:

- Contractor and coating foreman shall be licensed and certified by the manufacturer of the manhole coating system process proposed for use in performing the Work. Contractor shall have completed monolithic lining of at least 30 sanitary sewer manholes using the system proposed for use in performing the Work.
- All manhole coating work shall be supervised by a foreman responsible for rehabilitating a minimum of 10 sanitary sewer manholes using the proposed manufacturer's manhole coating system.
- All manhole coating work shall be performed by an installer having applied the proposed coating system to a minimum of 10 sanitary sewer manholes.

**(d) Guarantee -** All manhole repairs or rehabilitation shall be guaranteed by the CONTRACTOR against corrosion, infiltration, spalling, loss of adhesion or failure for a period of 2 years from the date of Substantial Completion. During this period, repair all defects in a manner satisfactory to the Owner's Representative at no additional compensation.

**(e) Quality Assurance -** Contractor shall initiate and enforce quality control procedures consistent with applicable ASTM, National Association of Corrosion Engineers (NACE) and Society of Protective Coatings (SSPC) standards and the protective coating manufacturer's recommendations.

**(f) Delivery, Storage, and Handling**:

- Materials are to be kept dry, protected from weather, and stored under cover.
- Protective coating materials are to be stored between 60 deg F and 90 deg F. Do not store near flame, heat, or strong oxidants.
- Protective coating materials are to be handled according to their material safety data sheets.

**(g) Construction -**

**(1) General -** Remove from the Site any uncured compound determined to be more than six months old. Do not use uncured compound or grout if container has been open for more than 24 hours.

Mix and handle the compounds and grouts, including their component parts in accordance with manufacturer's recommendations and to minimize hazard to personnel. Provide appropriate protective measures to ensure that the components and the chemicals produced in mixing are under the control of the Contractor at all times and are not available to unauthorized personnel or others. Dispose of excess material resulting from rehabilitation operations in a safe manner. All equipment and material shall be subject to the review of the Owner's Representative.

New Portland cement concrete shall have cured a minimum of 30 days prior to application.

Prior to commencing surface preparation, Contractor shall inspect all surfaces specified to receive the coating and notify the Owner's Representative, in writing, of any noticeable disparity in the site, structure or surfaces which may interfere with the work, use of materials or procedures as specified herein.

**(2) Manhole Cleaning / Preparation -** Inset plywood mats or sheeting over the existing flow channel and bench to prevent debris from falling into the sewer and to collect debris from manhole bench.

Concrete and/or mortar damaged by corrosion, chemical attack or other means of degradation shall be removed so that only sound substrate remains. Areas where rebar has been exposed and is corroded shall be first abrasive blasted and prepared in accordance with the manufacturer's recommendations. The exposed rebar shall then be abrasive blasted and coated with coating product compatible with coating system.

Clean bench/invert floor and interior walls of manholes by removing deleterious material, oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, dirt, grease, and other debris which may affect the performance and adhesion of the coating to the substrate. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease, or other hydrocarbon residues from the concrete. Cleaning must be performed in accordance with the requirements of the coating system manufacturer.

Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with adequate profile and porosity to provide a strong bond between the protective coating and the substrate. Surface preparation method, or combination of methods, may include high pressure water cleaning, high pressure water jetting, abrasive blasting, shotblasting, grinding, scarifying, detergent water cleaning, hot water blasting, and others as described in NACE No. 6/SSPC SP-13. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface suitable for the specified coating product(s) and in accordance with the requirements of the coating system material manufacturer. Remove loose and protruding brick, mortar, and concrete using a mason's hammer and chisel and/or scraper.

Repair products shall be used to fill voids, bungholes, and/or smooth transitions so the profile of the prepared concrete surface does not exceed ¼-inch in depth. Resurfacing products shall be used to fill large voids, lost mortar in masonry structures, smooth deteriorated surfaces and rebuild severely deteriorated structures so the profile of the prepared concrete surface does not exceed ¼-inch in depth and the coating product(s) can be applied. Repair or resurfacing products, as specified in 02200, shall be used to fill voids, bungholes, and other surface defects which may affect the performance or adhesion of the coating product(s). These products shall be installed to minimum thickness of 150 mils. Repair and resurfacing products shall be handled, mixed, installed, and cured in accordance with manufacturer guidelines.

The area between the manhole and the manhole ring and any other area that might exhibit movement or cracking due to expansion and contraction shall be grouted with a flexible grout or gel.

Manholes to receive polyurethane coating system shall be free of infiltration. If infiltration is present, seal the manholes per manufacturer's recommendations. Method(s) used to eliminate infiltration shall be approved by the Owner's Representative. All materials used to stop infiltration shall be compatible with the repair products and suitable for topcoating with the polyurethane coating product(s).

Steps shall be removed and do not need to be replaced.

All surfaces should be inspected for cleanliness, remaining laitance, and suitability to receive the coating product(s) during and after preparation and before the protective coating is applied. Any evidence of remaining contamination or laitance shall be removed by additional abrasive blast, shotblast or other approved method.

**(3) Application of Coating** - All products shall be applied in accordance with manufacturer recommendations, including environmental controls, product handling, mixing, application equipment, and methods.

Specified surfaces shall be coated by spray application of a solvent-free, 100% solids, polyurethane structural lining as specified in Section 02220, or approved equal.

Spray equipment shall be specifically designed to accurately ratio and apply the coating product(s) and shall be in proper working order.

Temperature of the surface to be coated should be maintained between 50 and 120 deg F.

Surfaces to receive coatings shall be shielded to avoid exposure of direct sunlight or other intense heat source. Where varying surface temperatures do exist, coating installation should be scheduled when the temperature is falling versus rising.

The protective coating material must be spray applied by a Certified Applicator of the protective coating manufacturer.

Airless spray application equipment approved by the coating manufacturer shall be used to apply each coat of the protective coating.

The coating shall be installed to the thickness necessary to qualify as a monolithic (void free) liner. The roughness of the substrate will dictate the thickness needed to create the monolithic liner and eliminate any opportunity for voids in the lining. Prepared surfaces shall be coated by spray application of the coating product(s) described herein to the required thickness. Coating shall be applied in no greater than 400 mils per coat. A finished minimum wet film thickness shall be in accordance with the design submitted and approved in 00490.60.(c) but no less than 250 mils at the highest point near the manhole frame. Monolithic liner shall be designed to withstand hydrostatic pressure at all locations. Subsequent topcoating or additional coats of the coating product(s) shall occur within the product's recoat window. Additional surface preparation procedures will be required if this recoat window is exceeded.

Coating product(s) shall interface with adjoining construction materials throughout the manhole structure to effectively seal and protect concrete or masonry substrates from infiltration and attack by corrosive elements. Procedures and materials necessary to effect this interface shall be as recommended by the coating product(s) manufacturer.

Coating product(s) shall be applied at all exposed concrete surface, including the invert (unless the invert has been lined through), bench, and all pipe penetrations.

**(4) Testing and Inspection** - During application a wet film thickness gauge, meeting ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used. Measurements shall be taken, documented, and attested to by the Contractor for submission to the Owner's Representative.

Groundwater infiltration shall be zero.

All pipe connections shall be open and clear.

No cracks, voids, pinholes, uncured spots, dry spots, lifts, delamination, or other type of defect shall be visible.

**(5) High Voltage Spark Test.** After the protective coating has set hard to the touch it shall be inspected with high-voltage holiday detection equipment. Surface shall first be dried, an induced holiday shall then be made on to the coated concrete surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that

particular area. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of film thickness applied but may be adjusted as necessary to detect the induced holiday (refer to NACE RPO188-99). All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional protective coating material can be hand applied to the repair area. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.

**(6) Adhesion Testing.** Adhesion tests shall be performed on a minimum of one or 15% of all rehabilitated structures, which ever is greater, or as shown on the Drawings and/or specified in the Special Provisions. Adhesion testing shall be conducted after the liner system has cured per manufacturer instruction and in accordance with ASTM D4541 as modified herein. A minimum of one 20 mm dolly shall be affixed to the lined surface of the structure at the upper section or cone area, mid section and at the bottom, unless otherwise specified in the Special Provisions. Each testing location shall be identified by the Owner's Representative. The adhesive used to attach the dollies to the liner shall be rapid setting with tensile strength in excess of the liner material and permitted to cure in accordance with manufacturer recommendations. The lining material and dollies shall be adequately prepared to receive the adhesive. Prior to pull test, the Contractor shall utilize a scoring device to cut through the coating until the substrate is reached. Extreme care shall be required while scoring to prevent micro cracking in the coating, since cracks may cause failures at diminished strengths. Failure due to improper dolly adhesive or scoring shall require retesting. The pull tests in each area shall meet or exceed 200 psi. and shall include subbase adhered to the back of the dolly or no visual signs of coating material in the test hole. Pull tests with results between a minimum 150 psi and 200 psi shall be acceptable if more than 50% of the subsurface is adhered to the back of the dolly. A test result can be discarded, as determined by the Owner's Representative, if there is a valid nonstatistical reason for discarding the test results as directed by Sections 8.4 and 8.5 of ASTM D4541. If any test fails, a minimum of three additional locations in the section of the failure shall be tested, as directed by the Owner's Representative. If any of the retests fail all loosely adhered or unadhered liner in the failed area, as determined by the Owner's Representative, shall be removed and replaced at the Contractor's expense. If a structure fails the adhesion test, one additional structure or 10% of the initial number of structures selected for testing shall be tested at the discretion of the Owner's Representative and/or as specified in the Special Provisions.

Adhesion testing will not performed in ACX675 unless tests results show failures in 25% of the coated manholes.

**(7) Visual Inspection -** A final visual inspection shall be made by the Inspector and manufacturer's representative. Any deficiencies in the finished coating shall be marked and repaired according to the procedures set forth herein by the Contractor.

**00490.80 Unit Basis** – In the first sentence after the phrase, "other similar structures" insert the phrase, "rehabilitate manhole with polyurethane coating and removal of existing manhole step".

Add the following subsection:

**00490.83 Volume Basis** - Measurement will include only the volume within the neat lines of the abandoned structure as shown or as revised.

**00490.90 Unit Basis** - Replace the entire Section with the following:

**00490.90 Unit Basis** - The accepted quantities of work on existing sewers and structures will be paid for at the Contract price per unit of measurement for the following items:

| | Pay Item | Unit of Measurement |
|---|---|---|
| (a) | Rehabilitate Manhole with Polyurethane Coating | Vertical Foot |
| (b) | Filling Abandoned Structures | Each |
| (c) | Filling Abandoned Pipes, ___-inch | Linear Foot |
| (d) | Permanent Plugs | Each |
| (e) | Reconstruct Manhole Base | Each |
| (f) | Discharge Structure | Lump Sum |
| (g) | Local Flow Diversion | Lump Sum |
| (h) | Fanno Flow Diversion | Lump Sum |

Item (a) is for manhole rehabilitation with the use of polyurethane coating. It includes all the materials and equipment necessary to remove existing rungs, clean and prepare the manhole, apply the coating, and conduct testing and inspection. Measurement will be from the bottom of the manhole frame to the manhole invert at the center of the manhole to the nearest foot.

Item (b) applies to plugging abandoned pipes 12 inches in diameter or less, filling abandoned manholes, sumps, inlets, boxes, and other similar structures, and includes all material and labor required to complete the work as specified.

Item (c) applies to filling abandoned pipes with CLSM or as specified, and includes all material and labor required to complete the work as specified.

Item (d) applies to plugs larger than 12 inches.

Item (f) applies to but is not limited to concrete work that includes fill and reinforcement, coating, re-installation of the 18-inch slide gate and 18-inch steel pipe as shown on the plans, 18-inch and 36-inch outlet connections and incidentals required to complete the work as shown on the plans. Item (f) also includes restoration and grading around the structure, including the installation of gravel surfacing.

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

**00490.91 Lump Sum Basis** – Replace the entire section with the following:

**00490.91 Diversion of Flow** – Both flow diversion items that include items (g) and (h) will be made at the Contract lump sum amount. Payment will be in full for furnishing all material, equipment, labor and incidentals necessary to complete the work as specified.

Item (h) includes, but is not limited to, the connection to the existing 30-inch force main inside the existing discharge structure, removal of the existing 18-inch pipe and slide gate, the steel pipe and fittings in the discharge structure, installation of the bypass piping thru the 24-inch opening, the connection between the 22-inch steel pipe and 24-inch HDPE pipe, all the HDPE piping from the discharge structure to it's end at MH-10, coring of MH-10 and tie straps in the manhole, excavation, shoring, and utility protection necessary to bury portions of the HDPE pipe, air vacuum valve materials and installation, pipe restraint materials and

installation, surface restoration, testing of the bypass piping system, and all incidentals required to complete the temporary bypass pipe installation according to the approved flow diversion plan for the Fanno flows. Work shall also include maintenance of the bypass system, removal and disposal of the required portions of the bypass piping, abandonment of the required portions of the bypass piping, and final surface restoration related to the maintenance, abandonment and removal of the bypass system.

## SECTION 00495 - TRENCH RESURFACING

Comply with Section 00495 of the Standard Specifications supplemented and/or modified as follows:

Add the letter "M" in front of all references to "HMAC" throughout the Section.

**00495.00 Scope** – Add "and excavated areas in front of curb replacement" after the words "consists of resurfacing pipe trenches".

**00495.40 General** – Add the following:

Construct the MHMAC pavement section in front of the curb replacement as shown.

**00495.40(a) Hot Mixed Asphalt Concrete (HMAC) Paving** – Revise section reference to read "Section 00747".

**00495.40(m) Minor Hot Mixed Asphalt Concrete (MHMAC) Paving** – Place MHMAC paving according to section 00744

Add the following sections:

**00495.42 Permanent Resurfacing** – Resurface all trenches and excavations as shown in the following table:

| Street | Resurfacing Material | Thickness (in) |
|---|---|---|
| SW Multnomah Blvd: SW 31st to SW Barbur Blvd. overpass | Level 3, ¾ inch dense HMAC | 8 |
| SW Multnomah Blvd: SW 17th to SW 14th | Level 3, ¾ inch dense MHMAC | 4 |

Replace all damaged driveways in kind. For concrete driveways, replace to the nearest cold joint. For asphaltic concrete driveways, replace as required.

**00495.43 Pavement Moratorium** – The following streets are within limits of a pavement moratorium:

- SW Multnomah Blvd: SW 31st to SW Barbur Blvd. overpass

Where the project is identified to be within limits of a pavement moratorium, refer to Attachment E for requirements.

**00495.80 Area Basis** – Add the following section:

**00495.81 Linear Foot Basis** – Measurement for trench resurfacing will be on the linear foot basis measured horizontally along the centerline of the installed pipe and shall include all damaged pavement and/or moratorium limits as listed in Section 00495.43.

**00495.90 General** – Add the following pay item:

| | Pay Item | Unit of Measurement |
|---|---|---|
| (c) | Trench Resurfacing w/o Base | Linear Foot |
| (d) | Owner Directed Pavement | Square Yard |

Item (c) includes cost for replacement of resurfacing material for all damaged pavement inclusive of all moratorium requirements listed in Section 00495.43. Pavement thickness and materials are listed in 00495.42. Payment for any aggregate base will be paid for according to Section 00640.

Replacement of damaged driveways and extra pavement at SW 31st Avenue shall be considered incidental to the Work.

Item (d) includes cost for additional pavement resurfacing material for additional pavement work as directed by the Owners Representative. Payment for any aggregate base will be paid for according to Section 00640.

# PART 00600 - BASES

## SECTION 00620 – COLD PLANE PAVEMENT REMOVAL

Comply with Section 00620 of the Standard Specifications.

## SECTION 00640 - AGGREGATE BASE AND SHOULDERS

Comply with Section 00640 of the Standard Specifications supplemented and/or modified as follows:

Add the following subsection:

**00640.81 Volume Basis** - Aggregate base for trench resurfacing will be measured on the volume basis, computed using the following dimensions:

- **Length** - The length will be the horizontal distance along the length of the centerline of installed pipe.
- **Width** - According to 00405.80(b).
- **Depth** - As shown.

**00640.90 General** – Change the unit of measurement to Cubic Yards for items (a) through (d).

# PART 00700 – WEARING SURFACES

## SECTION 00744 – MINOR HOT MIXED ASPHALT CONCRETE (MHMAC) PAVEMENT

Comply with Section 00744 of the Standard Specifications supplemented and/or modified as follows:

Add the letter "M" in front of all references to "HMAC" throughout the Section.

**00744.00 Scope** – Add the word "minor" after the word "constructing" in the first sentence.

**00744.01 Abbreviations:**

**SDC** - Surface Damp Condition

**00744.02 Definitions:** Add the word "**Minor**" to the definition that begins with **Hot Mixed Asphalt** ...

**Surface Damp Condition (SDC)** - When the outside of the aggregates are damp with moisture, but little or no free water present.

**00744.10 Aggregate** – Delete the word "and" and add the phrase "and RAP" after the word "fine" in the first sentence.

Add the following subsection:

**00744.10(d) Fractured Faces** - Provide crushed aggregate with not less than the minimum number of fractured faces as determined by AASHTO TP 61 as follows:

| Percent of Fracture (by weight) | | |
|---|---|---|
| | Material retained on 1 1/2," 1", 3/4", 1/2" and No. 4 Sieve | Material Retained on No. 8 Sieve |
| Type of Mix | (two fractured faces) | (one fractured face) |
| | | |
| All Dense Graded MHMAC, ATPB | 75 | 75 |
| | | |
| All Open Graded MHMAC | 90 | 75 |

**(e) Coarse Aggregate** – Produce coarse aggregate from crushed rock or other inert material of similar characteristics.

**(f) Fine Aggregate** – Produce fine aggregate from crushed rock or other inert material of similar characteristics.

Blend sand is allowed for Levels 1, 2 and 3 mixes. Do not blend more than 10% by weight of natural or uncrushed blend sand into the total fine aggregate unless approved. Provide a means of verifying and documenting the amount of blend sand added to the aggregate.

**(g) RAP Aggregate** – Use RAP aggregates in MHMAC, according to 00744.03, which are no larger than the specified maximum allowable aggregate size before entering the cold feed. Blend the RAP material with new aggregate to provide a mixture conforming to the JMF within the tolerances specified.

**00744.11(a) Asphalt Cement** - Replace the first sentence of the first paragraph with the following:

Use PG 70-22 asphalt on this Project.

**00744.12(b) Broadband Limits** – Replace this subsection with the following:

**00744.12(b) Broadband Limits** - Provide a JMF for the specified mix type within the control points listed below:

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

| Open Graded Mixes | | | | | | |
|---|---|---|---|---|---|---|
| | 3/4" Open | | 1/2 " Open | | 3/8" Open | |
| | Control Points (% passing by Weight) | | Control Points (% passing by Weight) | | Control Points (% passing by Weight) | |
| Sieve Size | Min. | Max. | Min. | Max. | Min. | Max. |
| 1" | 99 | 100 | | | 99 | 100 |
| 3/4" | 85 | 96 | 99 | 100 | 85 | 95 |
| 1/2" | 55 | 71 | 90 | 98 | 35 | 68 |
| 3/8" | --- | --- | --- | --- | --- | --- |
| No. 4 | 10 | 24 | 18 | 32 | 2 | 10 |
| No. 8 | 6 | 16 | 3 | 15 | 0 | 5 |
| No. 200 | 1.0 | 6.0 | 1.0 | 5.0 | 0.0 | 2.0 |
| Asphalt Cement | * | * | * | * | 2.5 | 3.5 |

*per JMF

**00744.13 Job Mix Formula (JMF) Requirements**– Replace this subsection with the following:

**00744.13 JMF Requirements** – Provide a JMF for the mixture to be used on the project meeting the criteria set forth below. The JMF shall have been performed or verified according to the ODOT Contractor Mix Design Guidelines for Asphalt Concrete within 3 years of the date the Contract was advertised. Perform a new TSR when the source of the asphalt cement changes.

**(a) Contractor Provided JMF –** The Certified Mix Design Technician (CMDT) shall prepare, sign, and submit a JMF to the Owner's Representative for each mixture required at least 10 days prior to the anticipated use in MHMAC, and according to the latest copy of the ODOT Contractor Mix Design Guidelines for Asphalt Concrete. If requested, submit material samples 10 calendar days prior to use.

**(b) JMF Requirements -** The JMF shall meet the following mixture requirements

| Dense Graded Mixture | | | |
|---|---|---|---|
| | **Level 1** | **Level 2** | **Level 3** |
| Design Method | Superpave | Superpave | Superpave |
| Compaction Level | 65 Gyrations | 65 Gyrations | 80 Gyrations |
| Air Voids, % | 3.5 | 4.0 | 4.0 |
| VMA, % minimum<br><br><br><br>VMA, % maximum | 1/2" - 14.0<br>3/8" - 15.0<br><br>min + 2.0% | 3/4" - 13.0<br>1/2" - 14.0<br>3/8" - 15.0<br>min + 2.0% | 3/4" - 13.0<br>1/2" - 14.0<br>3/8" - 15.0<br>min + 2.0% |
| P No. 200/ Eff AC ratio | 0.8 to 1.6 | 0.8 to 1.6 | 0.8 to 1.6 |
| TSR, % minimum | 80 | 80 | 80 |
| VFA, % | 70 – 80 | 65 - 78 | 65 - 75 |
| | 3/8 inch: 70 – 80 | 3/8 inch: 70 - 80 | 3/8 inch: 70 - 80 |

| Open Graded Mixture | | |
|---|---|---|
| | **3/4" Open and 1/2" Open** | **3/4" ATPB** |
| Design Method | ODOT | ODOT |
| Air Voids, % | 13.5 – 16.0** | --- |
| Draindown, % | 70 – 80 | --- |
| TSR*, % minimum | 80 | --- |
| Coating, %, minimum | --- | 90 |
| VFA, % | 40 – 50 | --- |

* Run the TSR for open graded mixtures on a surrogate dense graded mixture. If a dens grades JMF has been prepared for the same material sources in the last year, the results for the most recent TSR may be applied to the open graded mixture. If not, prepare the TSR test samples for a dense graded mix using the equivalent top size stone and materials from the same sources, which will be represent the open graded mixtures.

** 17% ±1% for Pervious Pavement.

**(c) Performance Test** - For dense graded level 3 wearing course mixes, the mix design submittal shall include the results of performance testing as outlined in the latest ODOT Contractor Mix Design Guidelines for Asphalt Concrete.

**00744.40 Season and Temperature Limitations** – Replace this subsection with the following:

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

| Nominal Compacted Thickness of Individual Lifts and Courses as shown on the typical section of the plans | All Levels | Level 1 and Level 2 | Level 3 | |
|---|---|---|---|---|
| | | | Travel Lane | All Other |
| | All Levels | All Courses | Wearing Course | Courses |
| | Surface Temperature* | From to Inclusive | From to Inclusive | From to Inclusive |
| **Open Graded Mixes** | | | | |
| Less than 2" | 60 °F | 3/15 9/30 | 3/15 9/30 | 3/15 9/30 |
| 2" and Over | 50 °F | 3/15 9/30 | 3/15 9/30 | 3/15 9/30 |
| ATPB | 40 °F | All Year** | All Year** | All Year** |
| | | | | |
| **Dense Graded Mixes** | | | | |
| Less than 2 inches | 60 °F | All Year** | 3/15 9/30 | All Year** |
| 2 inches - 2 1/2 inches | 50 °F | All Year** | 3/15 9/30 | All Year** |
| Greater than 2 1/2 inches | 40 °F | All Year** | 3/15 9/30 | All Year** |
| | | | | |
| **Temporary** | 40 °F | All Year** | All Year** | All Year** |

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

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

Add the following subsection:

**00744.60 Correction of Defects** – Correct all defects in materials and work, as directed, at no additional cost to the Owner, as follows:

**(a) Fouled Surface** – Immediately repair, clean and re-tack fouled surfaces that would prevent full bond between successive lifts of mixture.

**(b) Boils, Slicks, and Oversized Material** – Immediately replace boils, slicks, and oversized materials with fresh mixture.

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

**(d) Roller Damage to the Surface** – Immediately correct surface damage from rollers with additional fresh mixture or by other means approved.

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

**(f) Other Defects** – Remove and replace any MHMAC that:

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

**00744.70 Pavement Smoothness** - Delete the words "as directed" in the second sentence.

Add the following sentence to the end of the paragraph:

Perform straight-edge testing after placing the pavement while the area is closed to traffic or within one working day.

## SECTION 00747 – HOT MIXED ASPHALT CONCRETE (HMAC) PAVEMENT

Comply with Section 00747 of the Standard Specifications supplemented and/or modified as follows:

**00747.02 Definitions:** Add "according to 00747.49" to the end of the third bullet under Lot Size.

Add the following two definitions:

**Surface Damp Condition (SDC)** – When the outside of the aggregates are damp with moisture but little or no free water is present.

**Wearing Course** – Top lift of HMAC, regardless of thickness.

**00747.03 Reclaimed Asphalt Pavement (RAP) Material** – Replace the second sentence with the following:

No more than 30% RAP material will be allowed in Level 1, Level 2, and Level 3 HMAC. No more than 30% RAP material will be allowed in Level 4 base courses. No more than 20% RAP material will be allowed in Level 4 wearing courses.

Add the following subsection:

**00747.10(d) Fractured Faces** - Provide crushed aggregate with not less than the minimum number of fractured faces as determined by AASHTO TP 61 as follows:

| Percent of Fracture(by weight) | | |
|---|---|---|
| Type of Mix | Material retained on 1 1/2", 1" 3/4, 1/2" and No. 4 Sieve (two fractured faces) | Material Retained on NO. 8 Sieve (one fractured face) |
| All Dense Grade HMAC, ATBP | 75 | 75 |
| | | |
| All Open Graded HMAC | 90 | 75 |

**00747.11(a) Asphalt Cement** - Add the following sentence to the first paragraph of this subsection:

Use PG 64-22 asphalt cement on Multnomah Blvd between SW 19th and SW Evans St. Use PG 70-22 asphalt cement on Multnomah Blvd between SW 31st and the SW Barbur Blvd overpass.

**00747.12(b) Broadband Limits** – Replace this subsection with the following:

**00747.12(b) Broadband Limits** - Provide a JMF for the specified mix type within the control points listed below:

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

| Open Graded Mixes | | | | | | |
|---|---|---|---|---|---|---|
| | 3/4" Open | | 1/2 " Open | | 3/8" Open | |
| | Control Points (% passing by Weight) | | Control Points (% passing by Weight) | | Control Points (% passing by Weight) | |
| Sieve Size | Min. | Max. | Min. | Max. | Min. | Max. |
| 1" | 99 | 100 | | | 99 | 100 |
| 3/4" | 85 | 96 | 99 | 100 | 85 | 95 |
| 1/2" | 55 | 71 | 90 | 98 | 35 | 68 |
| 3/8" | --- | --- | --- | --- | --- | --- |
| No. 4 | 10 | 24 | 18 | 32 | 2 | 10 |
| No. 8 | 6 | 16 | 3 | 15 | 0 | 5 |
| No. 200 | 1.0 | 6.0 | 1.0 | 5.0 | 0.0 | 2.0 |
| Asphalt Cement | * | * | * | * | 2.5 | 3.5 |
| *per JMF | | | | | | |

**00747.13 Job Mix Formula (JMF) Requirements** - Replace this subsection with the following:

**00747.13 Job Mix Formula (JMF) Requirements** – Provide a JMF for the mixture to be used on the project meeting the criteria set forth below. The JMF shall have been performed or verified according to the ODOT Contractor Mix Design Guidelines for Asphalt Concrete within 3 years of the date the Contract was advertised. Perform a new TSR when the source of the asphalt cement changes.

**(a) Contractor Provided JMF –** The Certified Mix Design Technician (CMDT) shall prepare, sign, and submit a JMF to the Owner's Representative for each mixture required at least 10 days prior to the anticipated use in HMAC, and according to the latest copy of the ODOT Contractor Mix Design Guidelines for Asphalt Concrete. If requested, submit material samples 10 calendar days prior to use.

**(b) JMF Requirements -** The JMF shall meet the following mixture requirements

| Dense Graded Mixture | | | | |
|---|---|---|---|---|
| | **Level 1** | **Level 2** | **Level 3** | **Level 4** |
| Design Method | Superpave | Superpave | Superpave | Superpave |
| Compaction Level | 65 Gyrations | 65 Gyrations | 80 Gyrations | 100 Gyrations |
| Air Voids, % | 3.5 | 4.0 | 4.0 | Base:4.0 Wearing: 4.0 |
| VMA, % minimum | 1/2" - 14.0<br>3/8" - 15.0 | 3/4" - 13.0<br>1/2" - 14.0<br>3/8" - 15.0 | 3/4" - 13.0<br>1/2" - 14.0<br>3/8" - 15.0 | 3/4" - 13.0<br>1/2" - 14.0<br>3/8" - 15.0 |
| VMA, % maximum | min + 2.0% | min + 2.0% | min + 2.0% | min + 2.0% |
| P No. 200/ Eff AC ratio | 0.8 to 1.6 | 0.8 to 1.6 | 0.8 to 1.6 | 0.8 to 1.6 |
| TSR, % minimum | 80 | 80 | 80 | 80 |
| VFA, % | 70 – 80 | 65 - 78 | 65 - 75 | 65 - 75 |
| | 3/8 inch: 70 – 80 | 3/8 inch: 70 - 80 | 3/8 inch: 70 - 80 | 3/8 inch: 70 - 80 |

| Open Graded Mixture | | |
|---|---|---|
| | **3/4" Open and 1/2" Open** | **3/4" ATPB** |
| Design Method | ODOT | ODOT |
| Air Voids**, % | 13.5 – 16.0 | ----- |
| Draindown, % | 70 – 80 | ----- |
| TSR*, % minimum | 80 | ----- |
| Coating, %, minimum | ----- | 90 |
| VFA, % | 40 – 50 | ----- |

* Run the TSR for open graded mixtures on a surrogate dens grades mixture. If a dens grades JMF has been prepared for the same material sources in the last year, the results for the most recent TSR may be applied to the open graded mixture. If not, prepare the TSR test samples for a dense graded mix using the equivalent top size stone and materials from the same sources, which will be represent the open graded mixtures.

** 17% ±1% for Pervious Pavement.

**(c) Performance Test** - For dense graded Level 3 wearing course mixes and all dense graded Level 4 mixes, the mix design submittal shall include the results of performance testing as outlined in the latest ODOT Contractor Mix Design Guidelines for Asphalt Concrete.

**00747.14 Tolerances and Limits -** Add the following at the end of this subsection:

Open Graded* 1.10% Max.
Dense Graded 0.80% Max.

*Does not apply to 3/4" ATPB

**00747.16 HMAC Production QC/QA** - Replace this subsection with the following:

**00747.16 HMAC Production QC/QA** - - The following provisions apply to all HMAC:

**(a) Quality Control** - Provide and maintain a quality control program as defined in Section 00165, the MFTP and according to the following:

**(1) Personnel Requirements** - Maintain quality control by:

- Obtaining samples under the direct supervision of a CAT-I
- Having all testing, data analysis and reporting of test results performed by a CAT-I or an assistant technician under the direct supervision of the CAT-I
- Having a CAT-II available to make necessary process adjustments

**(2) Laboratory Requirements** - Furnish and maintain an ODOT certified quality control laboratory. Furnish the laboratory with the necessary equipment and supplies for performing Contractor quality control testing. Calibrate all testing equipment according to the required test methods. The Owner's Representative may inspect measuring and testing devices to confirm both calibration and condition.

The laboratory shall be operational prior to the beginning of HMAC production and be equipped with a telephone or cellular telephone, if either service is available. Provide laboratory equipment meeting the requirements of the applicable test methods identified in these Specifications and selected for use on the project.

**(3) HMAC Production Sampling and Testing** - Perform sampling and testing according to Section 00165 and the MFTP.

**(4) Testing Frequency** - Conduct the above testing program, once for each sublot, on randomly selected samples for each design mixture. (Do not obtain the first sample of the day in the first 25 tons of production.) If the random number indicates that the sample is to be obtained in the first 25 tons, sample at 25 tons. In addition, test the asphalt content at least once during each day of production. This requirement may be waived by the Owner's Representative.

After the Mix Design Verification (MDV) testing requirements of 00747.16(b) have been met, the frequency for Maximum Specific Gravity (AASHTO T209) testing may be reduced to only the first sublot produced each day, or a minimum of one test per day.

Provide "QC Program" sampling and testing frequencies (random numbers) to the Owner's Representative prior to production. Provide QC test results to the Owner's Representative by the middle of the following work shift.

When the Statistical Evaluation Method of 00747.95 is used, stop production when the pay factor for any constituent with a weighting factor greater than one falls below 0.75. Resume production when a plan for correction is accepted by the Owner's Representative.

**(b) Mix Design Verification (MDV):**

**(1) MDV Quality Control:**

**a. General** - Perform MDV testing on projects with Level 3 or Level 4 dense graded HMAC and at least once per calendar year for each JMF. If MDV testing has been completed for the JMF previously, submit verification to the Owner's Representative.

Perform MDV tests on every sublot and as required at start up according to 00747.16(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)

MDV testing may be discontinued when at least two running averages of four MDV results are within the limits given below:

| | Average no of samples | Limit |
|---|---|---|
| Air Voids | 4 | JMF Target -0.5%/+1.5% |
| VMA | 4 | 11.5 - 18.0 (1" Mix)<br>12.5 - 18.0 (3/4" Mix)<br>13.5 - 18.0 (1/2" Mix)<br>14.5 - 18.0 (3/8" Mix) |
| VFA | 4 | 65 - 75 |

Restart MDV testing when any individual Maximum Specific Gravity test deviates from the last (MAMD divided by 62.4 lb/ft$^3$) by 0.020 or more. Begin retesting according to the start-up MDV requirements of 00747.16(b)(1)(c). MDV testing may be discontinued again when the above criteria is met.

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 Owner's Representative for resolving the discrepancy based on the results of the investigation.

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 00747.95 are in tolerance. Provide test results to the Owner's Representative within four working days of obtaining the sample. The TSR shall be within 20 points of the value reported on the JMF. Stop production and make adjustments if the TSR is 20 points or more lower than the design value. Restart production only after the Owner's Representative has approved the proposed adjustments.

Take corrective action when required by the MDV start-up process of 00747.16(b)(1)(c). After the requirements of 00747.16(b)(1)(c) have been met, take

corrective action if the MDV test results show that two consecutive individual samples are outside the above limits for air voids, VMA, or VFA. Document the corrective action and notify the Owner's Representative. If test results continue to be outside the tolerance, stop production and make adjustments. Restart production only after the Owner's Representative 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 Owner's Representative by the Contractor's CAT-II. The requested change will be reviewed and documented by the Owner's Representative. 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 00747.03. Regardless of these tolerances, the adjusted JMF shall be within the mixture specification control points of 00747.12. If a redesign of the mixture becomes necessary, submit a new JMF according to the requirements of these Specifications.

**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** - Conduct gradation and asphalt content tests for each MDV test. 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 until requirements of 00747.16(b)(1) are met. If not, then go to step "3".

**3.** If air voids and/or VMA are out of tolerance according to 00747.16(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 until requirements of 00747.16(b-1) are met. If not, go to step "5".

**5.** If air voids from step "3" are more than plus or minus 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 Owner's Representative 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".

Use the initial MDV sample 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. All required MDV testing will be completed at the Contractor's expense.

**(2) MDV Quality Assurance** - The Owner's Representative will observe and document the Contractor's performing of MDV test procedures and calculations. Immediately correct any deviations from the specified test procedures. The Owner's Representative may conduct MDV assurance testing at any time.

**(c) Quality Assurance and Acceptance** - Any quality assurance testing for Level 1 and Level 2 HMAC will be at the discretion of the Owner's Representative. The Agency will provide quality assurance according to Section 00165 for Level 3 and Level 4 HMAC. When QA testing is performed, the Contractor's quality control results will be used for acceptance if they are within acceptable limits of the QA test results as defined by ODOT's Quality Assurance Program.

**00747.40 Season and Temperature Limitations -** Replace this subsection with the following:

**00747.40 Season and Temperature Limitations - -** Place HMAC when the temperature of the surface that is to be paved is not less than the temperature indicated:

| **Nominal Compacted Thickness of Individual Lifts and courses as shown on the typical section of the plans** | | | | |
|---|---|---|---|---|
| | **All Level*** | **Level 1 and Level 2** | **Level 3 and Level 4** | |
| | | | **Travel Lane Wearing Course** | |
| **Open Graded Mixes** | **Surface Temperature*** | **All Courses From to Inclusive** | **From to Inclusive** | **All Other Courses From to Inclusive** |
| Less than 2" | 60 °F | 3/15 9/30 | 3/15 9/30 | 3/15 9/30 |
| 2" and Over | 50 °F | 3/15 9/30 | 3/15 9/30 | 3/15 9/30 |
| ATPB | 40 °F | All Year | All Year | All Year |
| **Dense Grade Mixes** | | | | |
| Less than 2" | 60 °F | All Year** | 3/15 9/30 | All Year** |
| 2" and 2 1/2" | 50 °F | All Year** | 3/15 9/30 | All Year** |
| Greater than 2 1/2" | 40 °F | All Year** | 3/15 9/30 | All Year** |
| **Temporary** | 40 °F | All Year** | All Year** | All Year** |

*Do not use field burners or other devices to heat up the pavement surface to the specified minimum temperature.
**If placing HMAC between March 15 and September 30th, temperature requirement may be lowered 5 °F.

Add the following subsection:

**00747.48 Hauling, Depositing, and Placing- -** Haul, deposit, and place HMAC as follows:

**(a) Hauling –** Cover HMAC if rain or cold air temperatures are encountered any time between loading and placement.

HMAC will be rejected before placing if one or more of the following is found:

- Below specific placing temperature limit
- Slumping or separating
- Solidifying or crushing
- Absorbing moisture

Disposal or rejected loads at no additional cost to the Agency.

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

**(b) Depositing –** Deposit HMAC from the hauling vehicles so segregation is prevented.

When HMAC is windrowed, the pick-up equipment shall:

- Pick up substantially all the HMAC deposited on the roadway.
- Be self-supporting, not exerting any vertical load on the paving machine, or causing vibrations or other motions which could have a harmful effect on the riding quality of the completed pavement.

**(c) Placing –** Alternative equipment and means may be allowed by the Owner's Representative if the use of a paver is impractical.

Do not place HMAC during rain or other adverse weather conditions, unless allowed by the Owner's Representative. HMAC in transit at the time adverse conditions occur may be placed if:

- It has been covered during transit.
- The HMAC temperature is satisfactory.
- It is placed on a foundation free from pools or flow of water.
- All other requirements met.

When leveling irregular surfaces and rising low areas, do not exceed 2 inches actual compacted thickness of any one lift, except the actual compacted thickness of intermittent areas of 1,000 square feet or less may exceed 2 inches, but not more than 4 inches. This may require portions of the mixture to be laid in two or more lifts.

Place the mixture in the number of lifts and courses, and to the compacted thickness for each lift and course, as shown. Place each course in one lift unless otherwise specified. Do not exceed a compacted thickness of 4 inches for any lift. Limit the minimum lift thickness to twice the maximum aggregate size in the mix.

Do not intermingle HMAC produced from more than one JMF. Each base course panel placed during a working shift shall conform to a single JMF. The wearing course shall conform to a single JMF, except for any adjustments in the JMF.

Add the following two subsections:

**00747.49(d) Open Graded HMAC** -– Compaction of open graded HMAC to a specified density will not be required.

Use only steel-wheeled roller(s) for compaction. Continue the breakdown and intermediate rolling until the entire surface has been compacted with at least four coverages by the roller(s). Perform additional coverage's, as directed, to obtain finish rolling of HMAC.

**00747.49(e) Other Areas:** -

**(1)** Compaction to a specified density will not be required on temporary surfacing (see 00747.50), guardrail flares, mailbox turnouts, road approaches and areas of restricted width (less than 8 feet wide) or limited length, regardless of thickness.

Perform breakdown and intermediate rolling until the entire surface has been compacted with at least four coverage's by the roller(s). Perform additional coverage's, as directed, to obtain finish rolling of HMAC.

**(2)** Along curbs and walls, on walks, irregular areas, and other areas not practically accessible to rollers conforming to 00747.24, compact the mixture with a small, self propelled roller, mechanical tampers, hot hand tampers, or hand rollers. On depressed areas a trench roller may be used, or cleated compression strips may be used under the roller to transmit compression to the depressed area.

**00747.95 HMAC Price Adjustments** - Replace this subsection with the following:

**00747.95 HMAC 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 00747.90 and to the application 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 00747.17. The maximum CPF for any case will be 1.0.

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

| Gradation Constituents | Dense Graded HMAC Type | | | Open Graded HMAC Type | | |
|---|---|---|---|---|---|---|
| | Weighting Factor (f) | | | Weighting Factor (f) | | |
| **All Aggregate Passing** | **3/4"** | **1/2"** | **3/8"** | **3/4"** | **1/2"** | **ATPB** |
| 1" | 1 | | | 1 | | 1 |
| 3/4" | 1 | 1 | | 1 | 1 | 1 |
| 1/2" | 1 | 1 | 1 | 1 | 1 | 1 |
| 3/8" | --- | --- | 1 | --- | --- | --- |
| No. 4 | 5 | 5 | 5 | 5 | 5 | 6 |
| No. 8 | 5 | 6 | 6 | 5 | 6 | 7 |
| No. 30 | 3 | 3 | 3 | 3 | 3 | --- |
| No. 200 | 10 | 10 | 10 | 10 | 10 | 10 |
| | | | | | | |
| **Other Constituents** | | | | | | |
| Asphalt Content | 26 | 26 | 26 | 26 | 26 | 26 |
| Moisture Content | 8 | 8 | 8 | 8 | 8 | 8 |
| Compaction | 40 | 40 | 40 | 40 | 40 | 40 |

Those HMAC 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)[(JMF% ÷ 100 X Asphalt Unit Price) + (HMAC Unit Price)] X (LQ) = _____

Where:JMF % is the asphalt cement % from the JMF

LQ is the quantity of mixture in the lot

## SECTION 00759 – MISCELLANEOUS PORTLAND CEMENT CONCRETE STRUCTURES

Comply with Section 00759 of the Standard Specifications supplemented and/or modified as follows:

**00759.00 Scope** - Add the following:

This work consists of removing existing concrete walks and curbs, and constructing new Portland cement concrete sidewalk ramps with curbs.

**00759.12 Sidewalk Ramp Treatment** - Replace this subsection with the following:

**00759.12 Sidewalk Ramp Treatment** – Furnish truncated dome detectable warning surfaces for sidewalk ramps and accessible route islands from the CPL. The truncated domes shall be thermoplastic, polymer composite or cementitious panel in the color yellow.

Use one type of material throughout the Project and only adhesives recommended or supplied by the manufacturer.

**00759.45 Reinforcement, Dowels, and Tie Bars** - In the first sentence, change 00755.43 to 00530.41.

**00759.50(c) Driveways, Walks, and Surfacings** - Add the following after the second paragraph:

Replacing existing sidewalks, ramps, and accessible route islands in accordance with the latest ODOT standard drawings. New ramps shall include ADA truncated domes as required, regardless of existing conditions.

Add the following subsection:

**00759.53 Grout Pads** - When replacing driveways, walks, islands, and similar surfaces reconstruct the grout pads under illumination and traffic signal equipment according to 00960.46(h)(1) and as directed.

# PART 00800 – PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES

## SECTION 00861 - PAINTED PERMANENT PAVEMENT STRIPING

**00861.90 General** - Add the following:

If there are no bid items listed for permanent striping, the City will be responsible for the work and there will be no separate payment for any work related to striping.

# PART 00900 – PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS

## SECTION 00905 - REMOVAL AND REINSTALLATION OF EXISTING SIGNS

Comply with Section 00905 of the Standard Specifications.

## SECTION 00940 - SIGNS

Comply with Section 00940 of the Standard Specifications supplemented and/or modified as follows:

Add the following subsection:

**00940.44 Reflective or Nonreflective Sheeting Application** - Apply the sheeting according to the sheeting manufacturer's recommendations on extruded aluminum panel signs. Up to 25% of the extruded aluminum panel signs required in the plans will be permitted one manufacturer's splice per sign. One patch will be permitted per 50 square feet of sign to a maximum of three patches per sign. Patches shall be between 3/4 inch and 3 3/8 inches in diameter. No Contractor splices will be allowed.

On all other signs, manufacturer's splices will not be permitted except as noted on approved shop drawings, or when sign dimensions exceed the sheeting manufacturer's capabilities. Make these splices horizontal with the upper section of sheeting overlapping the lower by a minimum of 3/8 inch on encapsulated lens sheeting, and butt splice prismatic lens sheeting with no appreciable substrate visible. The use of overlaid transparent paste will not be allowed on overlapped splices. No Contractor splices will be allowed.

## SECTION 00941 – SIGN COVERS

Comply with Section 00941 of the Standard Specifications supplemented and/or modified as follows:

**00941.10 General** - Replace the last sentence with the following:

For temporary signs comply with Section 00225.

## SECTION 00960 - COMMON PROVISIONS FOR HIGHWAY ILLUMINATION AND TRAFFIC SIGNALS

Comply with Section 00960 of the Standard Specifications supplemented and/or modified as follows:

Replace the Section heading with the following:

## SECTION 00960 - COMMON PROVISIONS FOR ILLUMINATION AND TRAFFIC SIGNALS

**00960.02 Equipment List and Drawings** - Add the following paragraph to the first bullet item:

For Illumination, provide information on the following items:

- Pole
- Anchor Bolts
- Luminaires, including ballasts, color and finish
- Conductors
- Photoelectric Controls

- Lamps
- Service / Control cabinet associated electrical apparatus including contactors, circuit breakers, and rest switch
- Available Fault Current calculations from Utility Company for each power source
- Fuse Kits, Fuses, and Insulating Boots
- Conduit, fittings, and elbows (PVC/RGC)
- Sidewalk Pull Boxes
- Polyethylene plugs (Graybar)
- Ground rod and clamp
- RGS elbows
- Pull tape (polyester Muletape or Herculine)

**00960.45(a) General** - Add the following sentence:

Clearly label all conductors with associated circuits in sidewalk boxes, panels, and all splice points.

# PART 01000 – RIGHT OF WAY DEVELOPMENT AND CONTROL

## SECTION 01030 - SEEDING

Comply with Section 01030 of the Standard Specifications supplemented and/or modified as follows:

**01030.02 Definitions:** - Add the following:

**National Turfgrass Evaluation Program (NTEP)** - A program that gives recommendations on the best varieties of seed to use for a given application for a given area of the country.

**Turf Quality** - A rating by the NTEP that takes into account the aesthetic and functional aspects of the turf based on a combination of color, density, uniformity, texture and disease or environmental stress.

**01030.13(f) Types of Seed Mixes** - Provide the following seed mix formulas:

- **Lawn Seeding**: Use a mixture of 100% perennial ryegrass from the top performing NTEP varieties for this area. The varieties need to be in the top 50% of the three most recent NTEP trials for Turf Quality. Perennial ryegrass varieties can be selected from the top 50% in Turf Quality inclusive of all three maintenance schedules A, B, & C. The seeding rate shall be 6-8 lbs/1000 sq ft for new lawn and 2-4 lbs/1000 sq ft to increase density of existing turf.

Add the following subsection:

**01030.14(b)(3) Turf Grass Fertilizer** - Furnish inorganic fertilizer that analyzes 22% nitrogen, 5% phosphoric acid, 10% soluble potash with 1.9% iron. Provide at least 50% of the nitrogen as slow release. The iron shall be formulated in a manner which virtually eliminates the possibility of staining concrete. Apply inorganic fertilizer at a rate of 297 pounds per acre in all Lawn Seeding areas.

**01030.90 General** - Add the following paragraph(s) to the end of this subsection:

When temporary seeding, applied according to 01030.41, is later accepted as permanent seeding according to 01030.42, payment will be made only one time under the permanent seeding pay item. No separate payment will be made for initial temporary seeding.

The amount paid for permanent seeding items will be as follows:

At completion of seeding .....70%
At completion of the establishment period .....30%

## SECTION 01040 – PLANTING

Comply with Section 01040 of the Standard Specifications supplemented and/or modified as follows:

**01040.14(d) Stormwater Facility Topsoil** - Replace this subsection with the following:

**01040.14(d) Stormwater Facility Topsoil**- Furnish imported topsoil for vegetated stormwater facilities conforming to the following:

**(1) Standard Blend for Public and Private Facilities** - Use this blend for all vegetated stormwater management facilities, except those in the right-of-way where compaction from foot traffic is a concern as specified in Section 01040.14(d)(2) "Infiltration Blend for the Right-of-Way."

**a. General Composition** - The medium shall be any blend of loamy soil, sand, and compost that is 30-40 percent compost (by volume) and meets the other criteria in this specification.

**b. Analysis Requirements for the Blended Material**:

**1. Particle Gradation** - A particle gradation analysis of the blended material, including compost, shall be conducted in conformance with ASTM C117/C136 (AASHTO T11/T27). The analysis shall include the following sieve sizes: 1 inch, 3/8 inch, #4, #10, #20, #40, #60, #100, #200. The gradation of the blend shall meet the following gradation criteria.

| Sieve Size | Percent Passing |
|---|---|
| 1 inch | 100 |
| # 4 | 75 -100 |
| # 10 | 40-100 |
| # 40 | 15-50 |
| # 100 | 5-25 |
| # 200 | 5-15 |

The blend shall have a Coefficient of Uniformity (D60/D10) equal to or greater than 6 to ensure that it is well graded (has a broad range of particle sizes). The coefficient is the ratio of two particle diameters on a grain-size distribution curve; it is the particle diameter at 60 percent passing divided by the particle diameter at 10 percent passing.

**2. Power of Hydrogen (pH)** - The pH of the blended material shall be tested and have a pH of 5 to 8**.**

**c. General Requirements for the Blended Material:**

1. The material shall be loose and friable.

2. It shall be well mixed and homogenous.

3. It shall be free of wood pieces, plastic, and other foreign matter.

4. It shall have no visible free water.

**d. Compost** - The compost shall be derived from plant material and provided by a member of the US Composting Council Seal of Testing Assurance (STA) program. See www.compostingcouncil.org for a list of providers in Portland.

The compost shall be the result of the biological degradation and transformation of plant-derived materials under conditions designed to promote aerobic decomposition. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumption and carbon dioxide generation. The compost shall have no visible free water and produce no dust when handled. It shall meet the following criteria, as reported by the US Composting Council STA Compost Technical Data Sheet provided by the vendor.

- 100 percent of the material must pass through a ½-inch screen.

- The pH of the material shall be between 6 and 8.

- Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0 percent by weight.

- The organic matter content shall be between 35 and 65 percent.

- Soluble salt content shall be less than 6.0 mmhos/cm.

- Germination (an indicator of maturity) shall be greater than 80%.
- Stability shall be between classes 5-7.
- Carbon/nitrogen ratio shall be less than 25:1.
- Trace metals test result = "pass."

**e. Submittals** - At least 14 working days in advance of construction, submit the following:

1. Two 5-gallon buckets of the blended material.
2. Documentation for the three analyses described in section 01040.14(d)(1)b of this specification (particle gradation with calculated coefficient of uniformity; organic matter content; pH). The analyses shall be performed by an accredited laboratory with certification maintained current. The date of the analyses shall be no more than 90 calendar days prior to the date of the submittal. The report shall include the following information:
   - Name and address of the laboratory.
   - Phone contact and e-mail address for the laboratory.
   - Test data, including the date and name of the test procedure.
3. A compost technical data sheet from the vendor of the compost. The analysis and report must be consistent with the sampling and reporting requirements of the US Composting Council Seal of Testing Assurance (STA) program. The analysis shall be performed and reported by an approved independent STA program laboratory. The date of the analysis shall be no more than 90 calendar days prior to the date of the submittal.
4. A description of the location, equipment, and method proposed to mix the material.

**f. Stormwater Facility Topsoil Installation** - See 01040.43(c).

**(2) Infiltration Blend for the Right-of-Way** - Use this blend for facilities in the right-of-way where compaction from foot traffic is a concern. Approval is required.

**a. General Composition** - The medium shall be a mix of sand and compost, blended by volume. The medium shall consist of 60 to 70 percent sand and 30 to 40 percent compost (by volume).

**b. Analysis Requirements** - The requirements are the same as those specified in section 01040.14(d)(1)b for the "Standard Blend for Public and Private Facilities." The single difference is the particle gradation criteria, which are as follows.

| Sieve Size | Percent Passing |
|---|---|
| 1 inch | 100 |
| # 4 | 60-100 |
| # 10 | 40-100 |
| # 40 | 15-50 |
| # 100 | 5-20 |
| # 200 | 1-5 |

**c. General Requirements for the Blended Material** - See 01040.14(d)(1)c.

**d. Compost** - See 01040.14(d)(1)d.

**e. Submittals** - See 01040.14(d)(1)e.

**f. Stormwater Facility Topsoil Installation** - See 01040.43(e).

Add the following subsection:

**01040.43(e) Stormwater Facility Topsoil Installation:**

**(1) Protection of the Growing Medium** - The growing medium shall be protected from all sources of contamination, including weed seeds, while at the supplier, in conveyance, and at the project site.

**(2) Placement of the Growing Medium** - The medium shall be placed in loose lifts, not to exceed 8 inches each and each lift shall be compacted with a water-filled landscape roller. The material shall not otherwise be mechanically compacted.

**(3) Timing of Plant Installation** - Weather permitting, plants shall be installed as soon as possible after placing and grading the growing medium in order to minimize erosion and further compaction.

**(4) Erosion Control** - Temporary erosion control measures are required until permanent stabilization measures are functional, including protection of overflow structures.

**(5) Protection of the Facility -** In all cases, the facility must be protected from foot or equipment traffic that is unrelated to the construction of the facility. Temporary fencing or walkways should be installed as needed to keep workers, pedestrians, and equipment out of the facility. Under no circumstances should materials and equipment be stored in the facility.

Stormwater facilities shall be kept clean and shall not be used as erosion and sediment control structures during construction.

**(6) Wet and Winter Conditions** - Placement of the growing medium will not be allowed when the ground is frozen or saturated or when the weather is determined to be too wet.

**01040.54 Water** - Add the following watering table(s):

Water deciduous trees 1-1/2 inches or larger and conifer trees over 4 feet in height as follows:

| Time | Frequency | Gallons/Tree (Minimum) |
|---|---|---|
| May - June | weekly | 20 |
| July - August | weekly | 30 |
| September - October | weekly | 20 |

Water shrubs as follows:

| Time | Frequency | Gallons/Shrub |
|---|---|---|
| May - June | weekly | 5 - 10 |
| July - August | weekly | 15 - 20 |
| September - October | weekly | 10 - 15 |

**01040.77(a) Watering, Fertilizing, and Mulching** - Add the following:

Water all plants during establishment as shown in Section 01040.54.

### SECTION 01090 - GRAVEL BEDS AND BLANKETS

Comply with Section 01090 of the Standard Specifications.

## PART 02000 MATERIALS

### SECTION 02050 - CURING MATERIALS

Comply with Section 02050 of the Standard Specifications.

### SECTION 02220 – POLYURETHANE COATING FOR MANHOLE REHABILITATION

Section 02220, which is not a Standard Specification, is included in this Project by Special Provision.

**02220.01 Reference Standards** - Comply with applicable provisions and recommendations of the following:

- ACI 506.2-77 - Specifications for Materials, Proportioning, and Application of Shotcrete
- ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars
- ASTM D638 - Tensile Properties of Plastics.

- ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics.
- ASTM D695 - Compressive Properties of Rigid Plastics.
- ASTM D 2240 – Durometer Hardness, Type Shore D 80 – 85%
- ASTM D4541 - Pull-off Strength of Coatings Using a Portable Adhesion Tester.
- ASTM D2584 - Volatile Matter Content.
- ASTM D543 - Resistance of Plastics to Chemical Reagents.
- ASTM - The published standards of the American Society for Testing and Materials, West Conshohocken, PA.
- NACE - The published standards of National Association of Corrosion Engineers (NACE International), Houston, TX.

**02220.02 SUBMITTALS**

**(a) Product Data:**

**(1) Technical data sheet -** on each product used including application, cure time, and surface preparation procedures.

- Third party testing verifying the short-term Modulus of Elasticity of product used on this project.
- Third party testing verifying Flexural Strength of product used on this project.
- Third party testing verifying long-term Flexural Modulus of Elasticity. This third party testing will verify the long-term reduction factor (Creep Analysis) of a minimum of 50%. This long-term reduction factor verification shall be conducted utilizing ASTM D2990-01 via a third party, independently certified laboratory.

**(2) Material Safety Data Sheet (MSDS)** - for each product used.

**(3) Independent testing -** Copies of independent testing performed on the coating product indicating the product meets the requirements as specified herein.

**(4) Technical data sheet and project specific data** - for repair materials to be topcoated with the coating product(s) including application, cure time, and surface preparation procedures which permit optimum bond strength with the approved coating.

**(5) Warranty Information** – for protective coating product used.

**02220.10 General -** Use only chemical materials that meet the following minimum application requirements:

- All component materials shall be easily transportable by common carriers.
- Packing of component materials shall be compatible with field storage requirements.
- Components shall be packed in such a fashion as to provide for maximum worker safety when handling the materials and minimize spillage when preparing for use.
- Mixing of the components shall be compatible with field applications, not require precise measurements, and be within the limits recommended by the manufacturer.

- Catalyzation shall take place at the point of repair.
- Cleanup shall be done without inordinate use of flammable or hazardous chemicals.

**02220.11 Wall Cleaning Material -**

- Water: Clean water.
- Cleaners: Detergent or muriatic acid capable of removing dirt, grease, oil and other matter which would prevent a good bond of lining material to wall. Apply in accordance with manufacturer's recommendations.

**02220.12 Repair and Resurfacing Products** - Repair materials must be compatible with the specified coating product(s) and shall be used and applied in accordance with the manufacturer's recommendations.

The following products may be accepted and approved as compatible repair and resurfacing products for use:

- 100% solids, solvent-free epoxy grout specifically formulated for polyurethane topcoating compatibility.
- When approved for use by the manufacturer, factory blended, rapid setting, high early strength, fiber reinforced, non-shrink repair mortar that can be trowelled or pneumatically spray applied may be approved if specifically formulated to be suitable for topcoating with the specified coating product(s).

**02220.13 Protective Coating Material-** The resin based material shall be used to form the sprayed structurally enhanced monolithic liner covering all interior surfaces of the structure, including benches and inverts of manholes. The finished liner shall be a fast-setting, high-build, 100% solids, solvent-free, structurally monolithic (capable of withstanding hydrostatic pressures without relying on the existing structure) for a minimum of 50 years, and conform to the minimum physical requirements listed below or otherwise submitted and approved by the Owner's Representative. The physical requirements must be verified by an independent, certified, third-party testing laboratory within the last five years.

| | | |
|---|---|---|
| Compressive strength | ASTM D 695 | > 19,000 psi |
| Tensile strength | ASTM D 638 | > 7,450 psi |
| Flexural strength | ASTM D 790 | > 14,000 psi |
| Bond Substrate | | Failure |
| Flexural modulus (initial) | ASTM D 790 | > 735,000 psi |
| Density | 87 ± pcf | |
| Chemical Resistance: | ASTM F 1216.X2 | |
| Severe Municipal Sewer: | All types of service | |

The Manufacturer shall be Sprayroq, Inc or approved equal.

## SECTION 02410 - CONCRETE AND PLASTIC PIPE

Comply with Section 02410 of the Standard Specifications supplemented and/or modified as follows:

**02410.70 Polyvinyl Chloride (PVC) Pipe** – Replace all occurrences of "SDR 35" with "SDR 26".

Insert the following subsection:

**02410.70(d) PVC Pressure Pipe, 14 in. through 48 in.** – PVC pressure pipe shall meet the requirements of AWWA C-905 PVC Water Transmission Pipe and shall be manufactured from compounds conforming to cell classification of 12454B as defined in ASTM D1784. The integral bell joint system shall meet the requirements of ASTM D3139 and utilizes an elastomeric seal conforming to ASTM F477. The pipe shall be furnished in 20-foot laying lengths and the spigot ends are beveled and insertion depths are marked for correct installation

PVC materials and pipe shall be manufactured, inspected, sampled and tested in accordance with the requirements of AWWA C905 and this section

## SECTION 02420 - METAL PIPE

Comply with Section 02420 of the Standard Specifications.

## SECTION 02425 - FIBERGLASS-REINFORCED POLYMER (FRP) SEWER PIPE

Section 02425, which is not a Standard Specification, is included in this Project by Special Provision.

### Description

**02425.01 References** - Standards referenced in this Section are listed below:

- ASTM D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- ASTM D3262, Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
- ASTM D3681, Standard Test Method for Chemical Resistance of "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin Pipe) in a Deflected Condition.

- ASTM D4161, Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
- ASTM F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- ASTM D638, Standard Test Method for Tensile Properties of Plastics.

**02425.02 Submittals**

**(a) Shop Drawings -** Submit the following:

- Detailed drawings of the pipe, gaskets, joints, pipe special sections, access shafts, connections, and test reports on the properties of the gasket material.
- Manufacturers Certificate of Compliance with this Section and above referenced Standards for each size and stiffness of pipe and fittings used.
- Manufacturers Certificate of Compliance for resin compound.
- Manufacturer instructions on storage, handling, transportation, and installation
- Certified test reports on materials manufactured for this project.

**(b) Material Sample -** A sample piece of pipe approximately three-foot long of each diameter, if requested by the Owner's Representative.

**02425.03 Source Quality Control -**

**(a) Shop Tests** -

**(1)** Manufacturer shall maintain a continuous Quality Control Program and shall provide the Owner's Representative with certified test reports.

**(2)** Tests shall be witnessed by a Registered Professional Engineer or a member of ASTM, who may not be an employee of the manufacturer. The Registered Professional Engineer shall seal and sign all test reports.

**02425.04 System Performance** - Fiberglass-reinforced polymer piping system shall be specifically designed, constructed, and installed for gravity sanitary sewer service.

**02425.05 Manufacturers -** Provide products from Hobas Pipe USA, Inc., Flowtite from Amiantit, or approved equal.

**02425.10 Materials -**

**(a) Resin Systems**: The manufacturer shall use only polyester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product. The polyester wall resin shall be an isophtalic, orthophthalic, or other approved

resin. A surface layer resin shall be used and shall meet the chemical requirements of ASTM F1216, Appendix X2.

**(b) Glass Reinforcements**: The reinforcing glass fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments or ECR glass with binder and sizing compatible with impregnating resins.

**(c) Silica Sand**: Silica sand or other suitable materials may be used as fortifiers in the laminates. No fillers will be permitted in the inner liner or corrosion barrier.

**(d) Additives:** Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally affect the performance of the product.

**(e) Elastomeric Gaskets**: Gaskets shall meet ASTM F477 and be supplied by approved gasket manufacturers and be suitable for the service intended. Gaskets shall be made of nitrile (NBR; acrylonitrile butadiene) elastomer. Gaskets shall be either affixed to the pipe by means of a suitable adhesive or shall be installed in such a manner so as to prevent the gasket from rolling out of the pipes' pre-cut grooves.

**02425.11 Details of Construction** -Pipe shall be manufactured to meet the applicable requirements of ASTM D 3262, Type 1, Liner 2, Grade 2 or 3, and a minimum pipe stiffness of 72 psi or greater. The use of stiffening or reinforcing ribs is not allowed.

**(a) Pipe**: Pipe shall be a dense, non-porous, corrosion-resistant, consistent composite structure. The interior surface layer of the pipe exposed to sewer flow shall be manufactured utilizing a virgin (unfilled) resin with a 50% elongation (minimum) when tested in accordance with ASTM D638. The interior surface layer shall be a minimum of 40 mils of pure liner resin and shall provide crack and abrasion resistance. Interior surface layer shall provide an abrasion resistance demonstrating a maximum abrasion loss of 1.5 mm after 750,000 cycles per Darmstadt test method. If this abrasion resistance cannot be met, a sacrificial 1.5 mm layer of resin shall be added to the interior surface.

**(b) Joints**: Unless otherwise specified, the joints must meet the performance requirements of ASTM D 4161. The restraint system shall be provided in accordance with the manufacturer's recommendations. Joints at tie-ins, where required, may utilize fiberglass gasket-sealed closure couplings.

(1) For tunnel carrier or direct jacked installation, the joint shall have approximately the same O.D. as the pipe, so when the pipes are assembled, the joints are essentially flush with the pipe outside surface. The joints shall utilize elastomeric sealing gaskets as the sole means to maintain joint watertightness. Joints at tie-ins, when needed, may utilize gasket-sealed closure couplings. Provide grouting ports to allow the use of grout during installation.

(2) For direct bury installation, the pipe shall be field connected with fiberglass sleeve couplings that utilize elastomeric sealing gaskets made of EPDM rubber compound as the sole means to maintain joint watertightness. The gasket shall be mechanically bonded and factory mounted to the FRP coupling. No loose or o-ring type sealing elements are allowed.

**(c) Fittings**: Flanges, elbows, reducers, tees, wyes, laterals and other fittings shall be capable of withstanding all operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass-fiber-reinforced overlays. Properly protected standard ductile iron, fusion-bonded epoxy-coated steel and stainless steel fittings may also be used.

**(d) Class:** The pipe shall have a minimum stiffness class rating of 72 psi for direct-bury installations.

**(e) Diameters**: The actual outside diameter of the pipes shall be in accordance with ASTM D3262. Tolerance on inside diameters shall be plus 0.01% of the nominal diameter and minus 0.002%.

**(f) Lengths:** Pipe shall be supplied in nominal lengths of 20 or 40 feet. Actual laying length shall be nominal +1, -4 inches. At least 90 percent of the total footage of each size and class of pipe, excluding special order lengths, shall be furnished in nominal length sections.

**(g**) Wall thickness: The minimum wall thickness shall be as follows:

| Nominal Pipe Diameter (inches) | Minimum Wall Thickness Pipe stiffness 72 psi (inches) |
|---|---|
| 18 | 0.35 |
| 30 | 0.60 |
| 36 | 0.72 |
| 48 | 0.95 |

**(h)** End Squareness: Pipe ends shall be square to the pipe axis with a maximum tolerance of 0.50% of the nominal pipe diameter for direct-bury applications.

**(i)** Straightness: Pipes shall be straight to within 1/8-inch per ten lineal feet.

**(j)** Corrosion Resistance: Pipe specimens shall be capable of being deflected, without failure, at the 50-year strain level of 0.34 (t/d) or approximately 4.5% long-term deflection when exposed to 1.0 *N* sulfuric acid in accordance with ASTM D3681 and D3262.

**(k)** Marking: Each pipe section shall be marked at both ends inside and every 5 feet on the outside to identify the manufacturer, manufacturer number (identified factory location, date of manufacture, shift, and sequence), nominal diameter, pipe stiffness, ASTM D3262 designation, and lot number.

**(l)** Inspection: The owner or other designated representative shall be entitled to inspect pipes or witness the pipe manufacturing. Should the Owner request to see specific pipes during any phase of the manufacturing process, the Manufacturer must provide the Owner with adequate advance notice of when and where the production of those pipes will take place.

**02425.15 Quality Assurance**

**(a) Manufacturer's Qualifications -** Manufacturer shall have a minimum of five years experience of producing fiberglass-reinforced polymer pipe and fittings, and shall be able to show evidence of at least ten installations in satisfactory service for at least five years.

**(b) Component Supply and Compatibility** - Obtain all pipe material included in this Section, from a single FRP pipe and fittings manufacturer.

The fiberglass-reinforced polymer mortar pipe and fittings manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

**02425.70 Acceptance or Rejection** - The pipe shall be free of cracks, holes, delaminations, foreign inclusions, blisters, or other defects that result in a variation of inside diameter or more than 1/8-inch from that obtained on adjacent unaffected portions of the surface or defects that would, due to their nature, degree, or extent, have a deleterious effect on the pipe performance as determined by the Owners Representative. No glass fiber reinforcement shall penetrate the interior surface of the pipe wall. Prior to installation, damaged pipe shall be either repaired or field cut to remove the damaged portion as approved by a Manufacturer's representative. Retest within 60 days prior to installation all pipe that is more than 180 days old from the date of manufacture to ensure compliance with the requirements of this Section. Do not install pipe that is more than 2 years old from the date of manufacture.

Should the Owner's Representative elect not to inspect the manufacturing or testing of finished pipes, it in no way implies approval of products or tests.

## SECTION 02450 – MANHOLE AND INLET MATERIALS

Comply with Section 02450 of the Standard Specifications. supplemented and/or modified as follows:

02450.30 Metal Frames, Covers, Grates, and Ladders – Add the following to the end of the third paragraph:

Steps are not required for new manholes receiving HDPE liners.

## SECTION 02451 – MANHOLE AND REINFORCED CONCRETE PIPE HDPE LINER

Section 02451, which is not a Standard Specification, is included in this Project by Special Provision.

**02451.01 References** - Standards referenced in this Section are listed below:

| Reference | Title |
|---|---|
| ASTM D543 | Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents |
| ASTM D695 | Test Methods for Compressive Properties of Rigid Plastics |
| ASTM C1107 | Standard Specification for Packaged, Dry Hydraulic Cement Grout |

| Reference | Title |
|---|---|
| ASTM D790 | Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials |
| ASTM D2412 | Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading |
| ASTM D2583 | Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor |
| ASTM D2584 | Test Method for Ignition Loss of Cured Reinforced Resins |
| ASTM D6392 | Test Method for Determining the Integrity of Nonreinforced Geomembrane seams Produced Using Thermo-Fusion Methods |
| ASTM D6365 | Standard Practice for the Nondestructive Testing of Geomembrane Seams using the Spark Test |
| AASHTO H-20 | Axial Loading |

**02451.10 Manhole Liner -**

**(a) HDPE Liner**: All HDPE Liner systems for new manholes and pipes shall conform to the following:

- Embedment sheets shall have a thickness of 3.0 mm for pipe and manholes. Embedment sheet and welding strips shall be free of holes, pinholes, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges.
- Locking studs of the same material as that of the liner shall be integrally extruded with the sheet. Liner shall demonstrate a minimum pull-out strength of 8,000 psf Studs shall be spaced equidistant with a minimum of 40 studs per square foot.
- The material used in the embedment liner and in all welding strips shall be made from 97-98% virgin high density polyethylene. Plasticizer shall not be added to the resin formulation.
- The HDPE cap strips shall be made from HDPE, have good impact resistance and have an elongation sufficient to bridge up to 1/4 inch settling cracks. Cap strips shall be approximately 4 inches wide or greater and thickness 1.0 mm greater than that of the liner. Liner shall accommodate recessed electro-fusion welding cap strips; cap strips that intrude into the pipe more than 1.0 mm will not be allowed.
- Liner shall demonstrate a minimum pull-out strength of 8,000 psf.
- Liner shall have a minimum elongation in excess of 200% before break.
- Liner shall have an abrasion resistance demonstrating a maximum abrasion loss of 2.0 mm after 750,000 cycles per Darmstadt test method.

**(b) Manufacturer** - The HDPE manhole liner shall be Studliner as manufactured by GSE Lining Technology Inc., SureGrip Concrete Protective Liner by Agru America, or approved equal.

**(c) Identification -** All preformed liner shall be marked in letters no less than 1 inch in height with the following information:

- Manufacturers identification
- Manufacturers serial number
- HDPE liner length and thickness

**02451.11 Precast Concrete -** Precast manhole components and pipe shall have integrally cast liners pre-cast prior to delivery. Liner shall be integrally cast using self-consolidating concrete only. Voids in the concrete, wherever visible, will be cause for rejection of the entire structure or pipe segment.

**02451.12 Manhole Topslab -** Precast manhole topslabs shall have integrally cast liners on all exposed interior surfaces.

The opening for manhole frames shall be lined. The interface between the bottom of frame and the top of the "throat" liner shall be made corrosion resistant. A 4-inch wide flange or "top-hat" shall be prefabricated. Two strips of 1.5-inch preformed butyl mastic sealant shall be placed, side-by-side, between the liner flange and the manhole frame and cover. See the Drawings for additional details. All welding of integrally-casted liners in the precast top slabs shall be done at the precast facility prior to delivery to the Site.

Precast Manhole Components: Lifting hooks/holes shall be on the non-lined portion of the precast manhole components (e.g., on the outside of the manhole components).

**02451.13 Pipe to Manhole Connection –** Use HDPE boots to seal connection between new pipe and liner penetrations. Grout annular space between the exterior of the HDPE boot and the manhole wall, per the Standard Specifications. The use of rubber boots will not be allowed.

**02451.14 Stainless Steel Expansion or Tightening Bands -** Stainless steel bands shall be 1/2-inch in width. Tightening and expansion bands shall be Series 316 stainless steel with stainless steel nut and bolt tightening clamps. Stainless steel components shall meet all requirements of ASTM A240.

**02451.15 Sealant -** Sealant, as required, for penetrations in the liner or sealing gaps between dissimilar materials, shall be as follows:

**02451.16 Butyl Rubber Gasket** - Butyl rubber shall be preformed tape, 1/2-inch thick by 1-1/2 inches wide, conforming to ASTM C990.

**(a) Manufacturers:**

- Model MT-320 by A-Lok, Inc.
- Or approved equal.

Polyethylene Adhesive – Adhesive shall be a 0% VOC, modified polymer providing a minimum of 800 psi shear strength when used on HDPE-to-HDPE, per ASTM D1002 (48 hours at 75 degrees).

**(a) Manufacturers:**

- Tam Tech Polypropylene, Polyethylene Adhesive by Tamarron Technology, Inc.
- Or approved equal.

## SECTION 02630 - BASE AGGREGATE

Comply with Section 02630 of the Standard Specifications.

## SECTION 02690 - PCC AGGREGATE

Comply with Section 02690 of the Standard Specifications.

## SECTION 02910 - SIGN MATERIALS

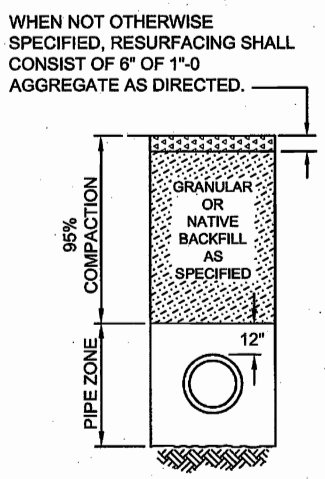
Comply with Section 02910 of the Standard Specifications supplemented and/or modified as follows:

**002910.20(a) General** - Change "Type 1" to "Type I".

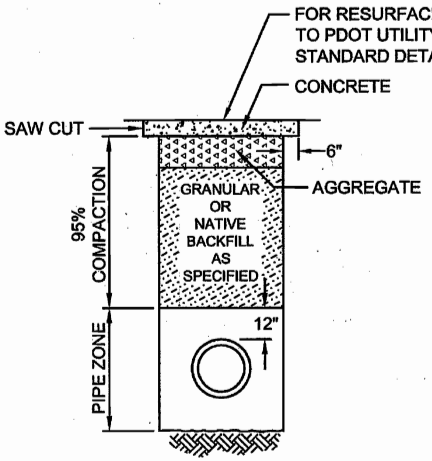
***END***

# PROJECT PLANS AND DETAILS

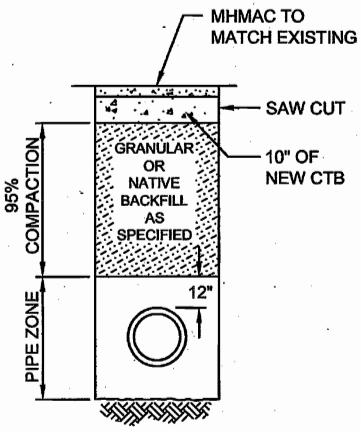
Project Plans provided under separate 11 by 17 book (Volume 2)



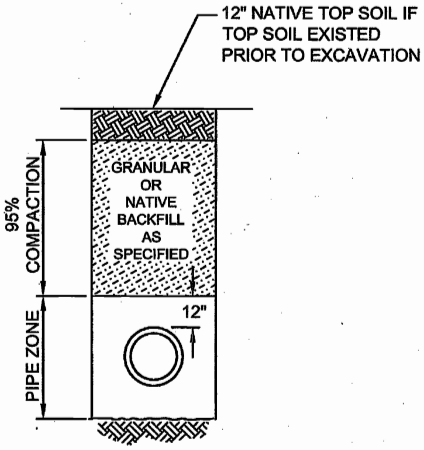

TRAVELED UNIMPROVED STREET




HARD SURFACE (CONCRETE)



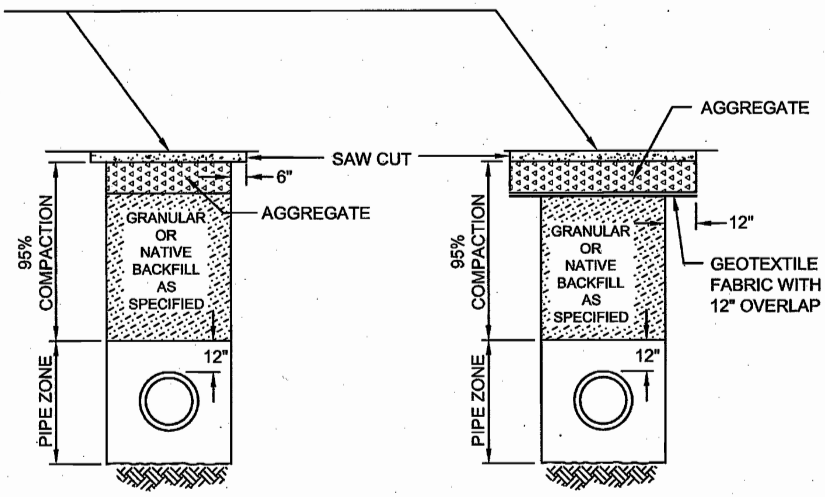

CTB STREET (CEMENT TREATED BASE)




UNIMPROVED AREAS

WHEN NOT OTHERWISE SPECIFIED, RESURFACE TRENCHES WITH:

- PAVEMENT: MHMAC EQUAL IN THICKNESS TO EXISTING PAVEMENT, BUT NOT TO EXCEED 6" MAX. OR 2" MIN.
- BASE: 1"-0 OR 3/4"-0 AGGREGATE EQUAL IN THICKNESS TO EXISTING BASE, BUT NOT TO EXCEED 12" MAX. OR 6" MIN.




OIL GRAVEL OR ASPHALT CONCRETE SURFACE

OIL GRAVEL OR ASPHALT CONCRETE SURFACE W/ GEOTEXTILE FABRIC

NOTE:

1. FOR PIPE ZONE BEDDING, BACKFILL AND COMPACTION REQUIREMENTS, SEE STANDARD DETAIL NO. P-101.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

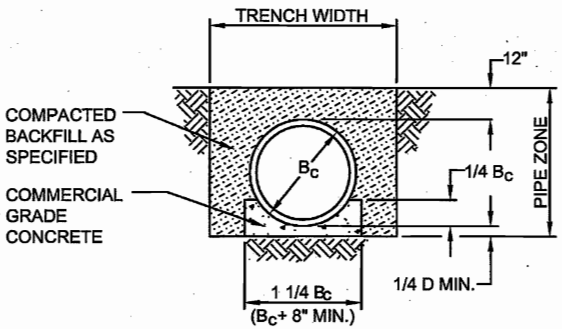
# Typical Trench Sections Backfill and Surfacing

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

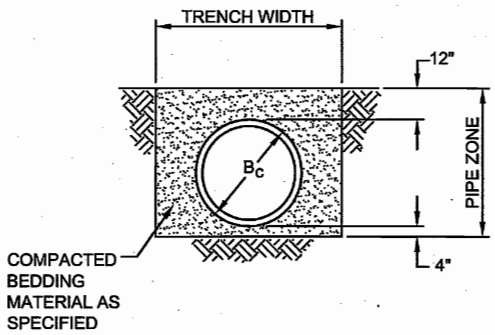
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-100

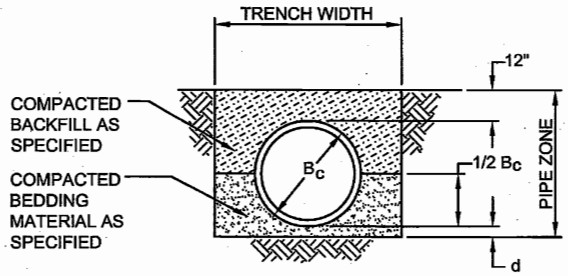
P-100_TYP_TRENCH_SECTIONS.DWG 4/6/09 5:31 PM RICKS



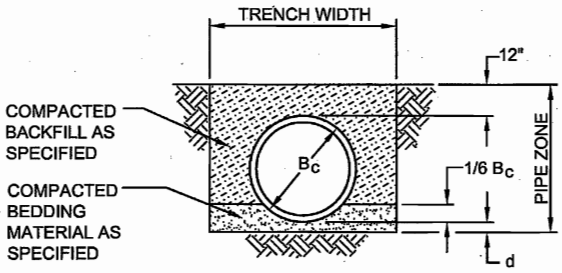

CLASS A
CONCRETE CRADLE




FLEXIBLE PIPE
OR CLASS D BEDDING




CLASS B BEDDING




CLASS C BEDDING

| DEPTH OF BEDDING MATERIAL BELOW PIPE FOR CLASSES B AND C | |
|---|---|
| D | d (MIN.) |
| 27" & SMALLER | 3" |
| 30" TO 60" | 4" |
| 66" & LARGER | 6" |

NOTES:

1. FOR ROCK OR OTHER INCOMPRESSIBLE MATERIALS, THE TRENCH SHALL BE OVEREXCAVATED A MINIMUM OF 6" AND REFILLED WITH GRANULAR MATERIAL AS DIRECTED BY THE ENGINEER.
2. FOUNDATION STABILIZATION: WHERE DIRECTED, FOUNDATION STABILIZATION SHALL BE PLACED PRIOR TO PLACEMENT OF PIPE BEDDING.

LEGEND:

$B_C$ = OUTSIDE DIAMETER
d = DEPTH OF BEDDING MATERIAL BELOW PIPE
D = INSIDE DIAMETER

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

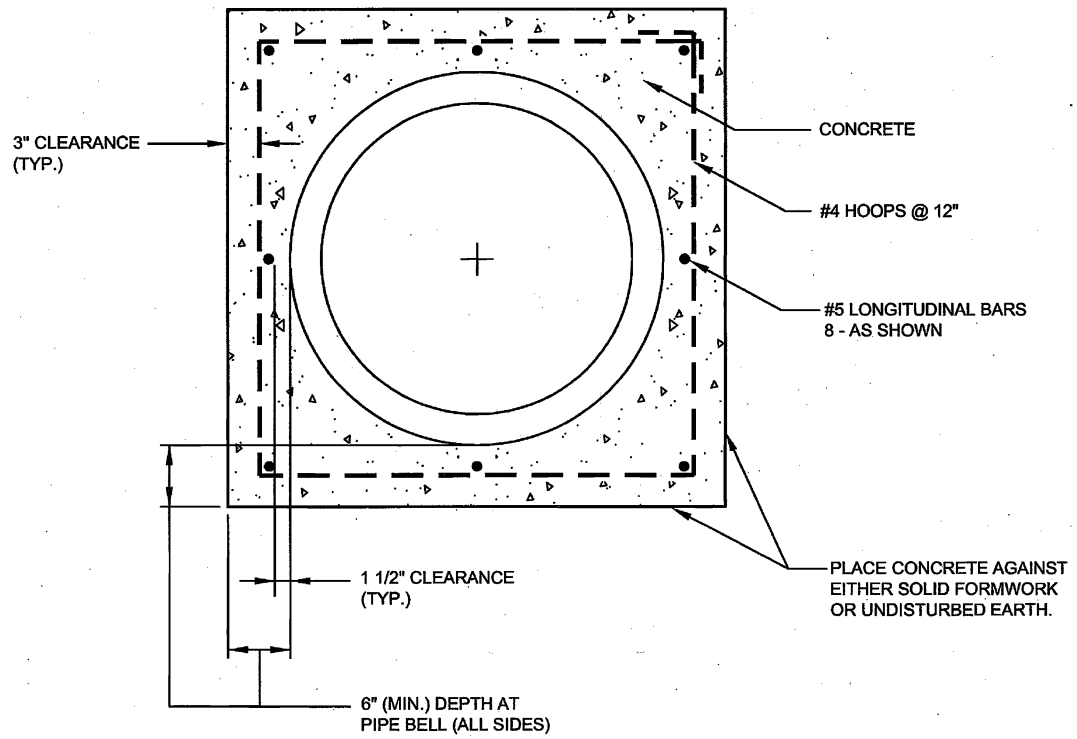
Pipe Bedding and Pipe Zone

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-101

P-101_PIPE_BEDDING_PIPE_ZONE.DWG 5/13/09 10:42 AM RICKS




NOTE:

1. CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

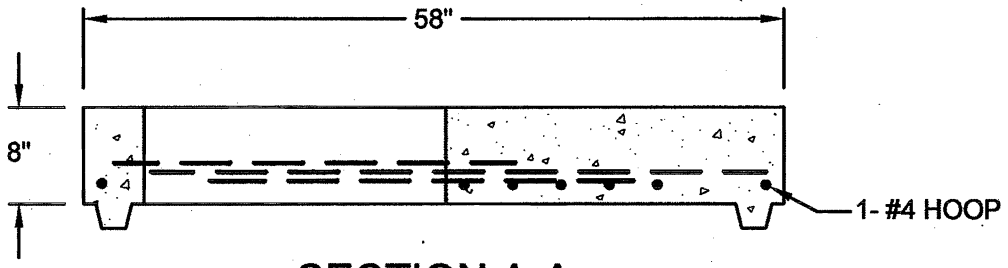
Sewer Pipe Concrete Encasement

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

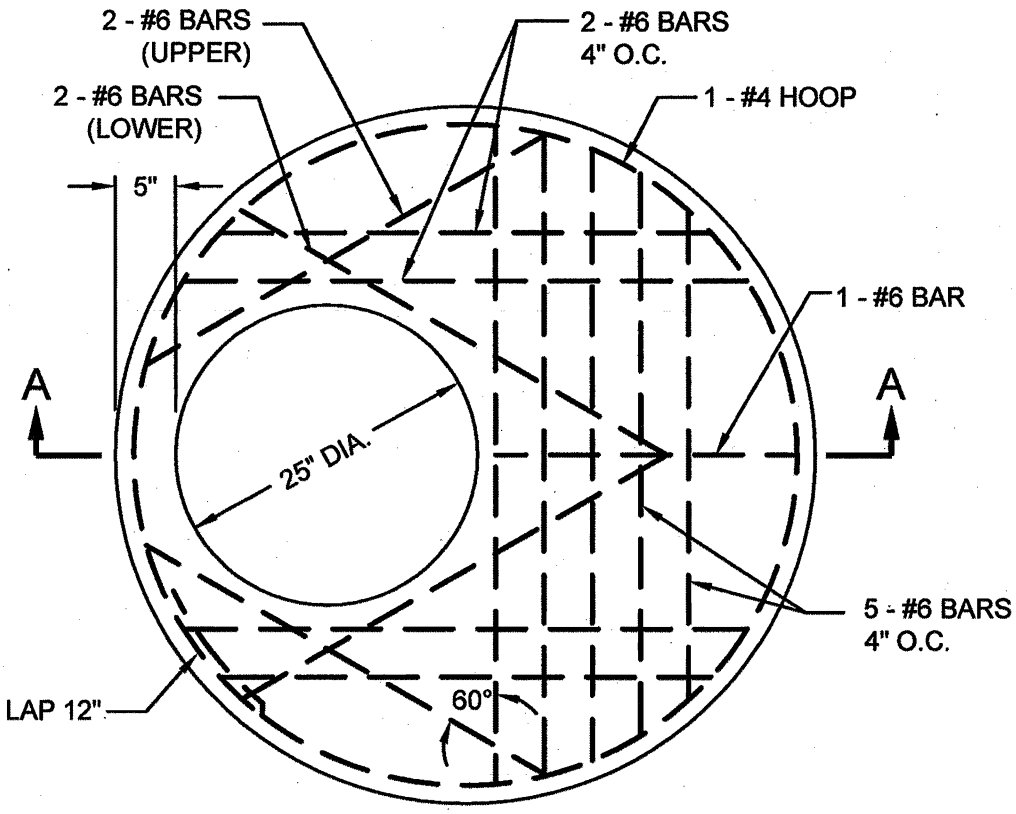
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-103

P-103_SEWER_PIPE_CONC_ENCASEMENT.DWG 4/6/09 5:32 PM RICKS




## SECTION A-A




## PLAN

NOTES:

- CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI (GRADE 60).
- LAP SPLICES SHALL BE A MINIMUM OF 24 BAR DIAMETERS IN LENGTH UNLESS OTHERWISE NOTED.
- ALL REINFORCING HOOPS AND BARS SHALL HAVE A MINIMUM 1½" CLEARANCE TO OUTSIDE SURFACES, INCLUDING TO THE INSIDE FACE AT OPENING.

The selection and use of this Standard Drawing, while designed in accordance wtih generally accepted engineering principles and practices, is the sole responsibility of the user.

Manufacturing Standards for Precast Concrete Products — Appendix A

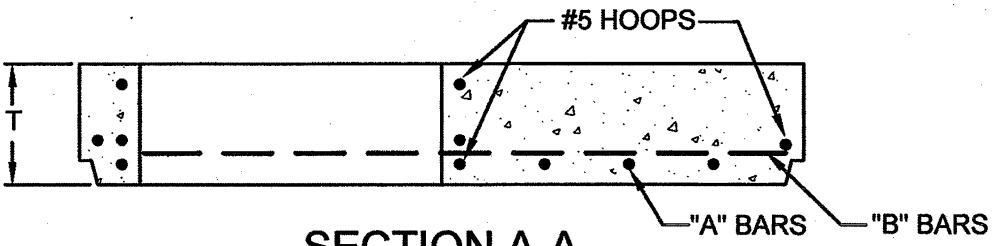
Top Slab "A" for Precast Manhole

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

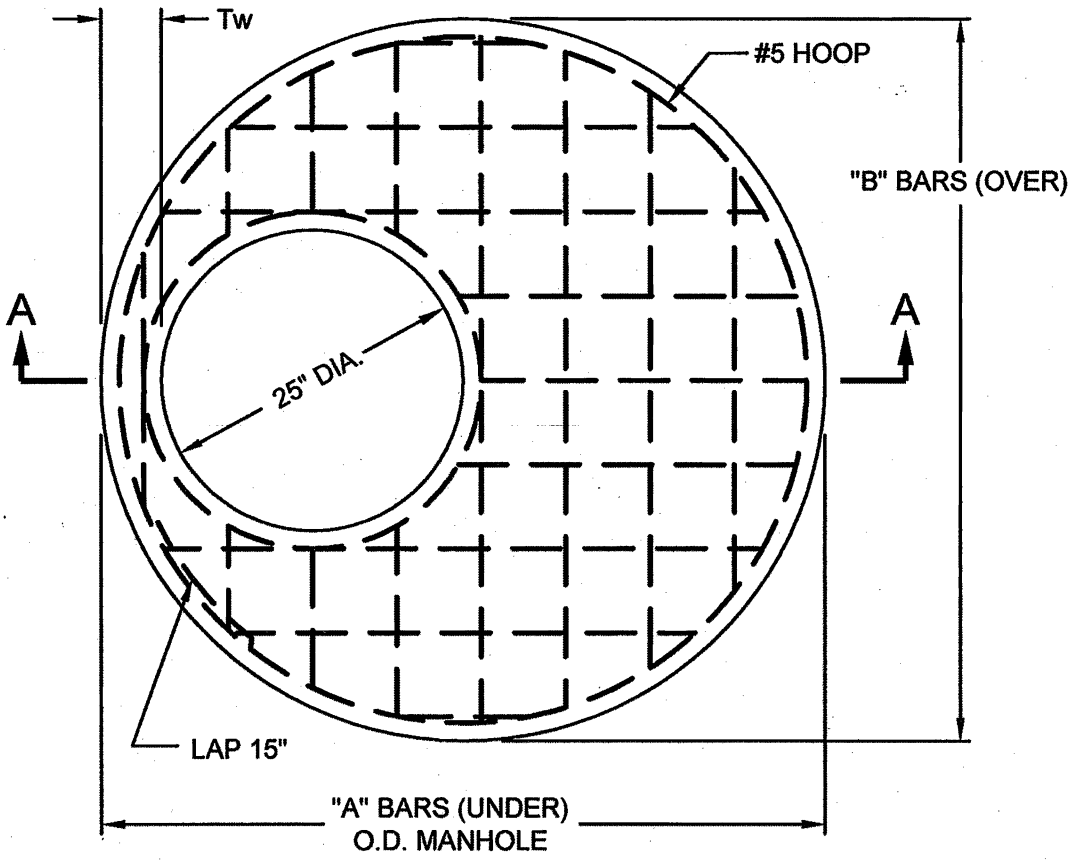
Calc. Book No.: 001

Effective Date: 01-01-09

Standard Drawing No.: P-140




## SECTION A-A




## PLAN

NOTES:

- CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI (GRADE 60).
- LAP SPLICES SHALL BE A MINIMUM OF 24 BAR DIAMETERS IN LENGTH UNLESS OTHERWISE NOTED.
- ALL REINFORCING HOOPS AND BARS SHALL HAVE A MINIMUM 1½" CLEARANCE TO OUTSIDE SURFACES, INCLUDING TO THE INSIDE FACE AT OPENING.
- OMIT BARS 6" OR LESS IN LENGTH. PROVIDE 6" TO 14" BARS WITH A 90° 4" HOOK, EACH END. HOOK SHALL BEND UPWARD TOWARD TOP OF SLAB.
- LOWER HOOP AROUND OPENING SHALL BE TIED TO TOP OF BOTTOM MAT REINFORCEMENT. UPPER HOOP SHALL BE LOCATED 1½" CLEAR OF TOP SURFACE OF SLAB.

The selection and use of this Standard Drawing, while designed in accordance wtih generally accepted engineering principles and practices, is the sole responsibility of the user.

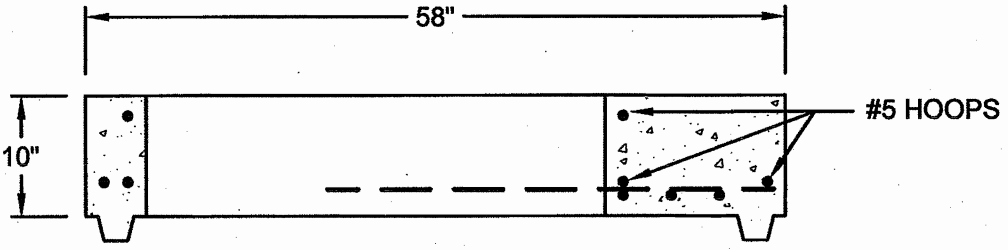
Manufacturing Standards for Precast Concrete Products — Appendix A

# Top Slab "B" for Precast Manhole

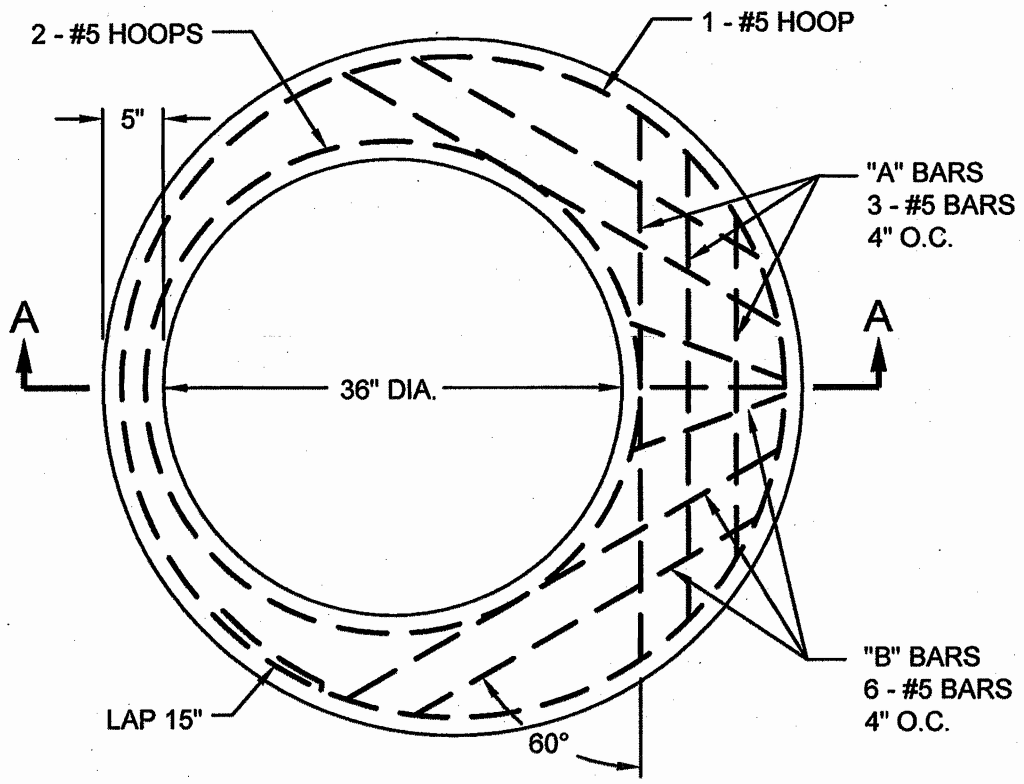
Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

| Calc. Book No. | Standard Drawing No. |
|---|---|
| 001 | P-141 |
| Effective Date | |
| 01-01-09 | |

A_P141_TOP_SLAB_B.DWG 4/6/09 4:48 PM RICKS




## SECTION A-A

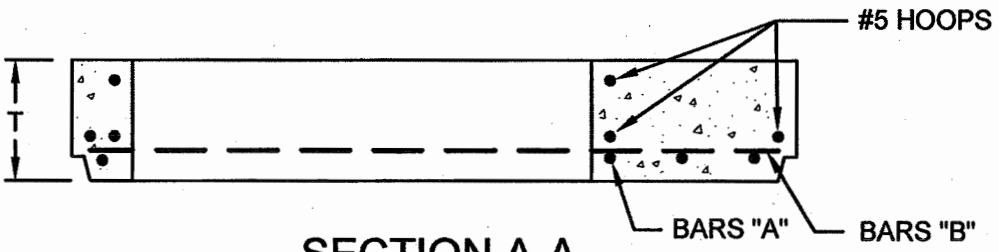



## PLAN

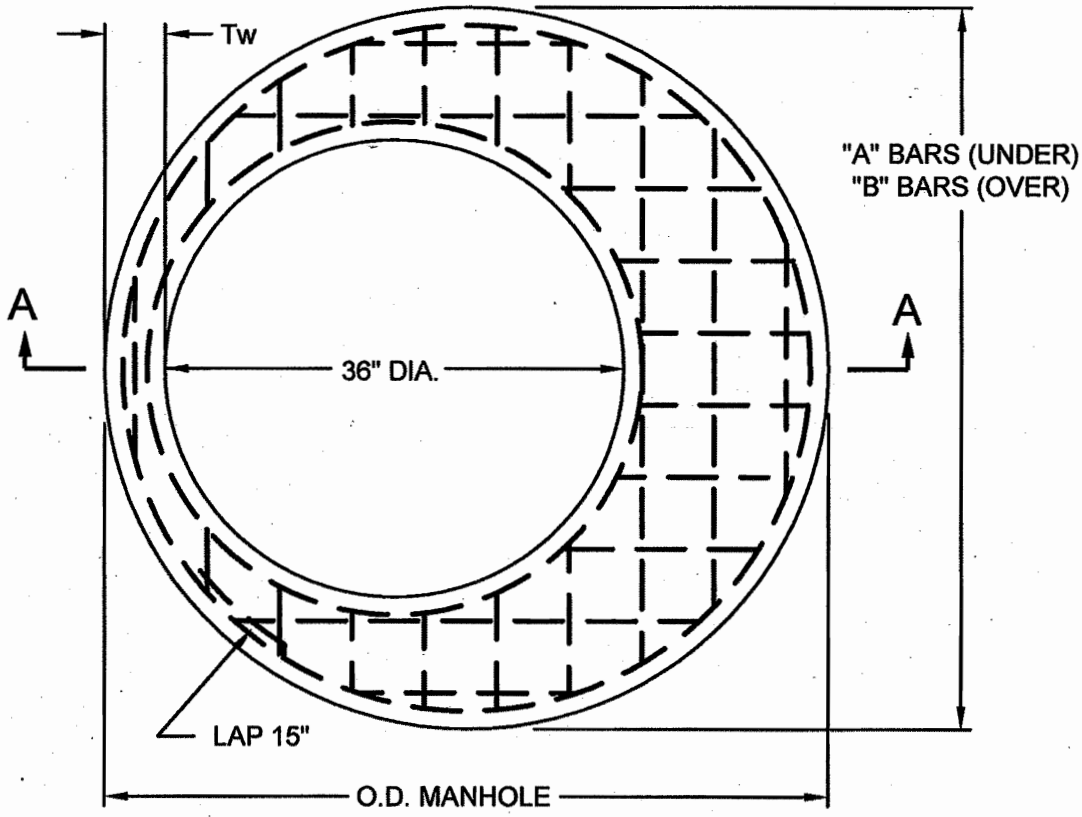
NOTES:

- CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI (GRADE 60).
- LAP SPLICES SHALL BE A MINIMUM OF 24 BAR DIAMETERS IN LENGTH UNLESS OTHERWISE NOTED.
- ALL REINFORCING HOOPS AND BARS SHALL HAVE A MINIMUM 1½" CLEARANCE TO OUTSIDE SURFACES, INCLUDING TO THE INSIDE FACE AT OPENING.
- LOWER HOOP AROUND OPENING SHALL BE TIED TO TOP OF BOTTOM MAT REINFORCEMENT. UPPER HOOP SHALL BE LOCATED 1½" CLEAR OF TOP SURFACE OF SLAB.

| | | | |
|---|---|---|---|
| The selection and use of this Standard Drawing, while designed in accordance wtih generally accepted engineering principles and practices, is the sole responsibility of the user. | Manufacturing Standards for Precast Concrete Products — Appendix A<br>Top Slab "C" for Precast Manhole | | |
| | Bureau of Environmental Services<br>CITY OF PORTLAND, OREGON<br>Chief Engineer | Calc. Book No.<br>001<br>Effective Date<br>01-01-09 | Standard Drawing No.<br>P-142 |




## SECTION A-A




## PLAN

NOTES:

- CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI (GRADE 60).
- LAP SPLICES SHALL BE A MINIMUM OF 24 BAR DIAMETERS IN LENGTH UNLESS OTHERWISE NOTED.
- ALL REINFORCING HOOPS AND BARS SHALL HAVE A MINIMUM 1½" CLEARANCE TO OUTSIDE SURFACES, INCLUDING TO THE INSIDE FACE AT OPENING.
- OMIT BARS 6" OR LESS IN LENGTH. PROVIDE 6" TO 14" BARS WITH A 90° 4" HOOK EACH END. HOOK SHALL BEND UPWARD TOWARD TOP OF SLAB.
- ADD A TEMPERATURE REINFORCEMENT MAT OF #4 BARS @ 12" E.W., 1½" CLEAR OF TOP SURFACE, ON ALL TOP SLABS GREATER THAN 12" IN THICKNESS.
- LOWER HOOP AROUND OPENING SHALL BE TIED TO TOP OF BOTTOM MAT REINFORCEMENT. UPPER HOOP SHALL BE LOCATED 1½" CLEAR OF TOP SURFACE OF SLAB. IF TEMPERATURE REINFORCEMENT IS REQUIRED, UPPER HOOP SHALL BE TIED UNDERNEATH TOP MAT REINFORCEMENT.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

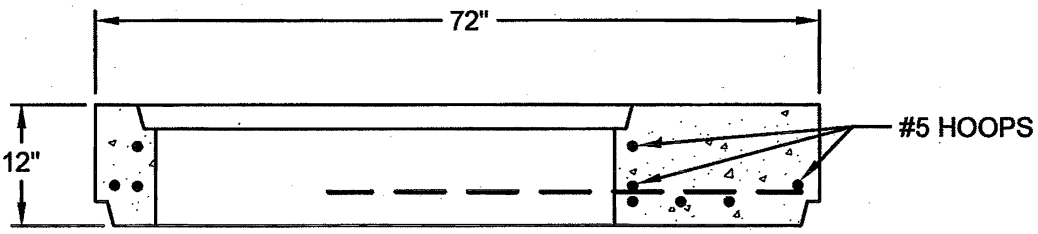
Manufacturing Standards for Precast Concrete Products — Appendix A

# Top Slab "D" for Precast Manhole

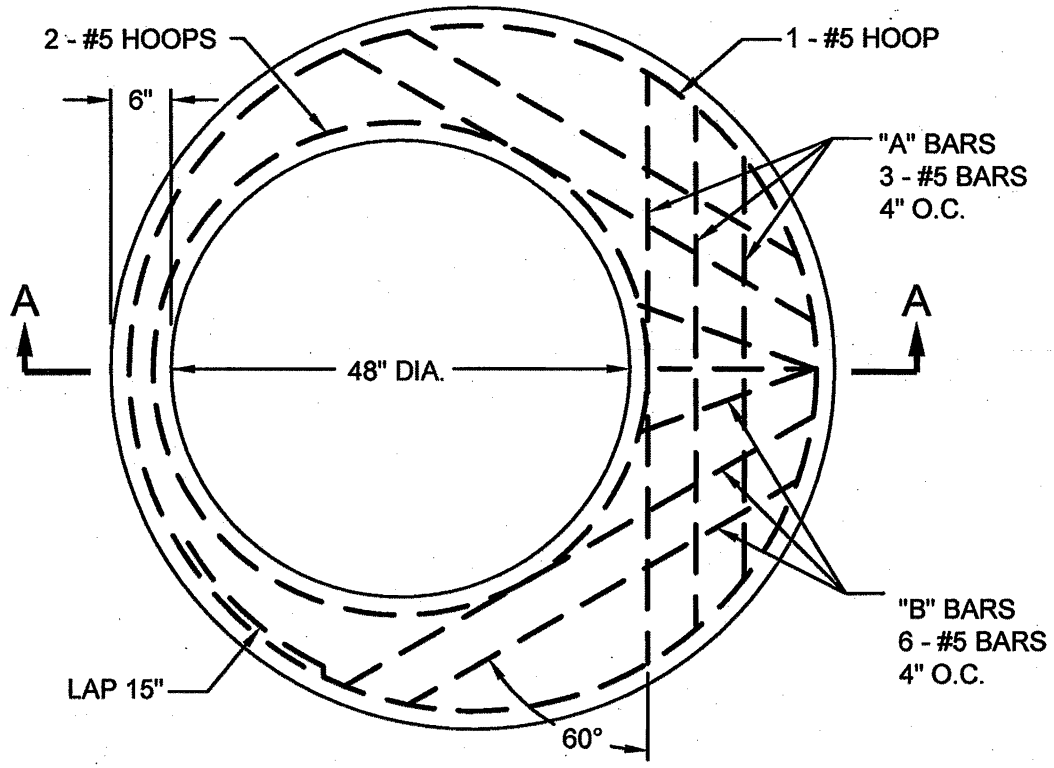
Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

| Calc. Book No. | Standard Drawing No. |
|---|---|
| 001 | P-143 |
| Effective Date | |
| 01-01-09 | |

A_P143_TOP_SLAB_D.DWG 4/6/09 4:33 PM RICKS




## SECTION A-A




## PLAN

NOTES:

- CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI (GRADE 60).
- LAP SPLICES SHALL BE A MINIMUM OF 24 BAR DIAMETERS IN LENGTH UNLESS OTHERWISE NOTED.
- ALL REINFORCING HOOPS AND BARS SHALL HAVE A MINIMUM 1½" CLEARANCE TO OUTSIDE SURFACES, INCLUDING TO THE INSIDE FACE AT OPENING.
- UPPER HOOP AROUND OPENING MAY BE LOCATED A MINIMUM OF 1" BELOW BOTTOM FACE OF RISER JOINT, OR A LARGER HOOP MAY BE LOCATED A MINIMUM OF 1½" CLEAR OF OUTSIDE FACE OF RISER JOINT AND 1½" CLEAR OF TOP OF SLAB.
- LOWER HOOP AROUND OPENING SHALL BE TIED TO TOP OF BOTTOM MAT REINFORCEMENT.

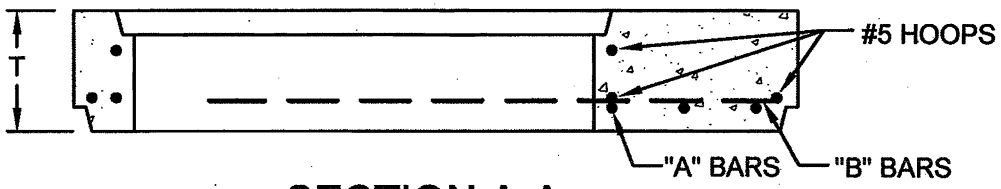
The selection and use of this Standard Drawing, while designed in accordance wtih generally accepted engineering principles and practices, is the sole responsibility of the user.

Manufacturing Standards for Precast Concrete Products — Appendix A

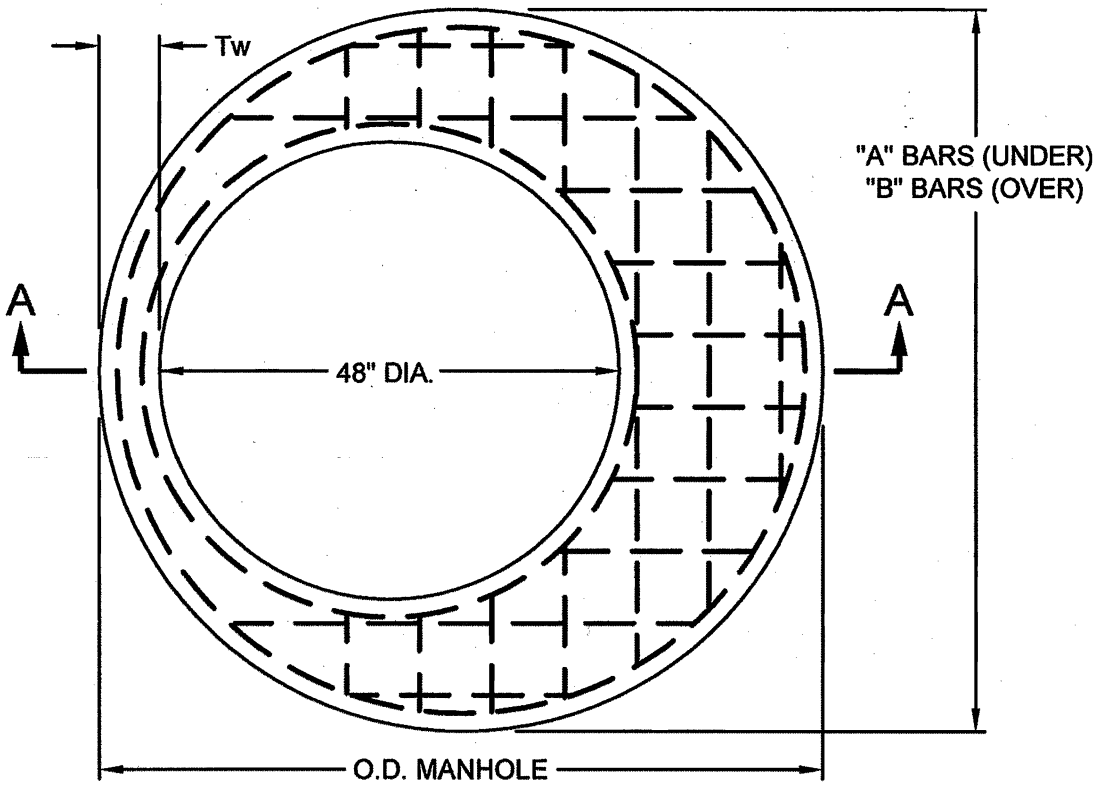
Top Slab "E" (Reducing Slab) for Precast Manhole (60" Dia.)

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

| Calc. Book No. | Standard Drawing No. |
|---|---|
| 001 | P-144 |
| Effective Date | |
| 01-01-09 | |




## SECTION A-A




## PLAN

NOTES:

- CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI (GRADE 60).
- LAP SPLICES SHALL BE A MINIMUM OF 24 BAR DIAMETERS IN LENGTH UNLESS OTHERWISE NOTED.
- OMIT BARS 6" OR LESS IN LENGTH. PROVIDE 6" TO 14" BARS WITH A 90° 4" HOOK EACH END. HOOK SHALL BEND UPWARD TOWARD TOP OF SLAB.
- ADD A TEMPERATURE REINFORCEMENT MAT OF #4 BARS @ 12" E.W., 1½" CLEAR OF TOP SURFACE, ON ALL TOP SLABS GREATER THAN 12" IN THICKNESS.
- ALL REINFORCING HOOPS AND BARS SHALL HAVE A MINIMUM 1½" CLEARANCE TO OUTSIDE SURFACES, INCLUDING TO THE INSIDE FACE AT OPENING.
- REINFORCING HOOPS AND BARS SHALL HAVE A MINIMUM 1" CLEARANCE TO BOTTOM FACE AND 1½" CLEARANCE TO OUTSIDE FACE OF 48" RISER JOINT.
- UPPER HOOP AROUND OPENING MAY BE LOCATED A MINIMUM OF 1" BELOW BOTTOM FACE OF RISER JOINT, OR A LARGER HOOP MAY BE LOCATED A MINIMUM OF 1½" CLEAR OF OUTSIDE FACE OF RISER JOINT AND 1½" CLEAR OF TOP OF SLAB. IF TEMPERATURE REINFORCEMENT IS REQUIRED, HOOP SHALL BE TIED UNDERNEATH TOP MAT REINFORCEMENT.
- LOWER HOOP AROUND OPENING SHALL BE TIED TO TOP OF BOTTOM MAT REINFORCEMENT.

The selection and use of this Standard Drawing, while designed in accordance wtih generally accepted engineering principles and practices, is the sole responsibility of the user.

Manufacturing Standards for Precast Concrete Products — Appendix A

# Top Slab "E" (Reducing Slab) for Precast Manhole (72"-144" Dia.)

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

| Calc. Book No. | Standard Drawing No. |
|---|---|
| 001 | P-145 |
| Effective Date | |
| 01-01-09 | |

A_P145_TOP_SLAB_E_72-144_INCH.DWG 4/6/09 4:49 PM RICKS

| Top Slab "A" | |
|---|---|
| Cover Depth | Manhole Dia (in) |
| 6" to 15" | 48 |
| T (in) | 8 |
| Reinforcement | refer to diagram |

| Top Slab "B" | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cover Depth | Manhole Diameter (in) | | | | | | | |
| 6" to 22" | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |
| T (in) | 9 | 10 | 11 | 12 | N/A | | | |
| "A" Bars (under) | No 5 @ 7" | No 5 @ 7" | No 5 @ 7" | No 5 @ 6" | N/A | | | |
| "B" Bars (over) | No 5 @ 7" | No 5 @ 7" | No 5 @ 7" | No 5 @ 6" | N/A | | | |

| Top Slab "C" | |
|---|---|
| Cover Depth | Manhole Dia (in) |
| 6" to 22" | 48 |
| T (in) | 10 |
| "A" Bars (under) | No 5 @ 4" long |
| "B" Bars (over) | No 5 @ 4" diag** |

| Top Slab "D" | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cover Depth | Manhole Diameter (in) | | | | | | | |
| 6" to 22" | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |
| T (in) | 10 | 10 | 11 | 12 | 12 | 12 | 14 | 14 |
| "A" Bars (under) | No 5 @ 8" | No 5 @ 7" | No 5 @ 6" | No 5 @ 6" | No 6 @ 8" | No 6 @ 7" | No 6 @ 8" | No 6 @ 7" |
| "B" Bars (over) | No 5 @ 8" | No 5 @ 7" | No 5 @ 6" | No 5 @ 6" | No 6 @ 8" | No 6 @ 7" | No 6 @ 8" | No 6 @ 7" |
| Temperature Reinforcement | N/A | | | | | | No. 4 @ 12" E.W. | No. 4 @ 12" E.W. |

NOTE:
** See detail drawings for reinforcement layout.

The selection and use of this Standard Drawing, while designed in accordance wtih generally accepted engineering principles and practices, is the sole responsibility of the user.

Manufacturing Standards for Precast Concrete Products — Appendix A

# Precast Concrete Manhole - Top Slabs "A" through "D"

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Calc. Book No.: 001
Effective Date: 01-01-09
Standard Drawing No.: P-148

A_P148_TABLE.DWG 4/6/09 5:01 PM RICKS

**Top Slab "E"**

| Cover Depth | Manhole Diameter (in) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 42" to 7' | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |
| T (in) | 12 | 12 | 12 | 12 | 12 | 12 | 14 | 14 |
| "A" Bars (under) | No 5 @ 4" long | No 5 @ 8" | No 5 @ 6" | No 5 @ 6" | No 6 @ 7" | No 6 @ 7" | No 6 @ 6" | No 7 @ 8" |
| "B" Bars (over) | No 5 @ 4" diag** | No 5 @ 8" | No 5 @ 6" | No 5 @ 6" | No 6 @ 7" | No 6 @ 7" | No 6 @ 6" | No 7 @ 8" |
| Temperature Reinforcement | N/A | | | | | | No. 4 @ 12" E.W. | No. 4 @ 12" E.W. |

| Cover Depth | Manhole Diameter (in) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 7' to 22' | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |
| T (in) | 12 | 12 | 12 | 14 | 16 | 16 | 16 | 16 |
| "A" Bars (under) | No 5 @ 4" long | No 5 @ 6" | No 6 @ 5" | No 6 @ 5" | No 7 @ 6" | No 8 @ 7" | No 8 @ 6" | No 9 @ 7" |
| "B" Bars (over) | No 5 @ 4" diag** | No 5 @ 6" | No 6 @ 5" | No 6 @ 5" | No 7 @ 6" | No 8 @ 7" | No 8 @ 6" | No 9 @ 7" |
| Temperature Reinforcement | N/A | | | No. 4 @ 12" E.W. | No. 4 @ 12" E.W. | No. 4 @ 12" E.W. | No. 4 @ 12" E.W. | No. 4 @ 12" E.W. |

**Precast Manhole Base Slab**

| 0 - 15' depth | Manhole Diameter (in) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |
| Ts (in) | 11 | 11 | 12 | 12 | 13 | 13 | 14 | 14 |
| "E" Bars | No 4 @ 10" | No 4 @ 8" | No 4 @ 6" | No 5 @ 7" | No 5 @ 6" | No 6 @ 7" | No 6 @ 6" | No 6 @ 5" |

| 15' to 30' depth | Manhole Diameter (in) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |
| Ts (in) | 12 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| "E" Bars | No 4 @ 8" | No 5 @ 8" | No 5 @ 7" | No 5 @ 6" | No 6 @ 6" | No 6 @ 6" | No 6 @ 5" | No 6 @ 5" |

NOTE:
** See detail drawings for reinforcement layout.

The selection and use of this Standard Drawing, while designed in accordance wtih generally accepted engineering principles and practices, is the sole responsibility of the user.

Manufacturing Standards for Precast Concrete Products — Appendix A

# Precast Concrete Manhole - Top Slab "E" and Base Slabs

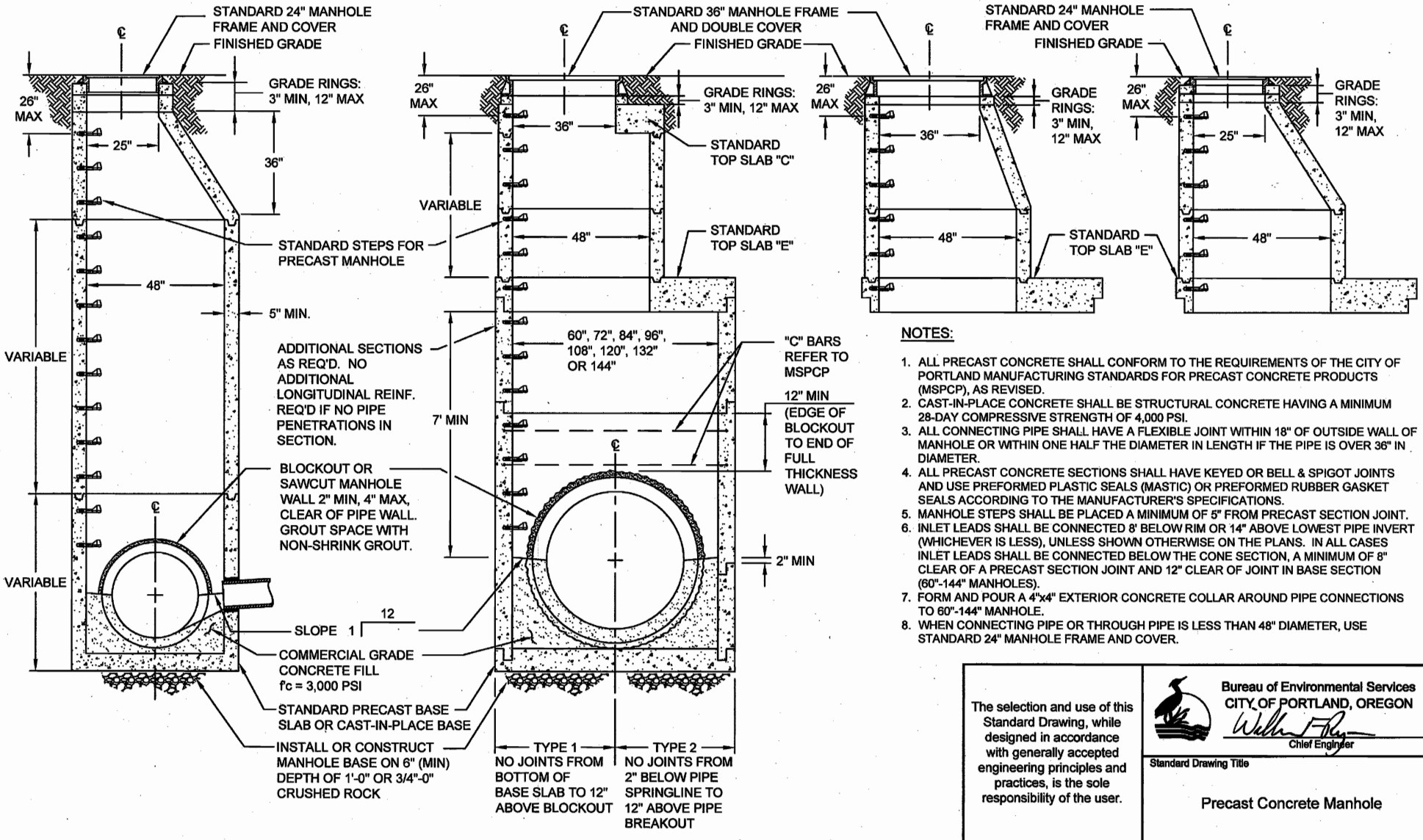
Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Calc. Book No. 001

Effective Date 01-01-09

Standard Drawing No. P-149

A_P149_TABLE.DWG 4/6/09 4:37 PM RICKS




## NOTES:

1. ALL PRECAST CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF PORTLAND MANUFACTURING STANDARDS FOR PRECAST CONCRETE PRODUCTS (MSPCP), AS REVISED.
2. CAST-IN-PLACE CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
3. ALL CONNECTING PIPE SHALL HAVE A FLEXIBLE JOINT WITHIN 18" OF OUTSIDE WALL OF MANHOLE OR WITHIN ONE HALF THE DIAMETER IN LENGTH IF THE PIPE IS OVER 36" IN DIAMETER.
4. ALL PRECAST CONCRETE SECTIONS SHALL HAVE KEYED OR BELL & SPIGOT JOINTS AND USE PREFORMED PLASTIC SEALS (MASTIC) OR PREFORMED RUBBER GASKET SEALS ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
5. MANHOLE STEPS SHALL BE PLACED A MINIMUM OF 5" FROM PRECAST SECTION JOINT.
6. INLET LEADS SHALL BE CONNECTED 8' BELOW RIM OR 14" ABOVE LOWEST PIPE INVERT (WHICHEVER IS LESS), UNLESS SHOWN OTHERWISE ON THE PLANS. IN ALL CASES INLET LEADS SHALL BE CONNECTED BELOW THE CONE SECTION, A MINIMUM OF 8" CLEAR OF A PRECAST SECTION JOINT AND 12" CLEAR OF JOINT IN BASE SECTION (60"-144" MANHOLES).
7. FORM AND POUR A 4"x4" EXTERIOR CONCRETE COLLAR AROUND PIPE CONNECTIONS TO 60"-144" MANHOLE.
8. WHEN CONNECTING PIPE OR THROUGH PIPE IS LESS THAN 48" DIAMETER, USE STANDARD 24" MANHOLE FRAME AND COVER.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
William F. Ryan
Chief Engineer

Standard Drawing Title

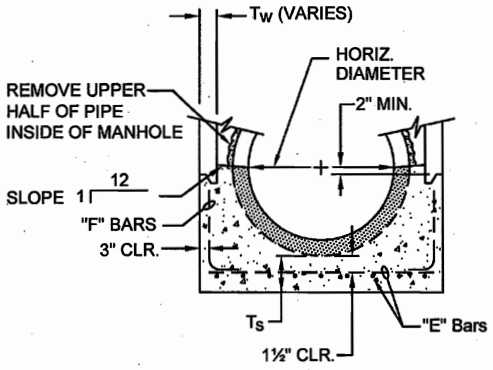
# Precast Concrete Manhole

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 01-01-09
Calc. Book No.: 001
Baseline Report Date: 03-24-09

Standard Drawing No.
P-150

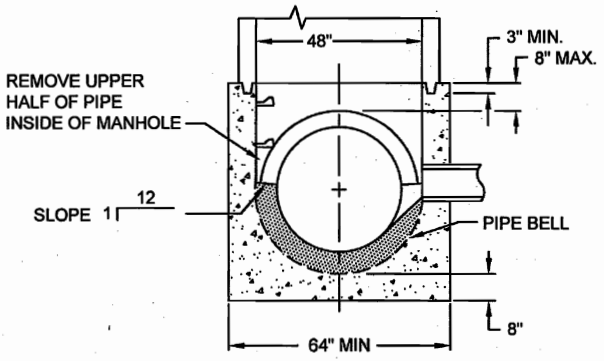
P-150_PRECAST_CONC_MANHOLE.DWG 4/6/09 4:53 PM RICKS




## CAST-IN-PLACE BASE FOR 60"-144" MANHOLES

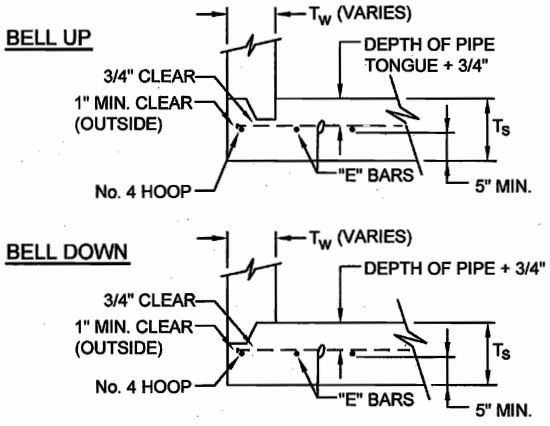
- CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- REINFORCING STEEL SHALL HAVE A YIELD STRENGTH OF 60,000 PSI.
- PROVIDE GROUT OR PREFORMED PLASTIC SEAL (MASTIC) AT JOINT WITH PRECAST MANHOLE SECTION. GROUT OR SEAL NOT REQUIRED WHEN BASE CAST IN CONTACT WITH PRECAST SECTION.

| MH SIZE | DEPTH (Invert to Street) | $T_S$ | "E" BARS | "F" BARS |
|---|---|---|---|---|
| 60" | 0 - 15' | 7" | #4 @ 10" | #4 @ 10" |
| | 15' - 30' | 9" | #4 @ 9" | #4 @ 9" |
| 72" | 0 - 15' | 7" | #4 @ 7" | #4 @ 7" |
| | 15' - 30' | 9" | #4 @ 6" | #4 @ 6" |
| 84" | 0 - 15' | 8" | #4 @ 6" | #4 @ 6" |
| | 15' - 30' | 10" | #5 @ 9" | #5 @ 9" |
| 96" | 0 - 15' | 9" | #4 @ 6" | #4 @ 6" |
| | 15' - 30' | 11" | #5 @ 7" | #5 @ 7" |
| 108" | 0 - 15' | 10" | #5 @ 9" | #5 @ 9" |
| | 15' - 30' | 12" | #6 @ 9" | #6 @ 9" |
| 120" | 0 - 15' | 11" | #5 @ 8" | #5 @ 8" |
| | 15' - 30' | 13" | #6 @ 8" | #6 @ 8" |
| 132" | 0 - 15' | 12" | #5 @ 8" | #5 @ 8" |
| | 15' - 30' | 14" | #6 @ 7" | #6 @ 7" |
| 144" | 0 - 15' | 13" | #5 @ 7" | #5 @ 7" |
| | 15' - 30' | 16" | #6 @ 7" | #6 @ 7" |




## CAST-IN-PLACE BASE FOR 48-INCH MANHOLE

- CONCRETE SHALL BE STRUCTURAL CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- BASE MAY BE POURED TO A HEIGHT OF 8" ABOVE TOP OF SEWER.
- PROVIDE GROUT OR PREFORMED PLASTIC SEAL (MASTIC) AT JOINT WITH 48" RISER SECTION. GROUT OR SEAL NOT REQUIRED WHEN BASE CAST IN CONTACT WITH RISER SECTION.




## PRECAST BASE SLAB FOR 48"-144" MANHOLES

- ALL PRECAST CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF PORTLAND MANUFACTURING STANDARDS FOR PRECAST CONCRETE (MSPCP), AS REVISED.
- REFER TO MSPCP FOR SIZE AND REINFORCEMENT SCHEDULE.
- PROVIDE PREFORMED PLASTIC SEAL (MASTIC) AT JOINT WITH PRECAST MANHOLE SECTION, ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
- 48" BASE SLABS SHALL BE A MINIMUM OF 6" THICK. REINFORCEMENT SHALL BE PLACED ABOVE MIDPOINT OF BASE SLAB THICKNESS AND SHALL CONSIST OF A MINIMUM OF 0.12 in²/LF IN BOTH DIRECTIONS.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Drawing Title

Manhole Cast-In-Place Base & Precast Base Slab

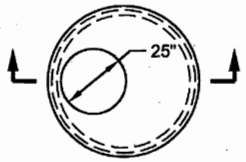
Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 01-01-09
Calc. Book No.: 001
Baseline Report Date: 03-24-09

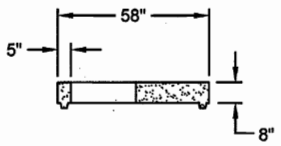
Standard Drawing No.
P-151

P-151_MANHOLE_BASE.DWG 4/6/09 4:53 PM RICKS

## TOP SLAB "A"

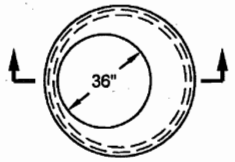



- FOR USE WITH 48" MANHOLES OR RISER SECTIONS AND STANDARD 24" MANHOLE FRAME.
- COVER DEPTH LESS THAN 15 INCHES.

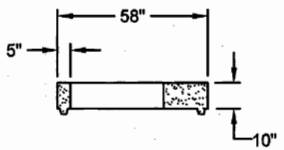



SECTION

## TOP SLAB "C"

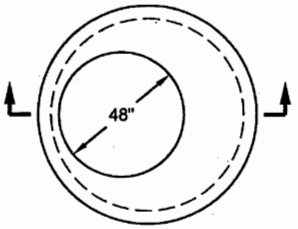



- FOR USE WITH 48" MANHOLES OR RISER SECTIONS AND STANDARD 36" MANHOLE FRAME.
- COVER DEPTH LESS THAN 22 INCHES.

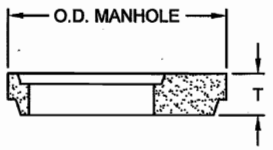



SECTION

## TOP SLAB "E" (REDUCING SLAB)

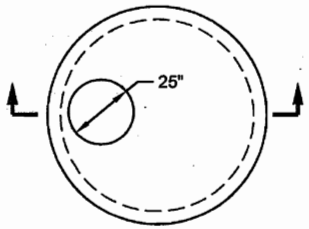



- FOR USE WITH 60" - 144" MANHOLES AND 48" RISER OR CONE SECTIONS.
- COVER DEPTH 42" TO 22'.

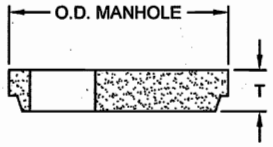



SECTION

## TOP SLAB "B"

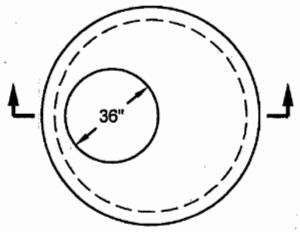



- FOR USE WITH 60" - 96" MANHOLES AND STANDARD 24" MANHOLE FRAME.
- COVER DEPTH LESS THAN 22 INCHES.

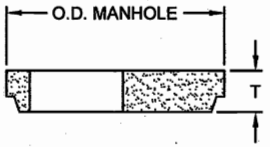



SECTION

## TOP SLAB "D"




- FOR USE WITH 60" - 144" MANHOLES AND STANDARD 36" MANHOLE FRAME.
- COVER DEPTH LESS THAN 22 INCHES.




SECTION

## NOTES:

1. ALL PRECAST CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF PORTLAND MANUFACTURING STANDARDS FOR PRECAST CONCRETE PRODUCTS (MSPCP), AS REVISED.
2. FOR EACH TOP SLAB, REFER TO MSPCP FOR COMPLETE SIZE AND REINFORCEMENT DETAILS.
3. ALL TOP SLABS SHALL HAVE KEYED OR BELL & SPIGOT JOINTS AND SHALL USE PREFORMED PLASTIC SEALS (MASTIC) OR PREFORMED RUBBER GASKET SEALS ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Drawing Title

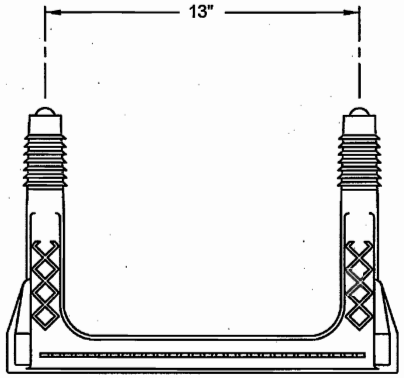
Top Slabs for
Precast Concrete Manholes

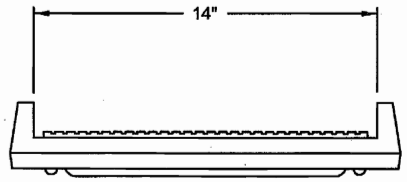
Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

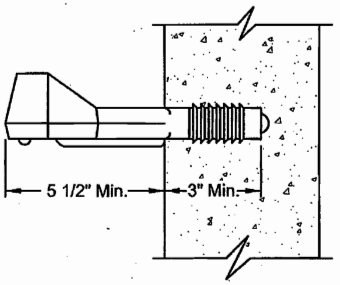
Effective Date: 01-01-09
Calc. Book No.: 001
Baseline Report Date: 03-24-09

Standard Drawing No.
P-152

P-152_TOP_SLABS_PRECAST_CONC_MH.DWG 4/6/09 4:54 PM RICKS




NOTES:

1. ONLY USE CITY CERTIFIED STEPS IN ALL MANHOLES. A CURRENT LIST OF CERTIFIED STEPS CAN BE OBTAINED FROM THE CITY OF PORTLAND MATERIALS TESTING LAB (503) 823-2340.
2. ALL STEPS SHALL BE OF THE SAME DESIGN, TYPE AND SIZE AND INSTALLED IN CONFORMANCE WITH THE MSPCP AND THE MANUFACTURER'S RECOMMENDATIONS.
3. FOR PRECAST MANHOLES THE MANUFACTURER SHALL INSTALL THE STEPS BEFORE DELIVERY TO THE JOB SITE.
4. LOOSE STEPS WILL NOT BE ACCEPTED. IN PRECAST MANHOLES LOOSE STEPS SHALL BE CAUSE FOR REJECTION OF THE MANHOLE CONE OR SECTION.
5. LOCATE THE FIRST MANHOLE STEP 6 INCHES BELOW THE TOP OF CONE AND NOT MORE THAN 26 INCHES BELOW FINISH GRADE. SUCCEEDING STEP SHALL BE SPACED 12 INCHES ON CENTER.
6. STEPS SHALL BE ALIGNED VERTICALLY.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

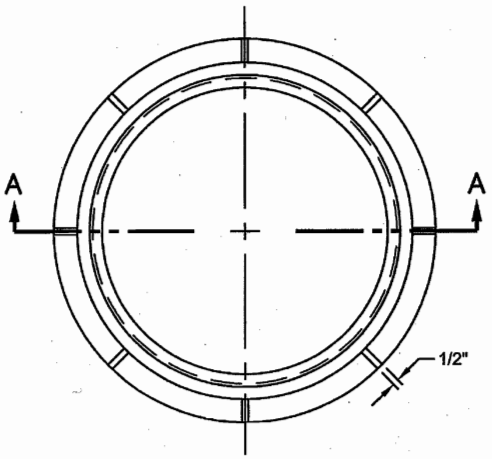
Step for Precast Manhole

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

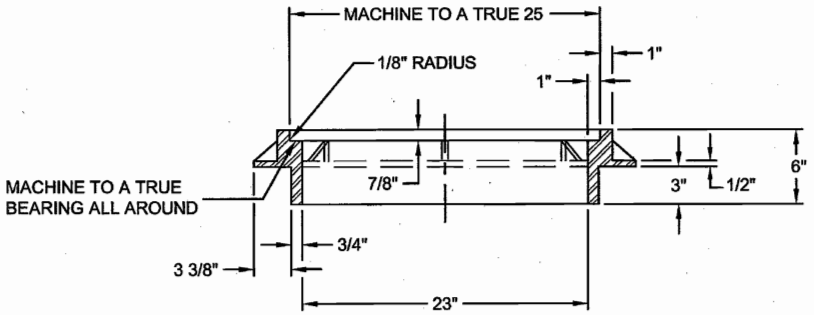
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-168

P-168_STEP_PRECAST_MANHOLE.DWG 4/6/09 5:57 PM RICKS




TOP VIEW




SECTION A–A

NOTE: MATERIAL TO BE GRAY CAST IRON ASTM A-48, CLASS 30 WEIGHT APPROX. 172 LBS.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

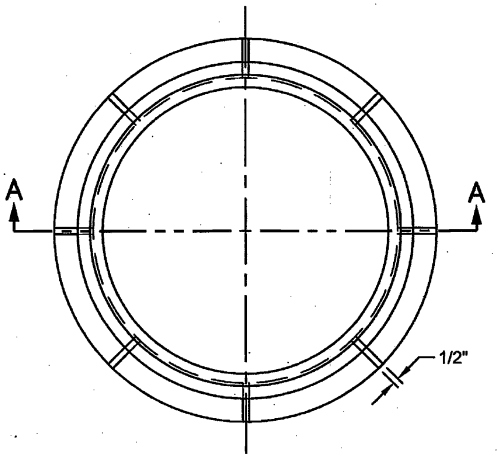
Manhole Frame - 6 Inch Depth

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

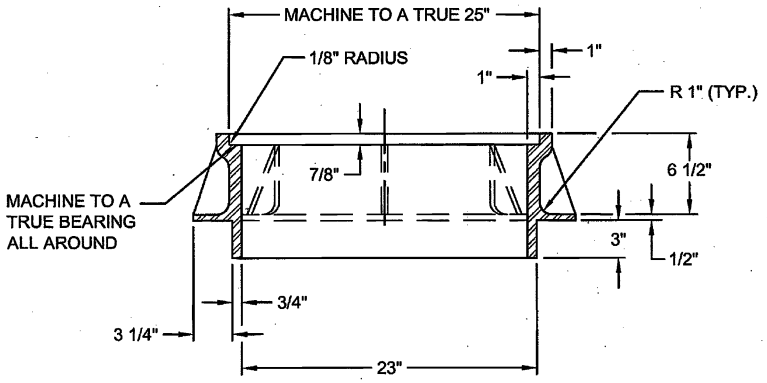
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-171

P-171_MH_FRAME_6-INCH_DEPTH.DWG 4/6/09 6:02 PM RICKS




TOP VIEW




SECTION A-A

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON

Chief Engineer

Standard Detail Title

Manhole Frame - 10 Inch Depth

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 01-01-09

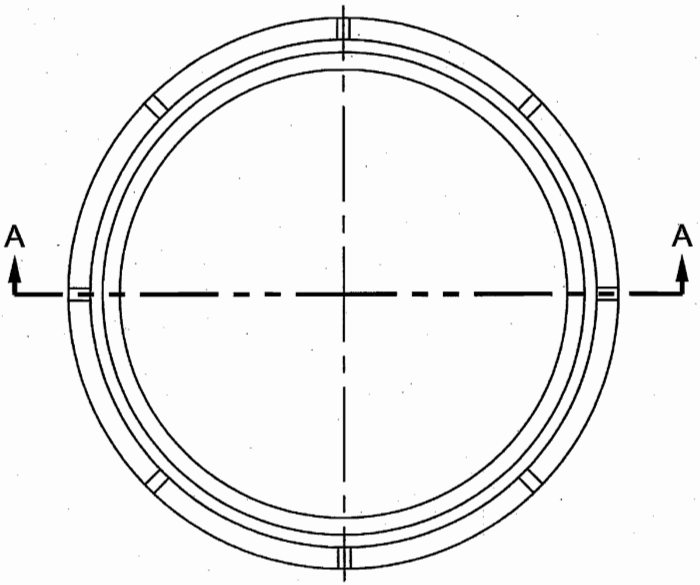
Calc. Book No.: N/A

Baseline Report Date: N/A

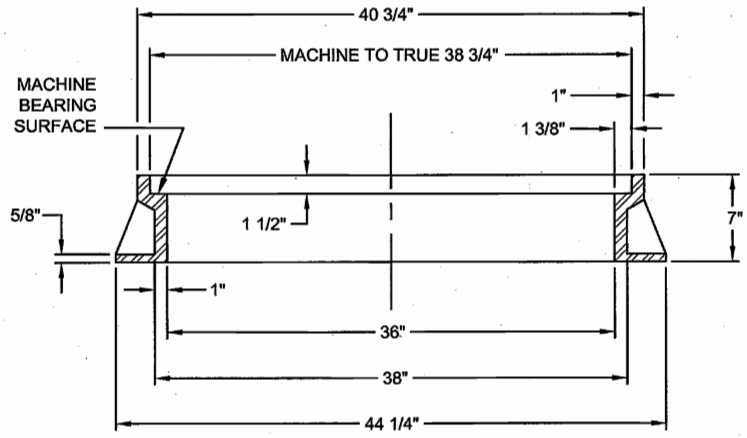
Standard Detail No.

P-172

P-172_MH_FRAME_10-INCH_DEPTH.DWG 4/6/09 6:03 PM RICKS




TOP VIEW




SECTION A-A

NOTES:

1. EACH CASTING SHALL BE STAMPED WITH MANUFACTURE'S INITIALS, HEAT NUMBER, AND YEAR OF THE CAST.
2. TOLERANCE ON NON-MACHINED SURFACES TO BE ±1/16".
3. APPROX. WT. = 375 LBS. MATERIAL TO BE DUCTILE IRON, ASTM A-48, CLASS 30.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

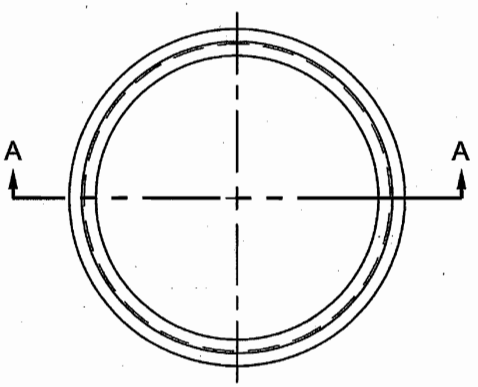
36 Inch Manhole Frame

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

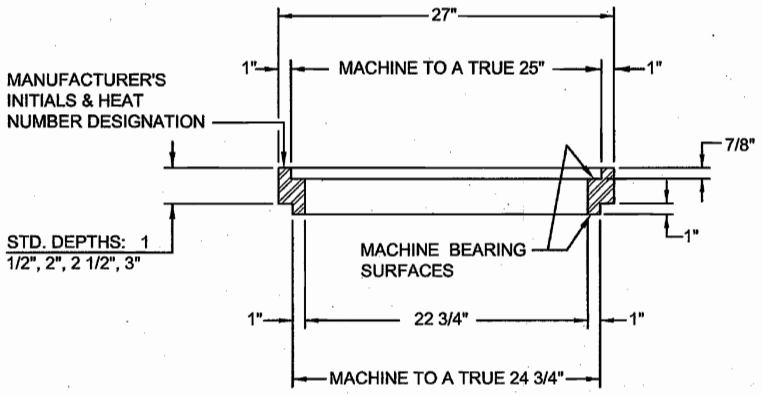
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-173

P-173_36-INCH_MANHOLE_FRAME.DWG 4/6/09 6:03 PM RICKS




TOP VIEW




SECTION A-A

NOTES:

1. MATERIAL TO BE GREY CAST IRON ASTM A-48, CLASS 30.
2. TOLERANCE ON NON-MACHINED SURFACES TO BE ±1/16"

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

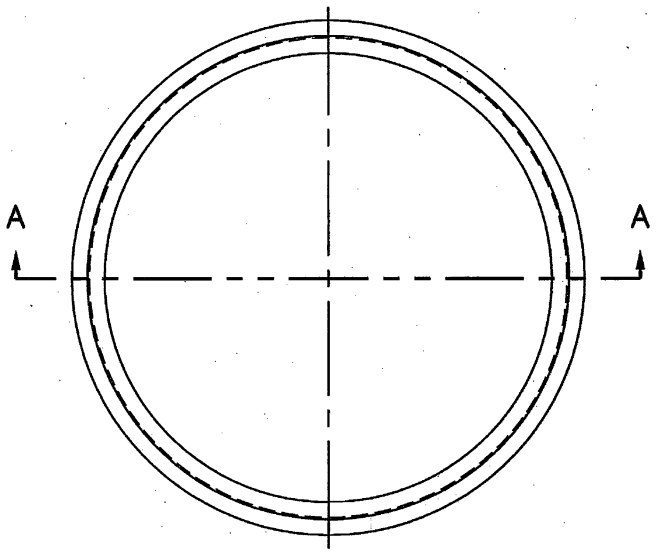
Manhole Riser Ring

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

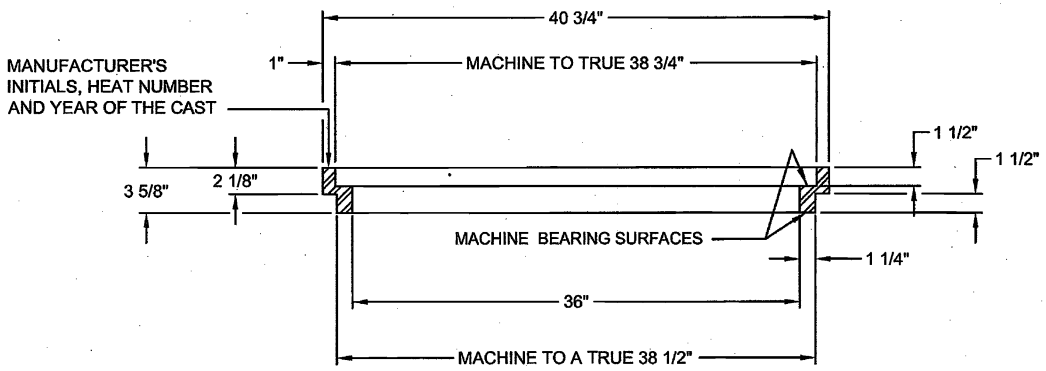
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-174

P-174_MH_RISER_RING.DWG 4/6/09 6:04 PM RICKS




TOP VIEW




SECTION A–A

NOTES:

1. MATERIAL TO BE GREY CAST IRON ASTM A-48, CLASS 30. APPROXIMATE WT. = 212 LBS.
2. TOLERANCE ON NON-MACHINED SURFACES TO BE ± 1/16".

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

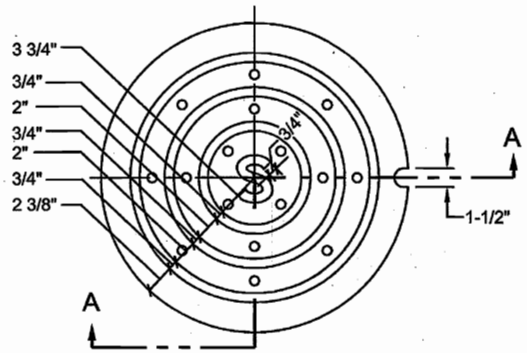
36 Inch Manhole Riser Ring

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

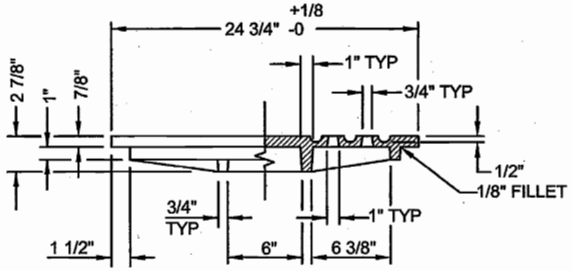
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-175

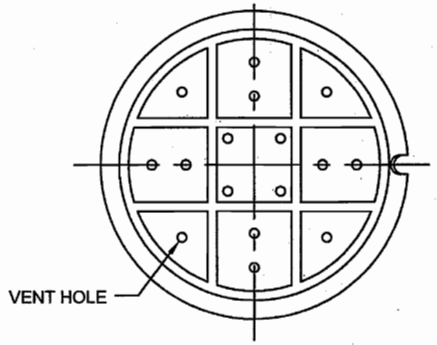
P-175_36-INCH_MH_RISER_RING.DWG 4/6/09 6:05 PM RICKS




TOP VIEW




SECTION A-A




BOTTOM VIEW

NOTES:

1. MATERIAL TO BE GRAY CAST IRON, ASTM A48, CLASS 30, WEIGHT APPROX. 139 LBS.
2. MACHINE TO A TRUE BEARING ALL AROUND.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

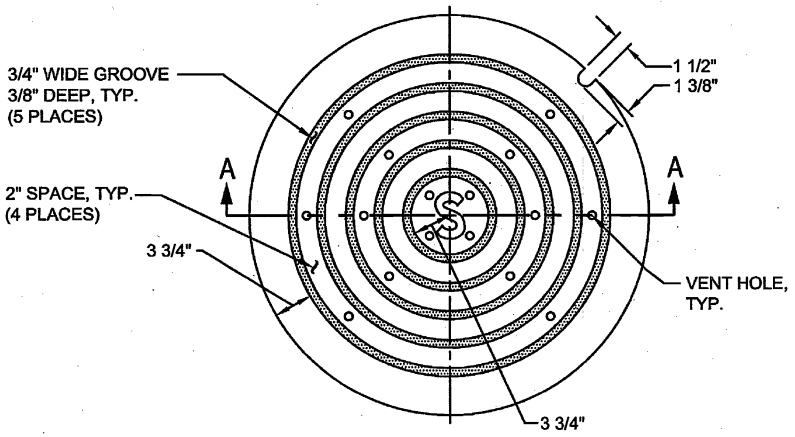
Manhole Cover

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

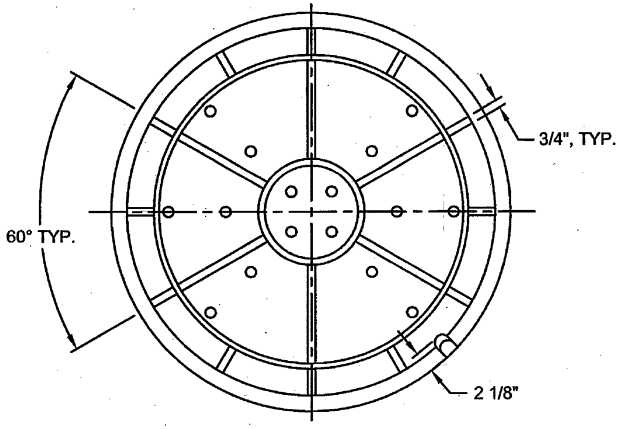
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-176

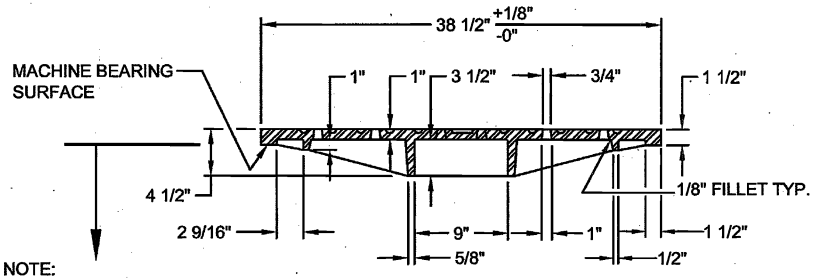
P-176_MANHOLE_COVER.DWG 4/6/09 6:06 PM RICKS




TOP VIEW




BOTTOM VIEW




NOTE:
FOUNDRY MAY VARY
UNDERSTRUCTURE
DESIGN AND DIMENSIONS SUBJECT
TO APPROVAL OF DESIGN AND
TESTING BY BES.

SECTION A-A

NOTES:

1. EACH CASTING SHALL BE STAMPED WITH MANUFACTURE'S INITIALS, HEAT NUMBER, AND YEAR OF THE CAST.
2. TOLERANCE ON NON-MACHINED SURFACES TO BE ± 1/16".
3. APPROX. WT. = 330 LBS. MATERIAL TO BE DUCTILE IRON, ASTM A536, GRADE 80-55-06.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

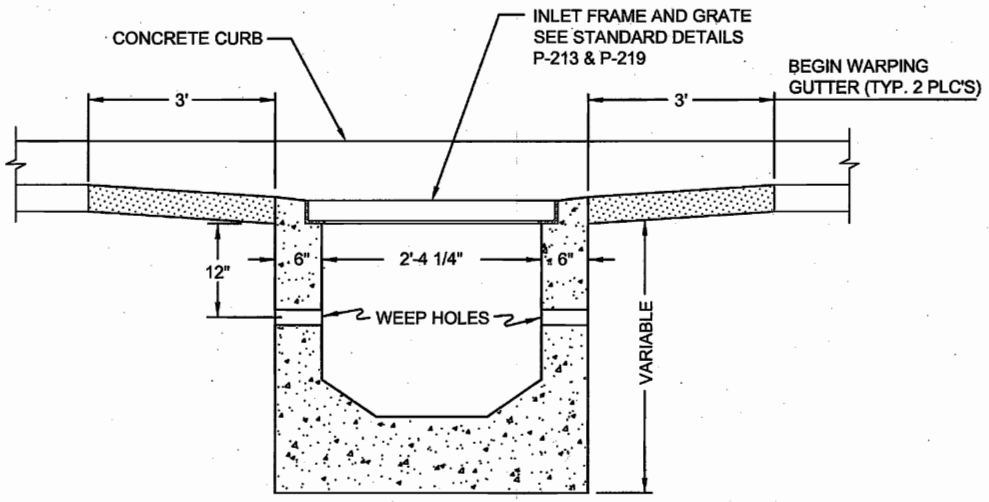
36 Inch Manhole Cover

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

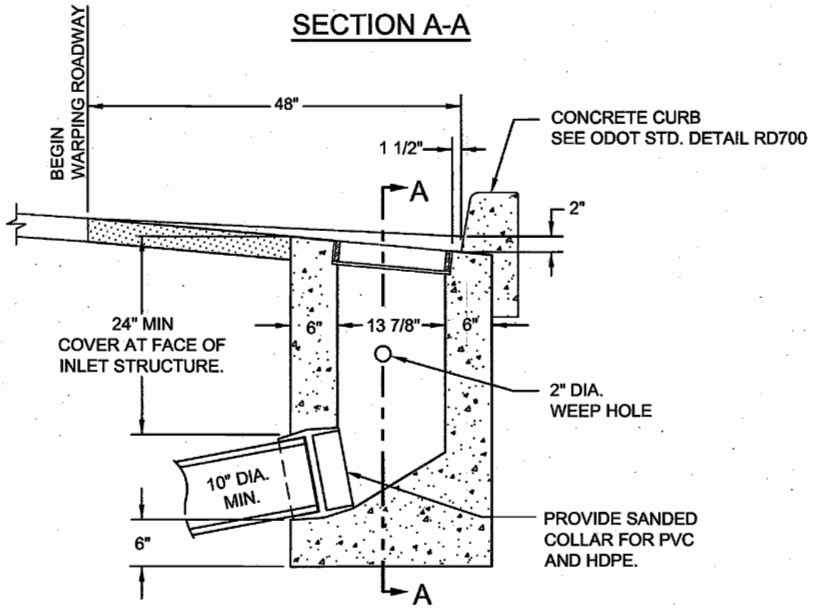
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-177

P-177_36-INCH_MH_COVER.DWG 4/6/09 6:12 PM RICKS




## SECTION A-A




## SIDE VIEW

NOTES:

1. DEPRESS GRATE 2 INCHES BELOW LONGITUDINAL GUTTER SLOPE AT INLET. WARP GUTTER TO MEET NORMAL GUTTER SLOPE AND ROADWAY CROSS SLOPE, AS SHOWN.
2. MAXIMUM INLET DEPTH 4 FEET.
3. CONCRETE SHALL BE COMMERCIAL GRADE.
4. SLOPE BOTTOM TO OUTLET PIPE. DO NOT USE "SONOTUBE" TYPE MATERIALS.
5. OUTLET PIPE SHALL HAVE A FLEXIBLE JOINT WITHIN 18 INCHES OF INLET STRUCTURE.
6. CONSTRUCT OUTLET PIPE WITH A WATERTIGHT SEAL AND CONNECTION.
7. THE OWNER'S REPRESENTATIVE MUST APPROVE ANY SUBSTITUTION OF THIS STANDARD.
8. FORM BATTER 1:20, MAXIMUM.
9. WHEN COVER DEPTH IS LESS THAN 24 INCHES USE PVC C-900 CLASS 150 PIPE UNLESS OTHERWISE APPROVED.
10. WHEN DIRECTED, SALVAGE AND REUSE THE EXISTING GRATE.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

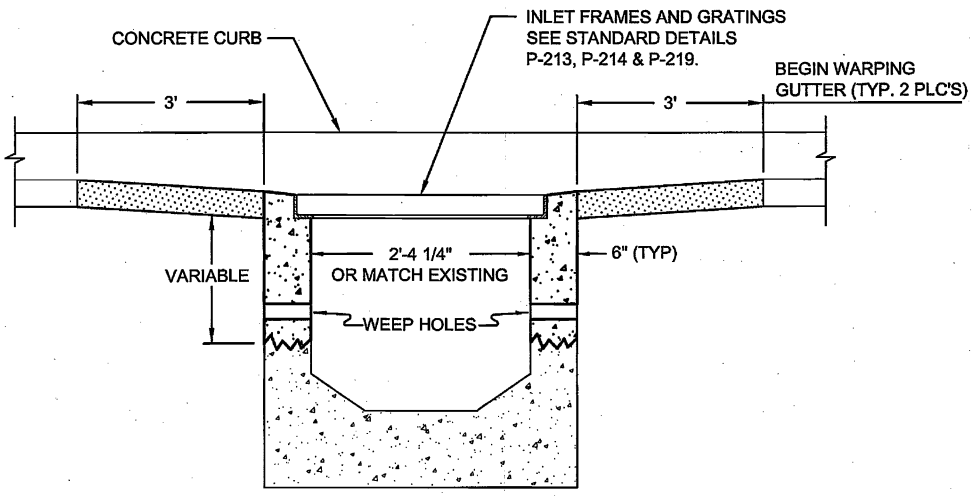
Concrete Inlet

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

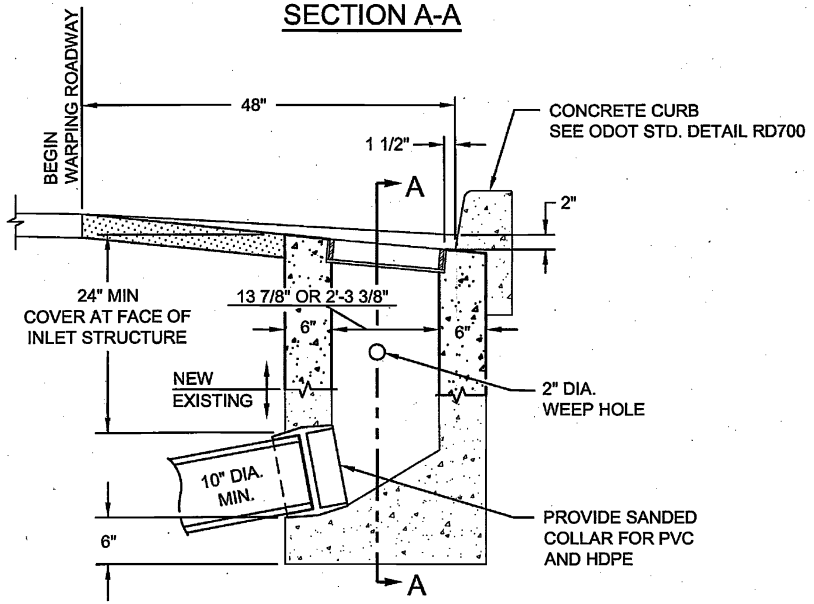
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-200

P-200_CONC_INLET.DWG 4/6/09 6:23 PM RICKS




## SECTION A-A




## SIDE VIEW

NOTES:

1. DEMOLISH TOP 6-12 INCHES OF THE EXISTING INLET. ROUGHEN AND PREPARE SURFACE FOR BONDING NEW CONCRETE TO EXISTING CONCRETE.
2. DEPRESS GRATE 2 INCHES BELOW LONGITUDINAL GUTTER SLOPE AT INLET. WARP GUTTER TO MEET NORMAL GUTTER SLOPE AND ROADWAY CROSS SLOPE, AS SHOWN.
3. MAXIMUM INLET DEPTH 4 FEET.
4. CONCRETE SHALL BE COMMERCIAL GRADE.
5. OUTLET PIPE SHALL HAVE A FLEXIBLE JOINT WITHIN 18 INCHES OF INLET STRUCTURE.
6. CONSTRUCT OUTLET PIPE WITH A WATERTIGHT SEAL AND CONNECTION.
7. THE OWNER'S REPRESENTATIVE MUST APPROVE ANY SUBSTITUTION OF THIS STANDARD.
8. WHEN COVER DEPTH IS LESS THAN 24 INCHES, USE PVC C-900 CLASS 150 UNLESS PIPE OTHERWISE APPROVED.
9. WHEN DIRECTED, SALVAGE AND REUSE THE EXISTING GRATE.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer 11/24/09

Standard Detail Title

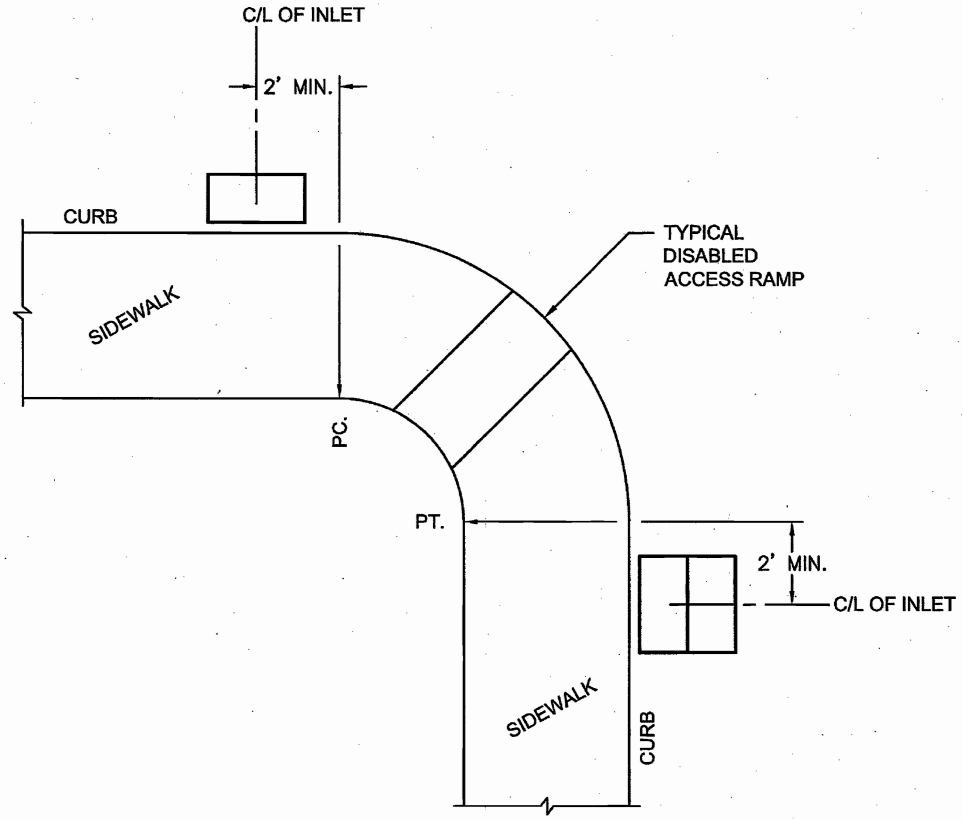
Adjust Concrete Inlet

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-201

P-201_ADJUST_CONC_INLET.DWG 11/9/09 5:20 PM RICKS




NOTES:

1. THIS PLAN FOR INLET LOCATION IS INTENDED TO REMOVE POTENTIAL HAZARDS FROM PEDESTRIAN ACCESS AREAS AND APPLIES TO ALL INTERSECTIONS.
2. THE NUMBER OF INLETS DEPENDS UPON STREET DRAINAGE PATTERN.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

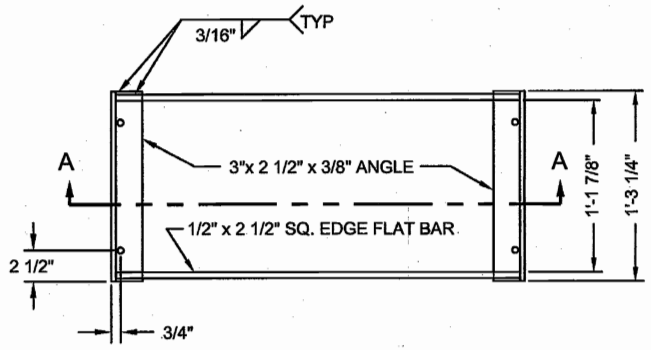
Inlet Location at Curb Return

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

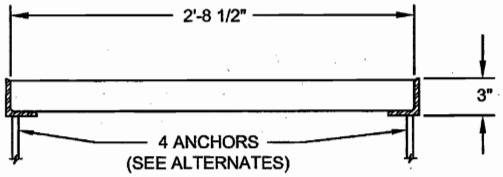
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-202

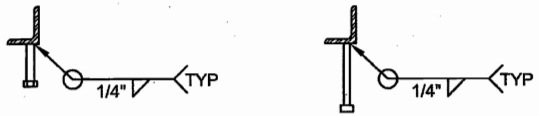
P--202_INLET_LOCATION_CURB_RETURN.DWG 4/6/09 6:25 PM RICKS




PLAN VIEW




SECTION A-A




5/8" x 3" BOLT

1/2" x 5" NELSON HEAD STUD

ALTERNATE ANCHORS

NOTE: MATERIAL TO BE NEW STRUCTURAL STEEL, ASTM A-36.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

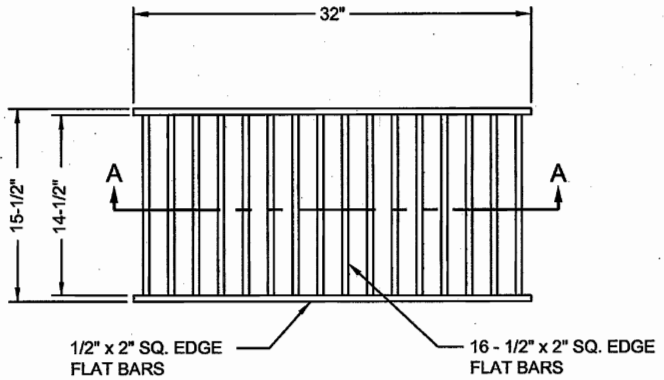
Inlet Frame

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

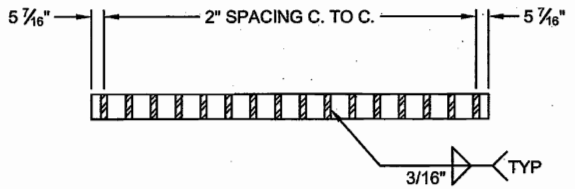
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-213

P-213_INLET_FRAME.DWG 4/6/09 6:34 PM RICKS




PLAN VIEW




SECTION A-A

NOTES:

1. MATERIAL TO BE NEW STRUCTURAL STEEL, ASTM A-36. WEIGHT APPROX. 84 LBS.
2. THIS GRATING FOR REPLACEMENT USE ONLY.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

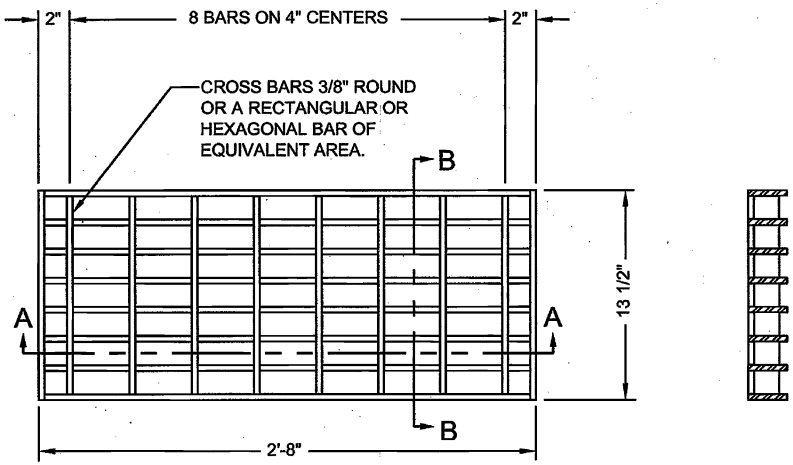
Inlet Grating

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

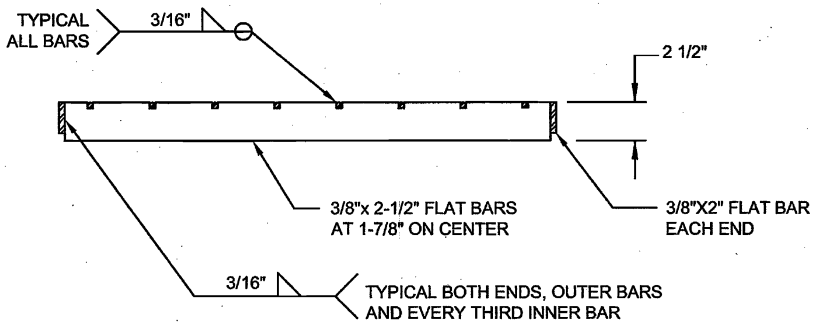
Standard Detail No.
P-216

P--216_INLET_GRATING.DWG 4/6/09 6:36 PM RICKS




PLAN VIEW

SECTION B-B




SECTION A-A

NOTES:

1. 3/8" CROSS BARS SHALL BE FLUSH WITH THE GRATE SURFACE (± 1/8") AND MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTROFORGED TO BEARING BARS.
2. MATERIAL SHALL BE NEW STRUCTURAL STEEL, ASTM A-36.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer

Standard Detail Title

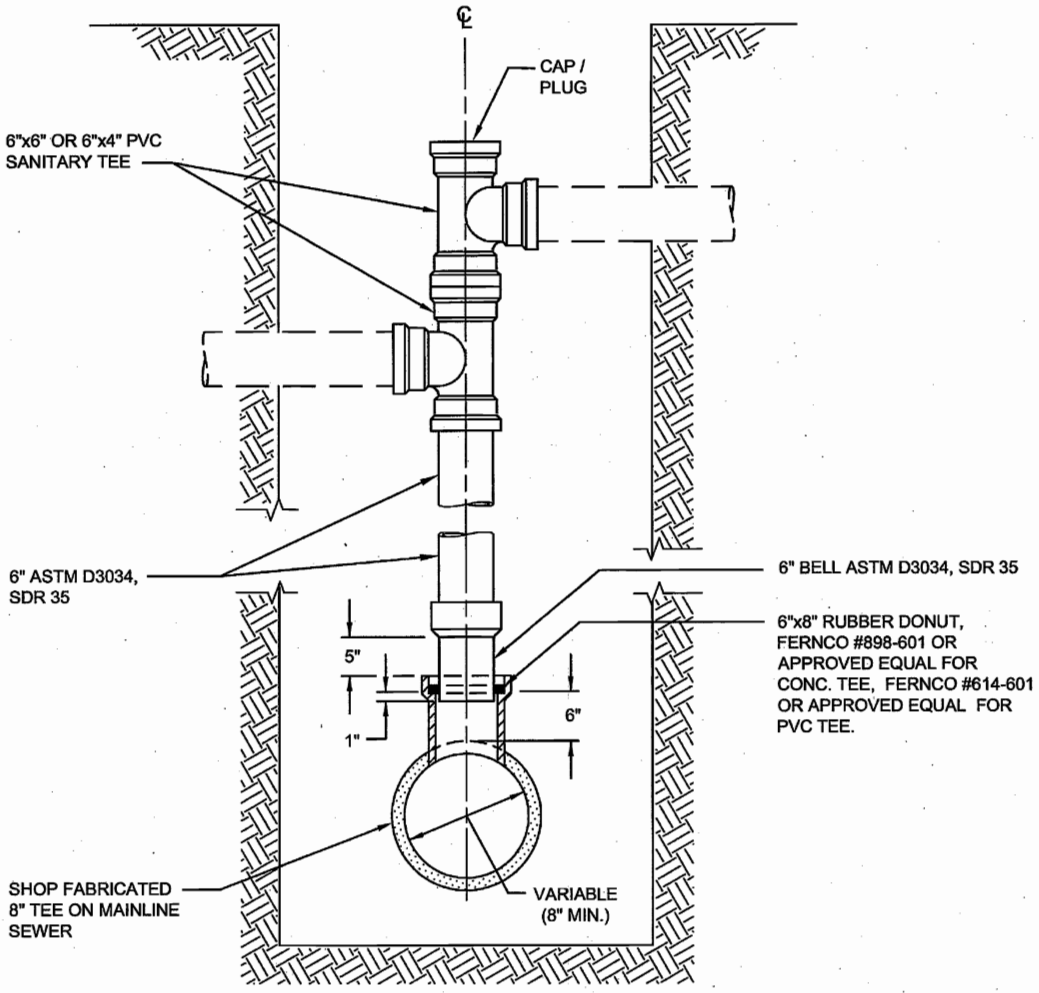
Inlet Grating

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-219

P--219_INLET_GRATING.DWG 4/6/09 6:39 PM RICKS




NOTES:

1. USE ONLY WHEN SPECIFIED OR DIRECTED.
2. SEWER RISER PIPE MUST BE SUPPORTED IN A PLUMB MANNER UNTIL BACKFILL HAS BEEN PLACED AND COMPACTED.
3. BACKFILL FULL DEPTH OF TRENCH WITH FLEXIBLE PIPE BEDDING MATERIAL EXTENDING 2 FEET MINIMUM EACH WAY FROM RISER ALONG MAINLINE TRENCH.
4. NO LUBRICANT SHALL BE USED BETWEEN THE SEWER RISER PIPE AND THE RUBBER DONUT.
5. THE NUMBER OF SANITARY TEES VARIES DEPENDING ON REQUIREMENTS.
6. PVC DEEP CONNECTION RISER ASSEMBLY INCLUDES RISER PIPE AND ALL FITTINGS SHOWN.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
William F. Bree
Chief Engineer

Standard Detail Title

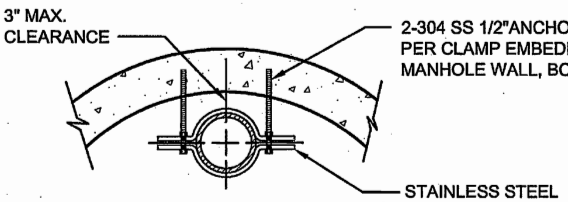
PVC Deep Connection Riser

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

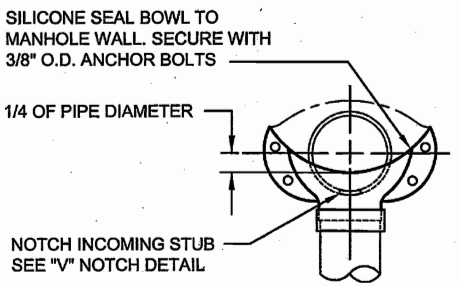
Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-250

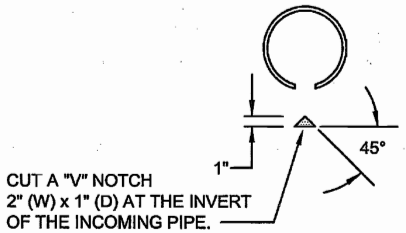
P-250_PVC_DEEP_CONN_RISER.DWG 4/9/09 2:37 PM RICKS



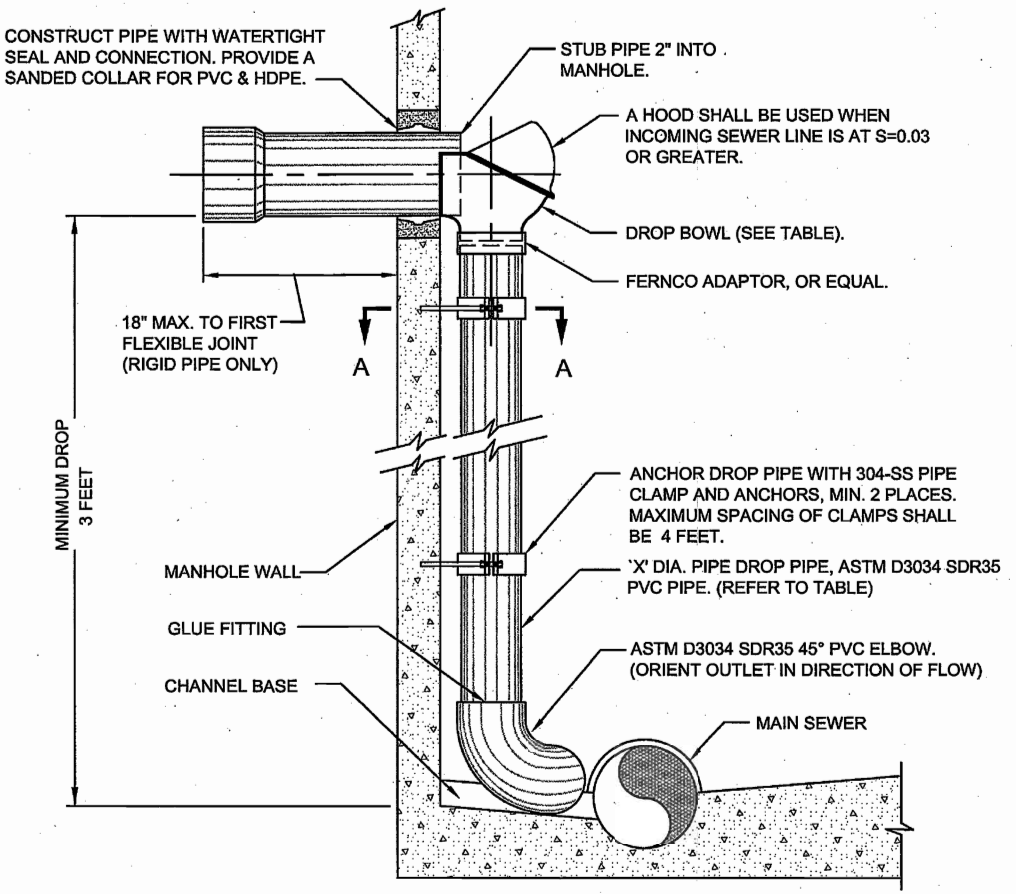

SECTION A-A
CLAMP DETAIL




DROP BOWL W/ HOOD
DETAIL




"V" NOTCH
DETAIL




| INCOMING SEWER SIZE | DROP PIPE SIZE 'X' | DROP BOWL MODEL |
|---|---|---|
| 8" DIA. | 6" DIA. | A-6 |
| 10" DIA. | 8" DIA. | B-8 |
| 12" DIA. | 10" DIA. | B-10 |

## DROP BOWL MODEL TABLE

ALL INSIDE DROP CONNECTIONS SHALL USE THE DROP BOWL AS PRODUCED BY:RELINER-DURAN, INC. OR EQUAL.

The selection and use of this Standard Detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Bureau of Environmental Services
CITY OF PORTLAND, OREGON
Chief Engineer 11/24/09

Standard Detail Title

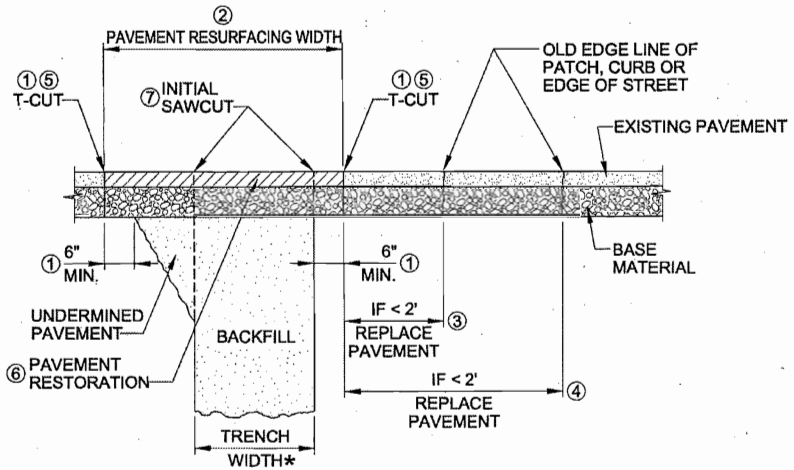
Piped Inside Drop Connection with Drop Bowl

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 01-01-09
Calc. Book No.: N/A
Baseline Report Date: N/A

Standard Detail No.
P-253

P--253_PIPED_INSIDE_DROP_MH.DWG 11/10/09 1:54 PM RICKS




*NOTE:
IF TRENCH WIDTH IS LESS THAN 12" USE CONTROLLED LOW-STRENGTH MATERIAL FOR BACKFILL.

SECTION

NOTES:

1. ON ALL STREETS, USE A MINIMUM 6" OVERLAP T-CUT DOWN THROUGH THE BASE MATERIAL UNLESS OTHERWISE SPECIFIED. T-CUT TO BE MEASURED FROM THE INITIAL SAWCUT OR EDGE OF UNDERMINED PAVEMENT, WHICHEVER RESULTS IN A WIDER REPLACEMENT SECTION.
2. A MINIMUM 3' PAVEMENT RESURFACING WIDTH ON ALL LOCAL NON-RESIDENTIAL AND HIGHER CLASSIFICATION STREETS.
3. IF NEW EDGE OF PAVEMENT IS LESS THAN 2' FROM ANOTHER PATCH, CURB OR EDGE OF STREET, REPLACE THE PAVEMENT IN BETWEEN.
4. IF MORE THAN ONE EXISTING PATCH EDGE IS WITHIN THE 2' ZONE, REMOVE PAVEMENT TO THE FAR EDGE OF THE PRE-EXISTING PATCH.
5. T-CUT SHALL NOT BE MADE UNTIL TRENCH IS FULLY BACKFILLED AND COMPACTED.
6. FOR PAVEMENT RESURFACING REQUIREMENTS SEE DRG. NOS. P-515, P-516 AND P-517.
7. FOR PAVEMENT CUTS IN CONCRETE SEE DRG. NO. P-514.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

BUREAU OF TRANSPORTATION
CITY OF PORTLAND, OREGON
Steve Iwai
Chief Engineer

Standard Drawing Title

PAVEMENT T-CUT

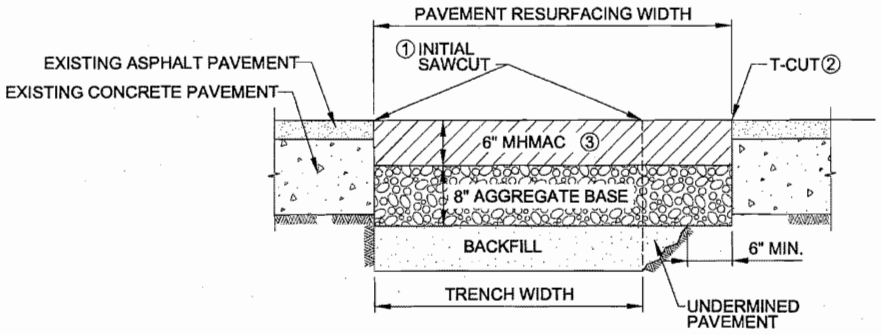
Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 05-20-10
Calc. Book No.:
Baseline Report Date:

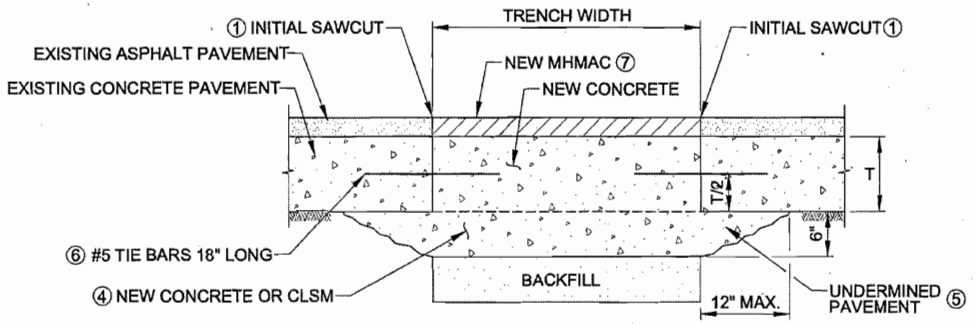
Standard Drawing No.
P-505

Plot Date: 5/20/2010 14:52 PM Filename: L:\Lisa\Cad\CITY OF PORTLAND - STANDARD DRAWINGS\SECTION DIVISIONS\3-STREETS\MICROSTATION\STD DRAWING NO P-505\PLOT_SHT_P-505.dgn SCALE: 1/2" = 1'-0"

Plot Date: 5/14/2010 10:27:41 AM Filename: U:\station\DGN\CITY OF PORTLAND - STANDARD DRAWINGS\SECTION DIVISIONS\3-STREETS\MICROSTATION\STD DRAWING NO P-516\PLOT_SHT_P-516.dgn SCALE: 3/4" = 1'-0" (SECTION)




RESIDENTIAL STREETS (LOCAL ONLY)




NON-RESIDENTIAL AND HIGHER CLASSIFICATION STREETS

NOTES:

1. SAWCUT PAVEMENT FULL DEPTH BEFORE REMOVAL PER DRG. NO. P-505.

RESIDENTIAL STREETS (LOCAL ONLY)

2. A T-CUT PER DRG. NO. P-505 WILL BE REQUIRED IF PAVEMENT IS UNDERMINED.

3. REPLACE PAVEMENT WITH 6" OF LEVEL 2, ½" DENSE MHMAC ON 8" OF AGGREGATE BASE. DO NOT SUBSTITUTE LEVEL 3 FOR LEVEL 2.

NON-RESIDENTIAL AND HIGHER CLASSIFICATION STREETS

4. IF PAVEMENT IS UNDERMINED BY LESS THAN 12", EXTEND PAVEMENT DEPTH 6" WITH CONCRETE INTO UNDERMINED AREA. CLSM MAY BE SUBSTITUTED WITH APPROVAL. NO ADDITIONAL PAVEMENT THICKNESS IS REQUIRED IF PAVEMENT IS NOT UNDERMINED OR DAMAGED DURING CONSTRUCTION.

5. A T-CUT PER DRG. NO. P-505 WILL BE REQUIRED IF THE UNDERMINED PAVEMENT EXCEEDS 12". SAWCUT FULL DEPTH AND REMOVE PAVEMENT BACK TO UNDISTURBED SUBGRADE. T-CUT SHALL NOT BE MADE UNTIL TRENCH IS FULLY BACKFILLED AND COMPACTED.

6. AFTER DRILLING TIE BAR HOLES, CLEAN HOLES AND THEN PLACE NON-SHRINK GROUT IN BACK OF HOLES BEFORE INSERTING TIE BARS. FOR TIE BAR SPACING SEE DRG. NO. P-514.

7. NEW MHMAC SHALL MEET THE FOLLOWING LEVELS:
   USE LEVEL 2 <3,000,000 ESALS/20 YEARS
   USE LEVEL 3 ≥3,000,000 ESALS/20 YEARS
   DO NOT SUBSTITUTE LEVEL 3 FOR LEVEL 2 AND VICE VERSA.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

BUREAU OF TRANSPORTATION
CITY OF PORTLAND, OREGON
Steve Townsend
Chief Engineer

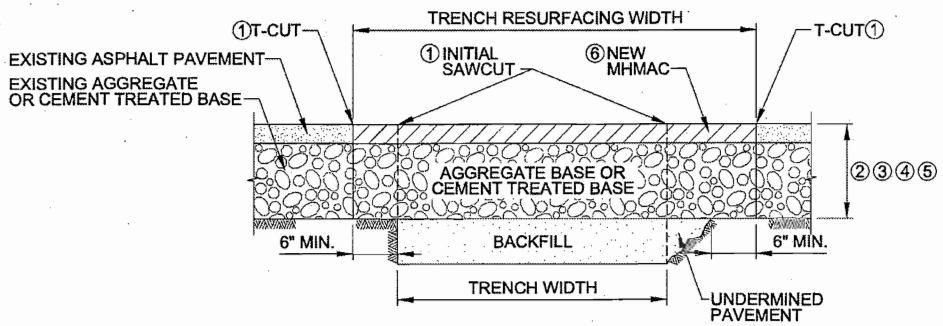
Standard Drawing Title

PAVEMENT RESURFACING IN ASPHALT ON CONCRETE STREETS

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 05-14-10
Calc. Book No.:
Baseline Report Date:

Standard Drawing No.
P-516




NOTES:

1. SAWCUT PAVEMENT FULL DEPTH BEFORE REMOVAL AND T-CUT PER DRG. NO. P-505.

RESIDENTIAL STREETS (LOCAL ONLY)

2. REPLACE PAVEMENT WITH 3" OF LEVEL 2, ½" DENSE MHMAC ON 8" OF AGGREGATE BASE. DO NOT SUBSTITUTE LEVEL 3 FOR LEVEL 2.

ALL OTHER NON-RESIDENTIAL AND HIGHER CLASSIFICATION STREETS

3. ARTERIAL CLASSIFICATION STREETS (MAJOR CITY TRAFFIC STREETS AND TRAFFIC ACCESS STREETS) ON EXISTING AGGREGATE BASE REPLACE WITH MINIMUM OF 10" MHMAC ON 8" OF AGGREGATE BASE, OR MATCH EXISTING TO A MAXIMUM OF 12" MHMAC ON 8" OF AGGREGATE BASE.

4. COLLECTOR CLASSIFICATION STREETS (DISTRICT COLLECTORS AND NEIGHBORHOOD COLLECTORS) ON EXISTING AGGREGATE BASE REPLACE WITH MINIMUM OF 8" MHMAC ON 8" OF AGGREGATE BASE, OR MATCH EXISTING TO A MAXIMUM OF 12" MHMAC ON 8" OF AGGREGATE BASE.

5. ON ALL OTHER LOCAL NON-RESIDENTIAL AND HIGHER CLASSIFICATION STREETS ON EXISTING CEMENT TREATED BASE (CTB) MATCH EXISTING PAVEMENT SECTION. CTB CEMENT CONTENT SHALL BE 3-4%. CLSM MAY BE SUBSTITUTED FOR THE CTB WITH APPROVAL.

6. NEW MHMAC SHALL MEET THE FOLLOWING LEVELS:
   USE LEVEL 2 < 3,000,000 ESALS / 20 YR
   USE LEVEL 3 ≥ 3,000,000 ESALS / 20 YR
   DO NOT SUBSTITUTE LEVEL 3 FOR LEVEL 2 AND VICE VERSA.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

BUREAU OF TRANSPORTATION
CITY OF PORTLAND, OREGON

Chief Engineer

Standard Drawing Title

PAVEMENT RESURFACING IN ASPHALT ON AGGREGATE OR CEMENT TREATED BASE

Note:
All material and workmanship shall be in accordance with the City of Portland Standard Construction Specifications.

Effective Date: 05-20-10

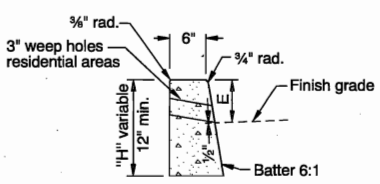
Calc. Book No.:

Baseline Report Date:

Standard Drawing No.

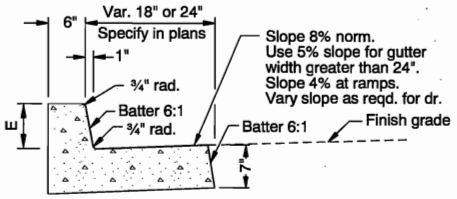
P-517

Plot Date: 8/2/2010 2:37:07 PM Filename: U:\users\rob\CITY OF PORTLAND - STANDARD DRAWINGS\SECTION DIVISIONS\3-STREETS\MICROSTATION\STD DRAWING NO. P-517\PLOT.SHT.P-517.dgn SCALE: 3/4" = 1'-0" (SECTION

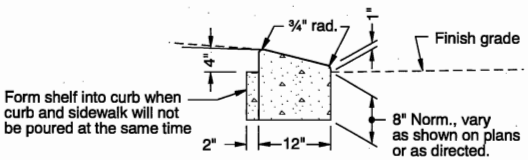



STANDARD CURB

O.D.O.T. & City of Portland Standard "H"=16"



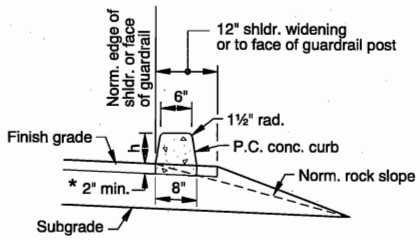

CURB AND GUTTER



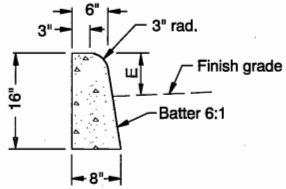

LOW PROFILE

MOUNTABLE CURB

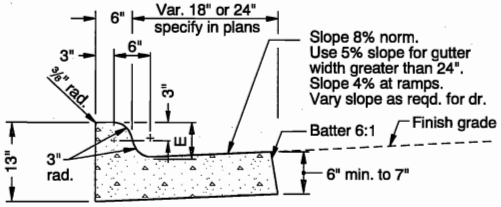
## DRAINAGE CURBS



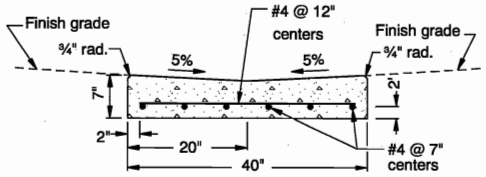

P.C. CONCRETE




MOUNTABLE CURB




MOUNTABLE CURB AND GUTTER

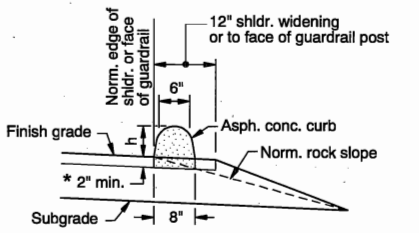



VALLEY GUTTER

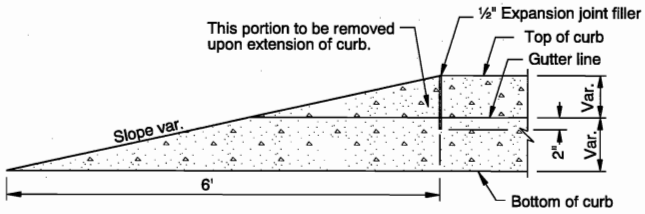
* The 2" min. curb depth below finish grade is reqd. only when the curb is placed in open-graded A.C. pvmt.

When bonding to dense graded A.C. pvmt. apply epoxy cement between surfaces.

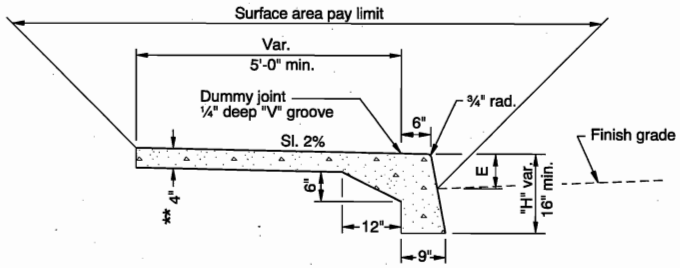
h = 6" normal
4" when run of curb or any part thereof is placed under guardrail




ASPHALT CONCRETE




CURB ENDING DETAIL




MONOLITHIC CURB & SIDEWALK

** As specified in plans. Min. 4". If sidewalk is intended as portion of a dwy. or mountable curb is used min. thkn. 6".

GENERAL NOTES FOR ALL DETAILS:

1. Curb exposure "E" = 6" to 9". Vary as shown on plans or as directed. O.D.O.T standard "E"=7".
2. Const. expansion joints at 200' maximum spacing, and at points of tangency, and at ends of each driveway. For monolithic curb & sidewalk, const. expansion joints at 45' maximum spacing.
3. Const. contraction joints at 15' maximum spacing, and at ends of each inlet and ramp.
4. Transitions shall be used to connect curbs of different exposures "E". ("E" Is the total vertical dimension of those curb surfaces having a slope of 1:1 or steeper). Minimum desirable transition length shall be 20' for each 1" difference in "E".
5. Tops of all curbs shall slope toward the roadway at 2% normal unless otherwise shown or as directed.
6. Dimensions are nominal, vary to conform with curb machine approved by the engineer.

CALC. BOOK NO. _____

BASELINE REPORT DATE _____

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

OREGON STANDARD DRAWINGS

**CURBS**

2002

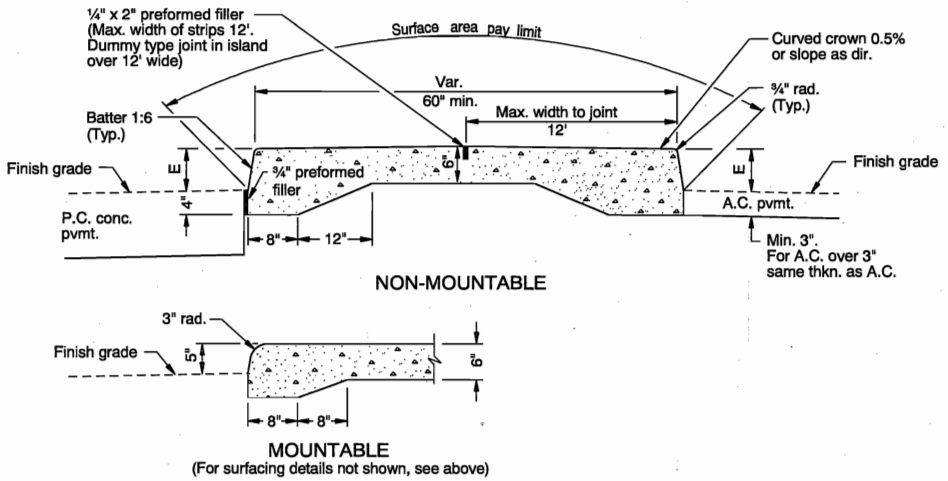
| DATE | REVISION DESCRIPTION |
|---|---|
| 06-05 | REVISED NOTES |
| 01-06 | REVISED DETAILS AND NOTES |
| 07-2006 | REVISED DETAILS AND NOTES |
| 01-2007 | ADDED & REVISED NOTES |
| 06-2007 | REVISED NOTE |

**Effective Date: June 1, 2008 - November 30, 2008**

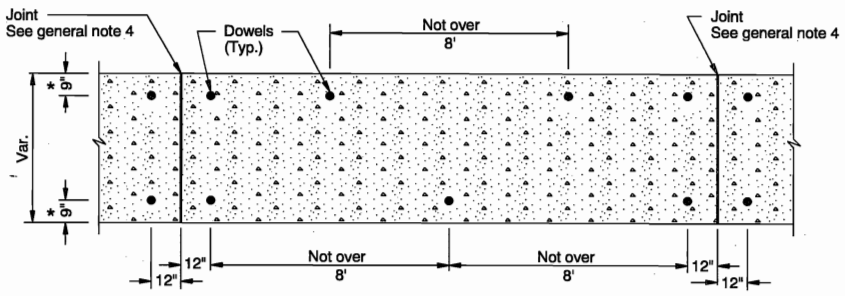
RD700

rd700.dgn 15-JUN-2007

RD700

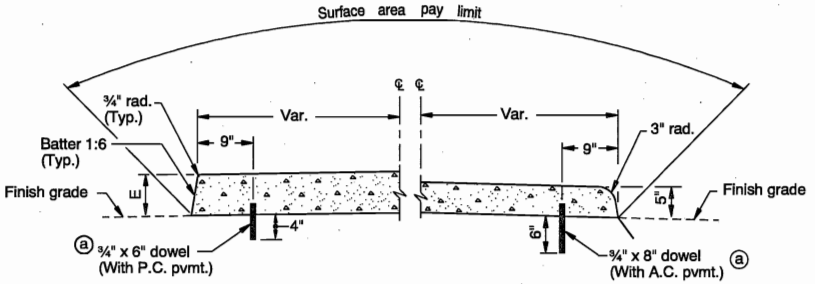



TYPE A



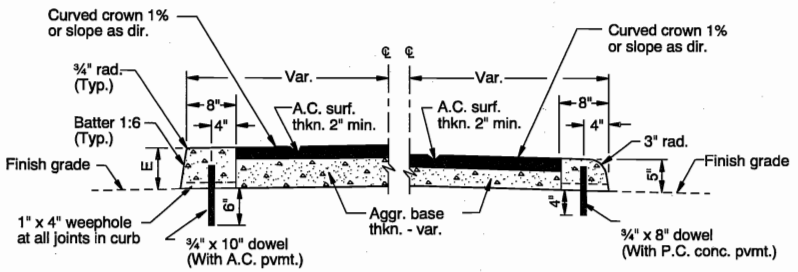

DOWEL PLAN
FOR TYPE C OR TYPE CA ISLANDS & TRANSITIONS
(ON SURFACE OF NEW OR EXISTING PAVEMENT)

* Also see below for type CA island requirement.




TYPE C

ⓐ No dowels reqd. for Type C islands 5' wide or wider




TYPE CA

GENERAL NOTES FOR ALL DETAILS:

1. Curb exposure "E" = 7" normal. Vary as shown on plans or as directed.
2. Standard batter is shown. Vary as shown on typical section or as directed.
3. Transverse joints in conc. islands to match joints in conc. pvmt. and to be of same type (Omit dowels in expansion joints).
4. Set joint spacing 200' max. for expansion and 15' max. for contraction.
5. Place preformed filler along one side of conc. islands in conc. pvmt. and around all curved ends.
6. Dowels shall be ¾" dia. with length as shown. In new conc. pvmt. set dowels before conc. hardens. In extg. conc. pvmt. drill holes 1½" dia. and grout dowels in. In A.C. pvmt. drive dowels.
7. For transitions to traffic separators, see Std. Drg. RD706.

CALC. BOOK NO. _____

BASELINE REPORT DATE _____

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

OREGON STANDARD DRAWINGS

**ISLANDS**

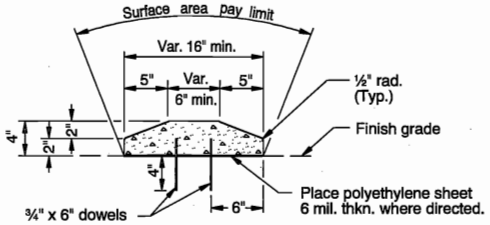
2002

| DATE | REVISION DESCRIPTION |
|---|---|
| 01-20-05 | ADDED SURFACE AREA PAY LIMIT AND REVISED NOTES |
| 06-2007 | REVISED DETAILS & NOTES |
| 01-2008 | REMOVED NOTES |

rd705.dgn 01-JAN-2008

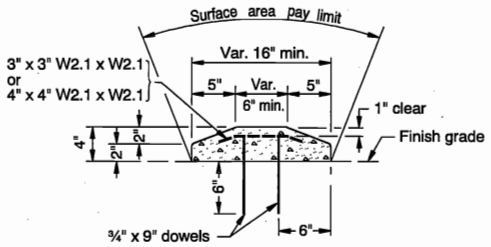
RD705

**Effective Date: June 1, 2008 - November 30, 2008**



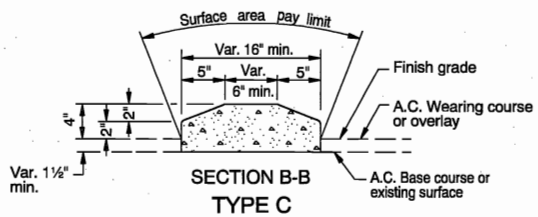

SECTION B-B

## TYPE A
## TRAFFIC SEPARATOR ON P.C. CONC. PVMT.



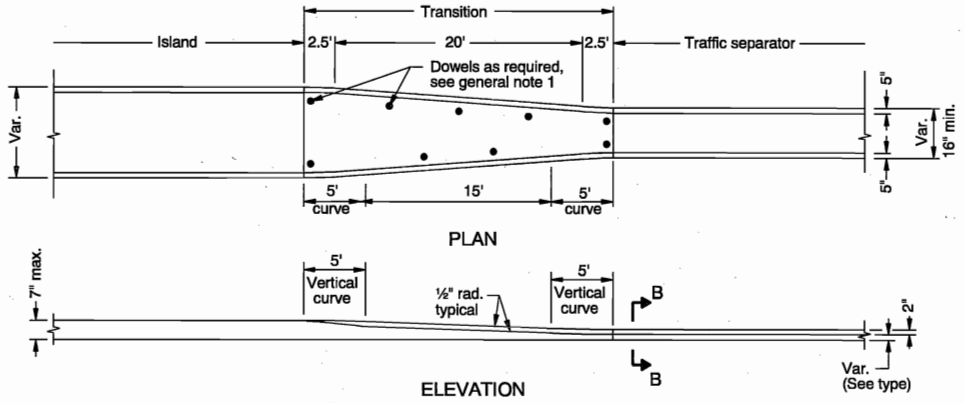

SECTION B-B

## TYPE B
## TRAFFIC SEPARATOR ON EXTG. A.C. PVMT.

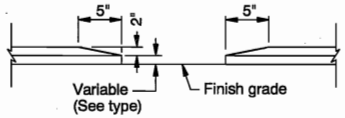



SECTION B-B

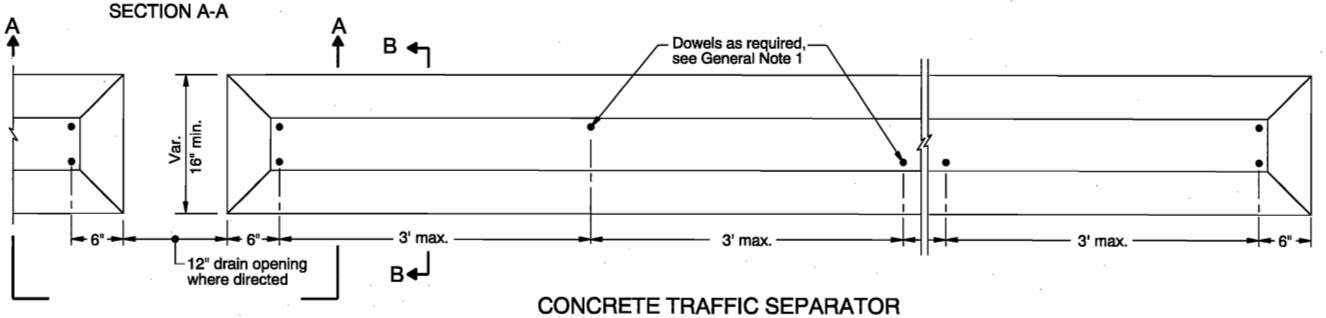
## TYPE C
## TRAFFIC SEPARATOR ON NEW A.C. PVMT. OR ON EXISTING A.C. PVMT. WITH OVERLAY




## TRANSITION FROM ISLAND TO TRAFFIC SEPARATOR




SECTION A-A




## CONCRETE TRAFFIC SEPARATOR

GENERAL NOTES FOR ALL DETAILS:

1. In transitions conform to dowel plan per Std. Drg. RD705.
2. Standard slope face is shown. Vary as shown on typical section or as directed.
3. Transverse joints in conc. traffic separators and transitions to match joints in conc. pvmt. and to be of same type (Omit dowels in expansion joints).
4. Set joint spacing 200' max. for expansion and 15' max. for contraction.
5. Place preformed filler along one side of conc. transitions in conc. pvmt. and around all curved ends.
6. Dowels shall be ¾" dia. with length as shown. In new conc. pvmt. set dowels before conc. hardens. In extg. conc. pvmt. drill holes 1½" dia. and grout dowels in. In A.C. pvmt. drive dowels.

CALC. BOOK NO. _____

BASELINE REPORT DATE _____

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

OREGON STANDARD DRAWINGS

**TRAFFIC SEPARATORS AND TRANSITIONS**

2002

| DATE | REVISION DESCRIPTION |
|---|---|
| 07-2008 | NEW DRAWING |
| 01-2008 | ADDED & REVISED NOTES |

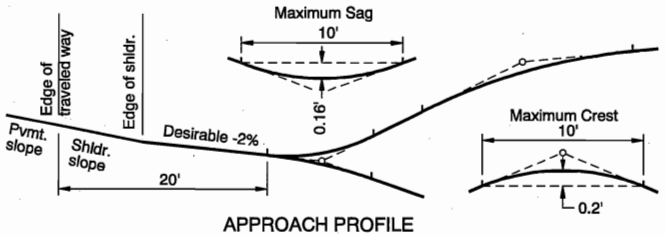
01-JAN-2008

rd706.dgn

RD706

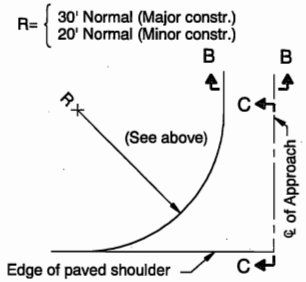
**Effective Date: June 1, 2008 - November 30, 2008**

RD706

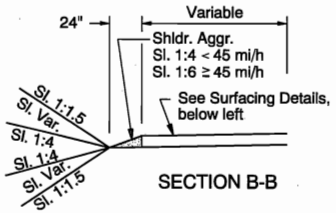



APPROACH PROFILE

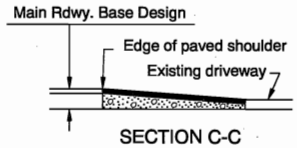
NOTE:
When grades on approaches meet without vertical curves the maximum algebraic difference on crests should be 8% and on sags 12%. Grades steeper than 15% should not be used without prior approval of the engineer of record. Any driveways with slopes exceeding 12% shall be paved.




HALF PLAN




SECTION B-B

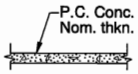



SECTION C-C

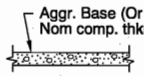
NOTE:
Normal paving limits to extend 20' from the edge of pavement or to the right of way line, whichever is less. Approach surfacing and width to then match existing approach.

30' for public road connections.

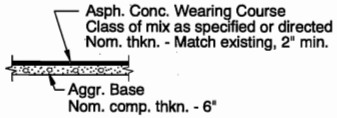
## APPROACH




P.C. CONCRETE SURFACING



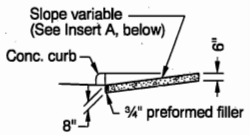

GRAVEL SURFACING



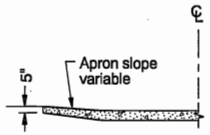

ASPHALT CONCRETE SURFACING

## APPROACH AND DRIVEWAY CONNECTION SURFACING DETAILS

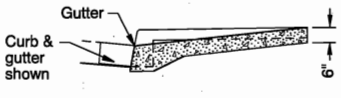
## TYPE A
### PORTLAND CEMENT CONCRETE




SECTION D-D

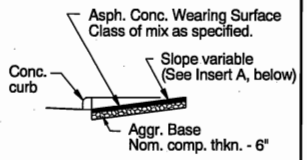



SECTION E-E

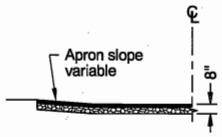



SECTION A-A
MONOLITHIC DRIVEWAYS

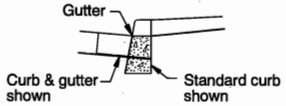
## TYPE A-1
### ASPHALT CONCRETE



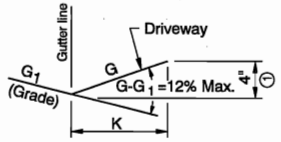

SECTION D-D




SECTION E-E

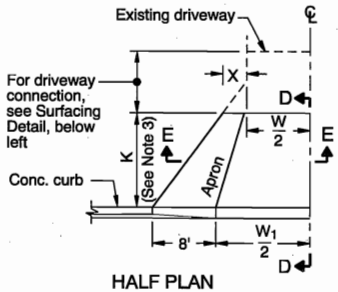



SECTION A-A
FOR DRIVEWAYS

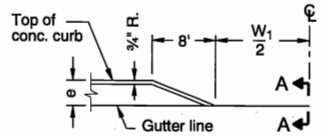



INSERT A

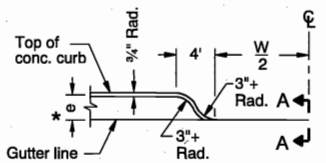
① Minimum allowable for drainage control on negatively sloped driveways.




HALF PLAN




HALF ELEVATION




HALF ELEVATION
(ALTERNATE APRON SLOPE)
(See General Note 5)

★ Curb exposure "e" = 7" normal. Vary as shown on plans or as directed.

TABLE A

| W (ft) | X (ft) | K (ft) 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|
| | | W1 (ft) | | | |
| 12 | 3 | 15 | 15 | 15 | 15 |
| 14 | | 17 | 17 | 17 | 17 |
| 16 | | 19 | 19 | 19 | 19 |
| 18 | | 21 | 21 | 21 | 21 |
| 20 | | 23 | 23 | 23 | 23 |
| 22 | 4 | 27 | 28 | 29 | 30 |
| 24 | | 29 | 30 | 31 | 32 |
| 26 | | 31 | 32 | 33 | 34 |
| 28 | | 33 | 34 | 35 | 36 |
| 30 | | 35 | 36 | 37 | 38 |
| 32 | 5 | 41 | 42 | 44 | 46 |
| 34 | | 43 | 44 | 46 | 48 |
| 36 | | 45 | 46 | 48 | 50 |

Where a travel lane is constructed adjacent to the curb line, use 16' W min. for residence and 30' W min. for light commercial, add 5' to $W_1$ for both. Do not add the 5' to $W_1$ when 4' min. shldr. or bikeway is included in the typical.

## NON-SIDEWALK DRIVEWAYS
NOTE: See "Table A" for dimensions not shown.

GENERAL NOTES FOR ALL DETAILS:
1. Driveway details shown on this drawing are to be used on roadways where there are no existing or planned sidewalks in driveway vicinity. For driveways located in a sidewalk see Std. Drgs. RD720, RD725 and/or RD730, RD735, RD740, RD745, RD750.
2. Width of driveway (W) as shown on plans or as directed.
3. K is the distance from back of curb to back of driveway (10' max.).
4. Where existing driveway is in good condition, construct only as much as required for satisfactory connection with new work.
5. "Alternate Apron Slope" used only where plans designate. Alternate Apron Slope may also be used at local jurisdiction's request when approved by the Project Manager.
6. Increase thickness of asphalt concrete and stone base where shown on plans.
7. For curb details, see Std. Drg. RD700.
8. For expansion and contraction joint requirements, see applicable curb and sidewalk standard drawings.

CALC. BOOK NO. _____

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

BASELINE REPORT DATE _____

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

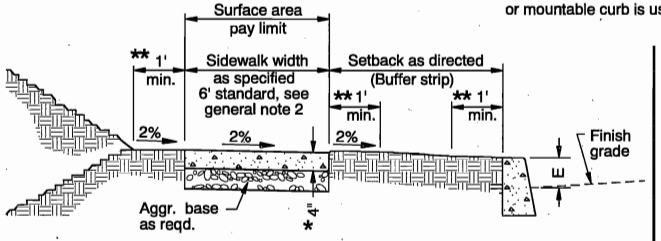
**APPROACHES AND NON-SIDEWALK DRIVEWAYS**

2002

| DATE | REVISION DESCRIPTION |
|---|---|
| 4-04 | REVISED NOTE |
| 01-06 | REVISED DETAILS AND NOTES |
| 07-2006 | REVISED DETAILS AND NOTES |
| 01-2007 | ADDED NOTES & DIMENSIONS |

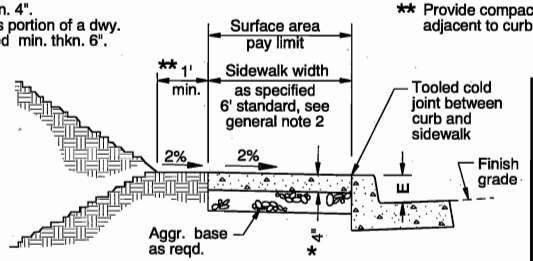
rd715.dgn 12-JAN-2007

RD715



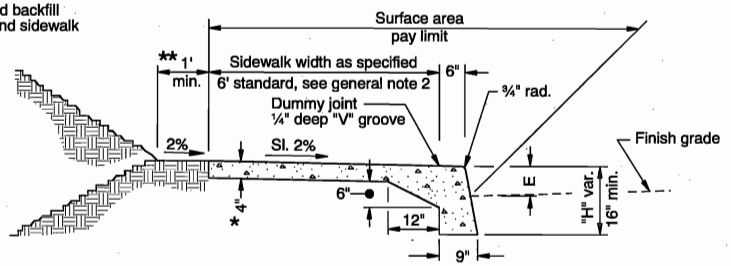

TYPICAL SETBACK SIDEWALK CROSS SECTION
E = curb exposure, see general note 6

* As specified in plans, min. 4". If sidewalk is intended as portion of a dwy. or mountable curb is used min. thkn. 6".

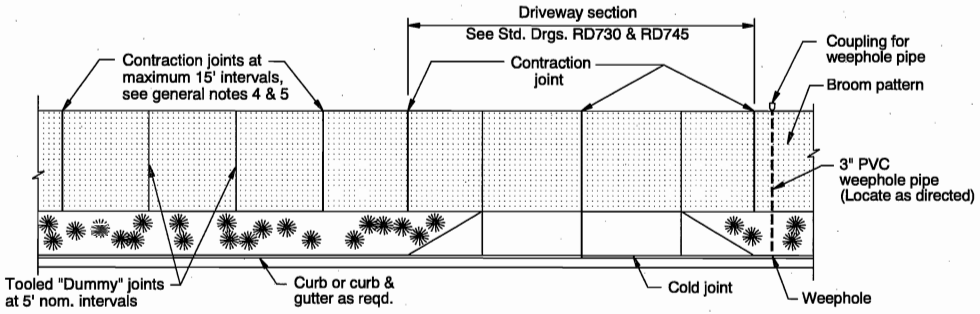



TYPICAL CURB SIDEWALK CROSS SECTION
E = curb exposure, see general note 6

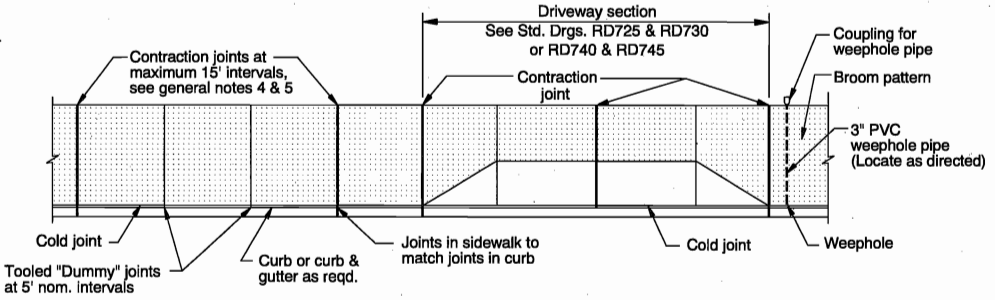
** Provide compacted backfill adjacent to curb and sidewalk



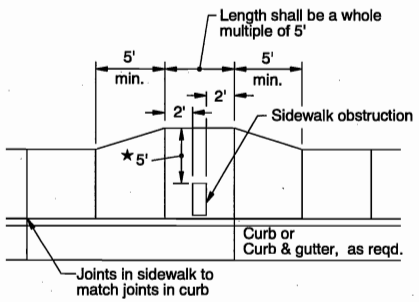

TYPICAL MONOLITHIC CURB & SIDEWALK
E = curb exposure, see general note 6




TYPICAL PLAN VIEW - SETBACK SIDEWALK

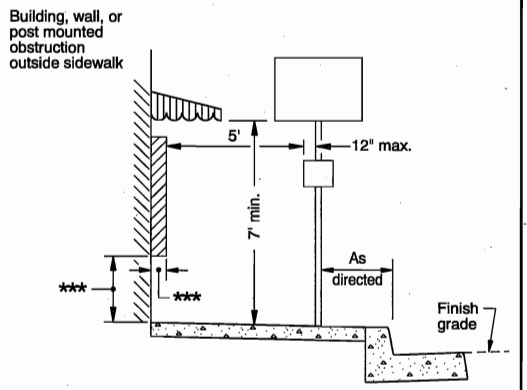



TYPICAL PLAN VIEW - CURB SIDEWALK




REQUIRED SIDEWALK WIDENING AROUND OBSTRUCTIONS

★ When site constraints prohibit a 5' passage, the Engineer may direct this to be reduced, but no less than 4'.




CLEAR CIRCULATION PATH

*** Objects with base below 2'-4" may protrude any distance as long as the 5' circulation path is maintained. When an object with a base higher than 2'-4" protrudes further than 4" provide a curb below protrusion to delineate edge.

GENERAL NOTES FOR ALL DETAILS:

1. Include additional paved or unpaved 2' clearance to vertical faces higher than 5' such as retaining walls, sound walls, fences and buildings.
2. Curb type and sidewalk width as shown on plans or as directed. On sidewalks 8' and wider, provide a longitudinal joint at the midpoint.
3. Install 3" pvc weephole pipes in sidewalks in locations as directed by the engineer. Place contraction joint over top of pipe.
4. Const. expansion joints at 200' maximum spacing, and at points of tangency, and at ends of each driveway. For monolithic curb & sidewalk, const. expansion joints at 45' maximum spacing.
5. Const. contraction joints at 15' maximum spacing, and at ends of each driveway and ramp.
6. Curb exposure "E"=6" to 9". Vary as shown on plans or as directed. O.D.O.T. standard "E"=7".
7. For curb details, see Std. Drg. RD700.

CALC. BOOK NO. _____

BASELINE REPORT DATE _____

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

OREGON STANDARD DRAWINGS

**SIDEWALKS**

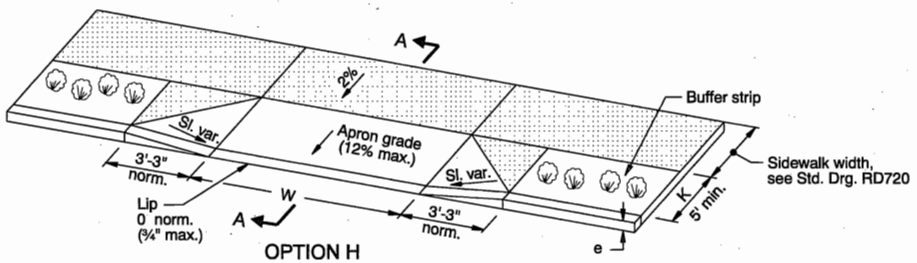
2002

| DATE | REVISION DESCRIPTION |
|---|---|
| 01-20-05 | ADDED SURFACE AREA PAY LIMIT AND REVISED NOTES |
| 07-2006 | REVISED DETAILS AND NOTES |
| 01-2008 | ADDED AND REVISED NOTES |

rd720.dgn 01-JAN-2008

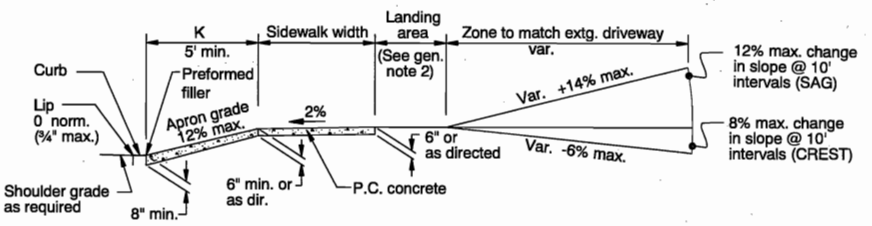
RD720

**Effective Date: June 1, 2008 - November 30, 2008**

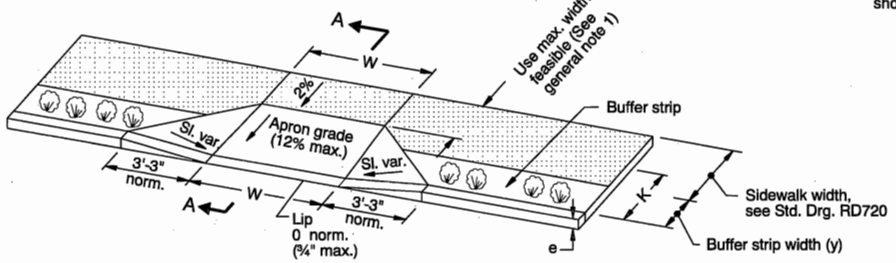



OPTION H
TYPICAL SEPARATED SIDEWALK DRIVEWAY
(Use Options I or J below if slope requirements shown in Section A-A and general note 2 can't be met)

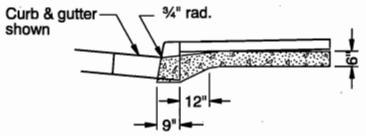
K = Planter strip width as shown on plans




SECTION A-A




OPTION I
DRIVEWAY ENCROACHES INTO SIDEWALK

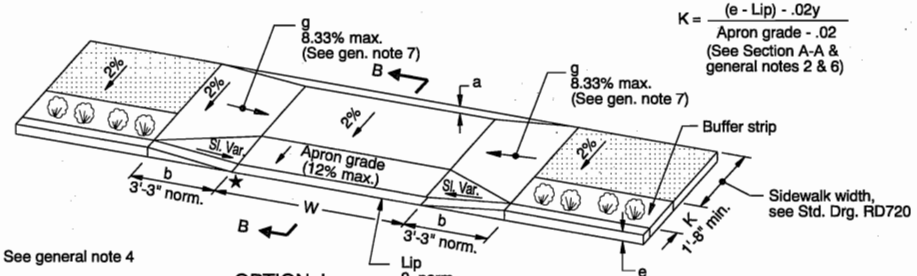



FOR DRIVEWAYS
WITH MONOLITHIC CURB & SIDEWALK
(For details not shown, see Std. Drg. RD700 & Section A-A or B-B, as appropriate.)

W = Width of driveway as exists behind sidewalk

$$K = \frac{(e - Lip) - .02y}{\text{Apron grade} - .02}$$

(See Section A-A & general notes 2 & 6)




★ See general note 4

OPTION J
LOWERED SIDEWALK

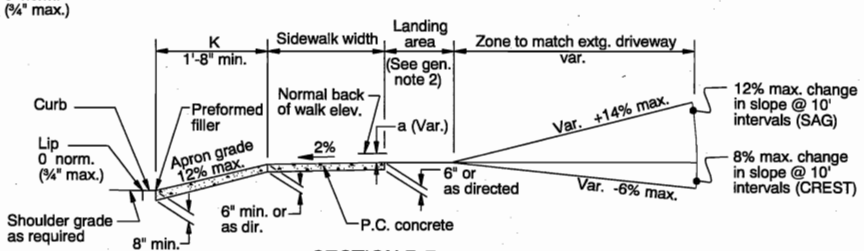
NOTE:
This drawing is to be used by local agencies to assist them in the design of driveways on their facilities.

K = Planter strip width as shown on plans

a = e - Lip - K(Apron grade - 0.02)

b = a/g

NOTE:
Dimensions a & b are nominal. Construct driveways to meet required slopes.




SECTION B-B

GENERAL NOTES FOR ALL DETAILS:

1. 4' unobstructed clear passage with slope of 2% is required behind driveways. 3'-6" width is acceptable where sidewalk width is less than standard 6'.
2. Width of driveway (W) and length of landing area shall be as shown on plans or as directed.
3. Where existing driveway is in good condition, and meets slope requirements, construct only as much as required for satisfactory connection with new work.
4. Check the gutter flow depth at driveway locations to assure that the design flood does not overtop the back of sidewalk at driveway. If overtopping occurs place an inlet at upstream side of driveway or perform other approved design mitigation.
5. Equations may be calculated using either feet or inches. Use same unit throughout equation.
6. Tooled joints are required at all driveway slope break lines.
7. Longitudinal slopes shown are relative to the running slope of the sidewalk.
8. Any dimensions except those of general note 1 may be amended by local agencies for their use.
9. At least 15' of the driveway behind the sidewalk should be surfaced to prevent tracking of gravel onto the sidewalk.
10. Pay limit for driveways is the outer limit of thicker structural section that is subject to vehicle loads.
11. See Std. Drg. RD700 for curbs. See Std. Drg. RD720 for sidewalks.

CALC. BOOK NO. _____ BASELINE REPORT DATE _____

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

OREGON STANDARD DRAWINGS

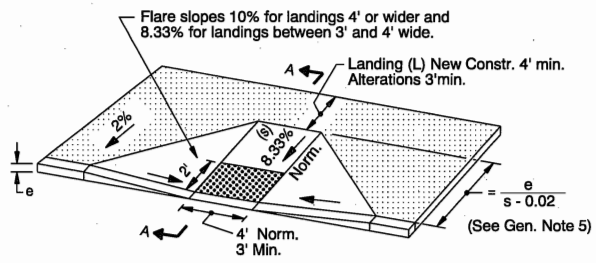
**SEPARATED SIDEWALK DRIVEWAYS OR ALLEYS (OPTIONS H, I & J) LOCAL JURISDICTIONS**

2002

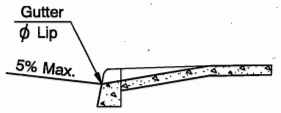
| DATE | REVISION DESCRIPTION |
|---|---|
| 06-2007 | REVISED DETAILS & NOTES |
| 01-2008 | REVISED NOTES |
| | |
| | |
| | |

rd740.dgn 01-JAN-2008

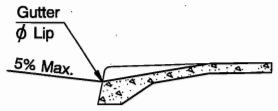
RD740



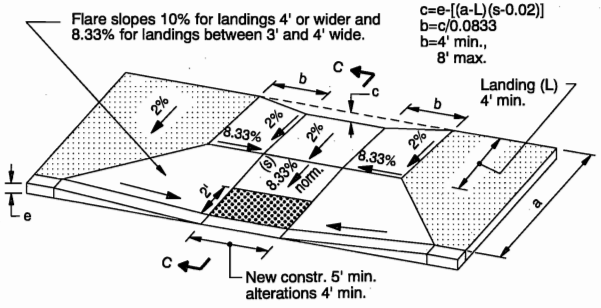

PERPENDICULAR SIDEWALK RAMP DETAIL
(Use "Parallel Sidewalk Ramp Detail" or "Combination Sidewalk Ramp Detail" when reqd. landing cannot be obtained)



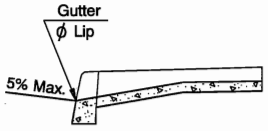

SECTION A-A



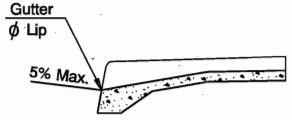

SECTION A-A
WITH MONOLITHIC CURB & SIDEWALK



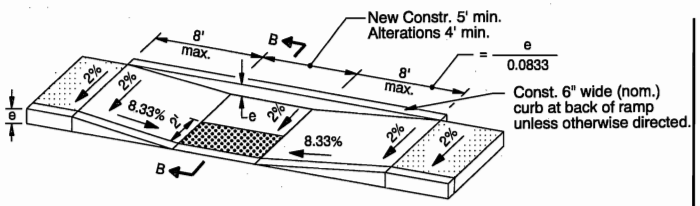

COMBINATION SIDEWALK RAMP DETAIL




SECTION C-C

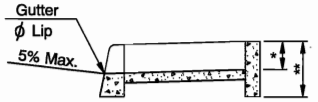



SECTION C-C
WITH MONOLITHIC CURB & SIDEWALK

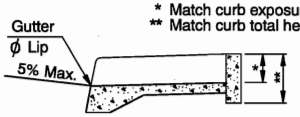



PARALLEL SIDEWALK RAMP DETAIL

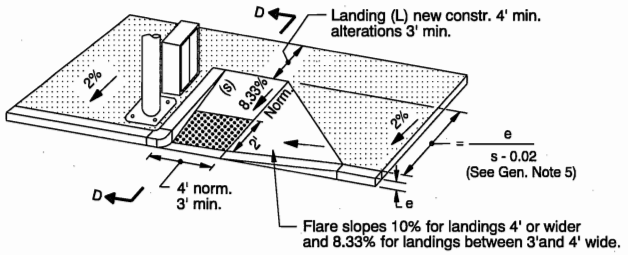
* Match curb exposure
** Match curb total height



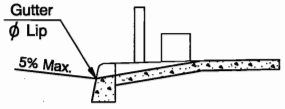

SECTION B-B



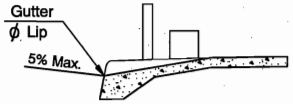

SECTION B-B
WITH MONOLITHIC CURB & SIDEWALK



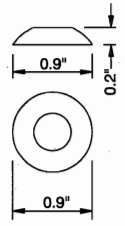

PERPENDICULAR SIDEWALK RAMP DETAIL (WITH SINGLE FLARE)
(Use "Parallel Sidewalk Ramp Detail" or "Combination Sidewalk Ramp Detail" when reqd. landing cannot be obtained)



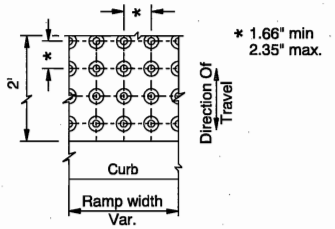

SECTION D-D




SECTION D-D
WITH MONOLITHIC CURB & SIDEWALK

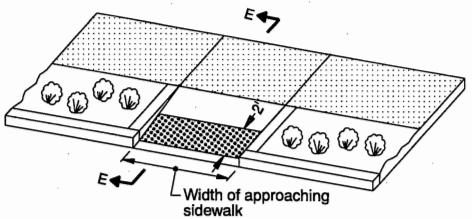



TRUNCATED DOME DETAIL

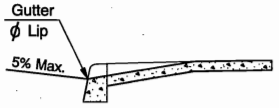



* 1.66" min
2.35" max.

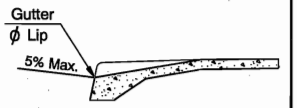
RAMP TEXTURE PATTERN DETAIL




PERPENDICULAR SIDEWALK RAMP DETAIL
(THROUGH BUFFER STRIP)




SECTION E-E
See Std. Drg. RD760 for Sidewalk Ramp Placement




SECTION E-E
WITH MONOLITHIC CURB & SIDEWALK

GENERAL NOTES FOR ALL DETAILS:

1. Place truncated dome detectable warning texture in the lower 2' adjacent to traffic of throat of ramp only. Arrange domes using square in-line pattern only as shown in detail below. Color of texture to be safety yellow.
2. Sidewalk curb ramp slopes shown are relative to the true level horizon (zero bubble).
3. In alterations curb ramp slope(s) may be 10% for a max. rise of 6", or 12.5% for a max. rise of 3". Curb ramps, in alterations, need not exceed 6' in length.
4. Side flares that are not part of the path of travel may be any slope. See Std. Drg. RD750, General Note 4.
5. Ramps for paths intersecting a roadway should be full width of path, excluding flares. When a ramp is used to provide bicycle access from a roadway to a sidewalk, the ramp should be 8' wide with no texturing.
6. Sidewalk ramp details are based on ORS 447.310 and the PROWAAC Final Report.
7. When 2 curb ramps are immediately adjacent as in Options A,B,C and F on Std. Drg. RD760, the curb exposure (e) between the adjacent side flares may range between 3" and full design exposure.
8. For the purpose of this drawing, a curb ramp is considered "perpendicular" if the angle between the longitudinal axis of the ramp and a tangent to the curb at the ramp center is 75° or greater.
9. Tooled joints are required at all sidewalk ramp slope break lines.
10. Sidewalk flare is not necessary where the ramp is protected from pedestrian cross-travel.
11. For curb details, see Std. Drg. RD700.
12. For sidewalk details, see Std. Drg. RD720.

CALC. BOOK NO. _____ BASELINE REPORT DATE _____

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

OREGON STANDARD DRAWINGS

**SIDEWALK RAMP DETAILS**

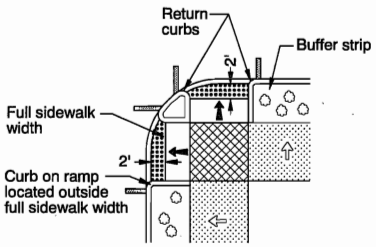
2002

| DATE | REVISION DESCRIPTION |
|---|---|
| 06-03 | REVISED DETAIL |
| 04-04 | REVISED DETAIL |
| 01-20-05 | REMOVED, REVISED AND ADDED NOTES |
| 07-2006 | REVISED DETAILS & NOTES |
| 01-2008 | ADDED NOTES |

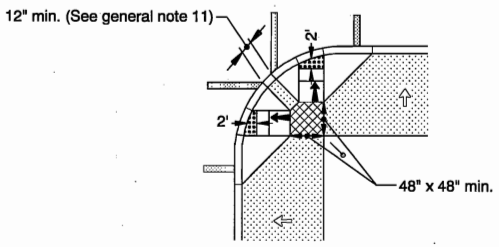
rd755.dgn 01-JAN-2008

RD755

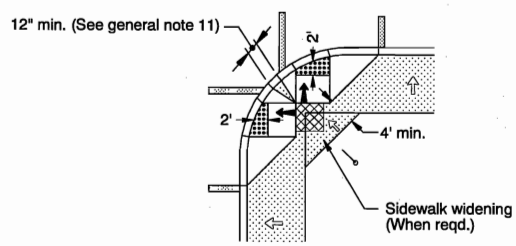
**Effective Date: June 1, 2008 - November 30, 2008**




OPTION A
PERPENDICULAR RAMP WITH
LANDSCAPED BUFFER STRIP

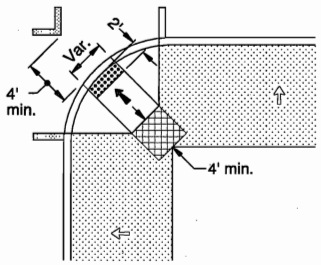



OPTION B
PERPENDICULAR RAMP
(FOR WIDE SIDEWALKS)

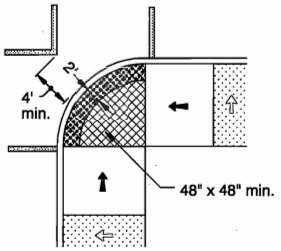



OPTION C
PERPENDICULAR RAMP
(FOR NARROW SIDEWALKS)

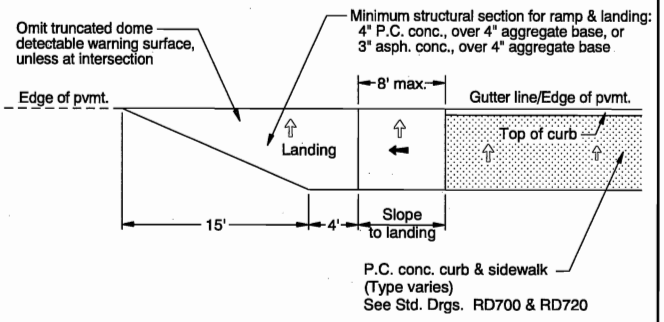
Marked or intended crossing location
Slope 2% max.
Slope 8.33% max.
Truncated dome detectable warning surface
Landing Area (Minimum level area 48" x 48")
For the purposes of this application,
a 2% maximum slope (For drainage) is considered level




OPTION D
DIAGONAL RAMP
(FOR WIDE SIDEWALKS)
Use in alterations only and when site constraints prohibit installing two ramps




OPTION E
DIAGONAL-PARALLEL RAMP
(FOR SIDEWALK WIDTHS ≥ RADIUS)
Use in alterations only and when site constraints prohibit installing two ramps




OPTION F
SIDEWALK RAMP AND LANDING
(FOR ENDS OF SIDEWALKS)

GENERAL NOTES FOR ALL DETAILS:

1. Sidewalk ramp details are based on United States Access Board Standards.
2. See Std. Drg. RD700 for curbs. See Std. Drg. RD720 for sidewalks. See Std. Drgs. TM503 & TM530 for crosswalk markings, widths, etc. See Std. Drg. RD755 for sidewalk ramp details.
3. Tooled joints are required at all sidewalk ramp slope break lines.
4. Sidewalk curb ramp slopes shown are relative to the true level horizon (Zero bubble).
5. Place truncated dome detectable warning surface in the lower 2' adjacent to traffic of throat of ramp only. For details not shown, see Std. Drg. RD759.
6. Side flares that are not part of the path of travel may be any slope. Check the gutter flow depth to assure that the design flood does not overtop the back of sidewalk. If overtopping occurs place an inlet at upstream side or perform other approved design mitigation.
7. Sidewalk flare is not necessary where the ramp is protected from pedestrian cross-travel.
8. For the purpose of this drawing, a curb ramp is considered "perpendicular" if the angle between the longitudinal axis of the ramp and a line tangent to the curb at the ramp center is 75° or greater.
9. Ramps for paths intersecting a roadway should be full width of path, excluding flares. When a ramp is used to provide bicycle access from a roadway to a sidewalk, the ramp should be 8' wide.
10. In alterations, curb ramp slope(s) may be 10% for a max. rise of 6", or 12.5% for a max. rise of 3".
11. When 2 curb ramps are immediately adjacent as in Options B & C, the curb exposure (e) between the adjacent side flares may range between 3" and full design exposure.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 07-JUL-2008

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

OREGON STANDARD DRAWINGS

**SIDEWALK RAMP PLACEMENT OPTIONS**
**CURB RADII ≤ 15'**

2008

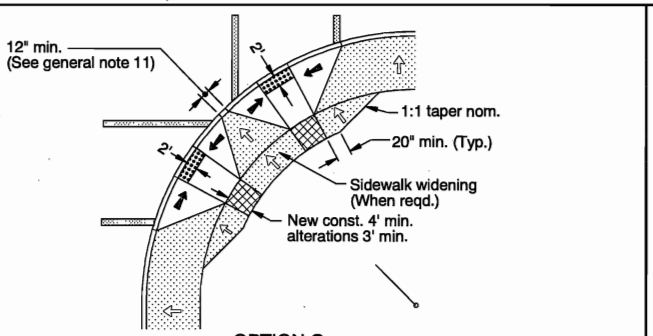
| DATE | REVISION DESCRIPTION |
|---|---|
| | |

**Effective Date: June 1, 2009 - November 30, 2009**

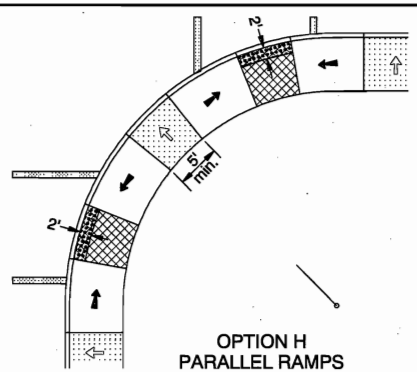
RD756

rd756.dgn 31-DEC-2008

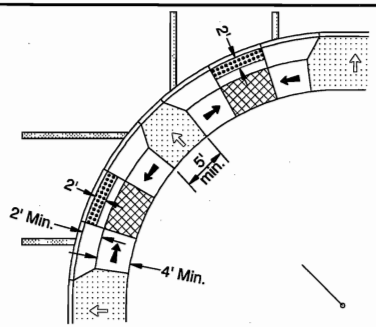
RD756




OPTION G
PERPENDICULAR RAMPS
(FOR NARROW SIDEWALKS)

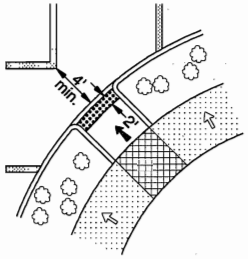



OPTION H
PARALLEL RAMPS
(FOR NARROW SIDEWALKS)



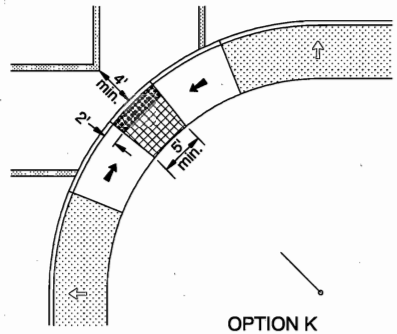

OPTION I
COMBINATION RAMPS
(FOR WIDE SIDEWALKS)

Marked or intended crossing location
Slope 2% max.
Slope 8.33% max.
Truncated dome detectable warning surface
Landing Area (Min. level area 48" x 48")
For the purposes of this application,
a 2% maximum slope (For drainage) is considered level



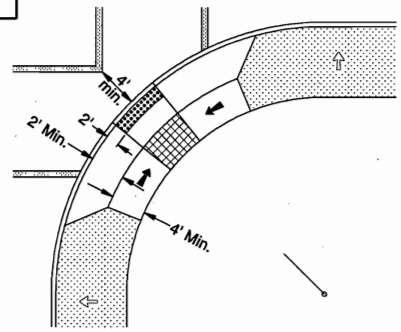

OPTION J
DIAGONAL RAMP WITH
LANDSCAPED BUFFER STRIP

Use in alterations only and when site constraints prohibit installing two ramps




OPTION K
DIAGONAL-PARALLEL RAMP
(FOR NARROW SIDEWALKS)

Use in alterations only and when site constraints prohibit installing two ramps




OPTION L
DIAGONAL-COMBINATION RAMP
(FOR WIDE SIDEWALKS)

Use in alterations only and when site constraints prohibit installing two ramps

GENERAL NOTES FOR ALL DETAILS:

1. Sidewalk ramp details are based on United States Access Board Standards.
2. See Std. Drg. RD700 for curbs. See Std. Drg. RD720 for sidewalks. See Std. Drgs. TM503 & TM530 for crosswalk markings, widths, etc. See Std. Drg. RD755 for sidewalk ramp details.
3. Tooled joints are required at all sidewalk ramp slope break lines.
4. Sidewalk curb ramp slopes shown are relative to the true level horizon (Zero bubble).
5. Place truncated dome detectable warning surface in the lower 2' adjacent to traffic of throat of ramp only. For details not shown, see Std. Drg. RD759.
6. Side flares that are not part of the path of travel may be any slope. Check the gutter flow depth to assure that the design flood does not overtop the back of sidewalk. If overtopping occurs place an inlet at upstream side or perform other approved design mitigation.
7. Sidewalk flare is not necessary where the ramp is protected from pedestrian cross-travel.
8. For the purpose of this drawing, a curb ramp is considered "perpendicular" if the angle between the longitudinal axis of the ramp and a line tangent to the curb at the ramp center is 75° or greater.
9. Ramps for paths intersecting a roadway should be full width of path, excluding flares. When a ramp is used to provide bicycle access from a roadway to a sidewalk, the ramp should be 8' wide.
10. In alterations, curb ramp slope(s) may be 10% for a max. rise of 6", or 12.5% for a max. rise of 3".
11. When 2 curb ramps are immediately adjacent as in Option G, the curb exposure (e) between the adjacent side flares may range between 3" and full design exposure.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 08-JUL-2008

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

OREGON STANDARD DRAWINGS

**SIDEWALK RAMP PLACEMENT OPTIONS**
**CURB RADII > 15'**

2008

| DATE | REVISION DESCRIPTION |
|---|---|
| | |
| | |
| | |
| | |
| | |

31-DEC-2008

rd757.dgn

RD757

**Effective Date: June 1, 2009 - November 30, 2009**

# PERMITS AND EASEMENTS

FORM W-35

CITY OF PORTLAND,
OREGON

OFFICE OF TRANSPORTATION
TRANSPORTATION ENGINEERING AND DEVELOPMENT

No. **54453**

Apr 28, 2010

# Revocable Permit to Open Street

Fee: $11,713.47

**Utility Ref. No.:** E09052.D28

**Map No.:** **3826**

Permission is hereby granted to Environmental Services - CIP
to open street in SW Multnomah Blvd between 31st Ave and 19th Ave,
SW Multnomah Blvd between 17th Ave and 14th Ave
for construction or repair of Sewer line -- Length (feet): 3579
Sewer line -- Number of cuts: 4
BWW fee -- plan review @ $55.00 ea: 1

**Commencement of work authorized by this permit acknowledges permittee's acceptance of the following conditions:**

The permittee agrees to comply with the provisions of the City Charter, Ordinances, Resolutions, Title 17 and Title 33 of the City Code and the City of Portland Standard Construction Specifications pertaining to the above work, and to file a report of the work performed within 48 hours of completion.

The permittee is responsible for complying with Title 10 of the City Code, including all erosion control measures and signs.

The permittee agrees to protect and save harmless the City of Portland, the City Engineer, and each of its officers and employees against any injury or damage that may result from the acts of said permittee on or in the said street and against any damage or liability of any character whatsoever arising out of any act of said permittee due to the issuance of this permit.

**The permittee shall notify the INSPECTION SECTION, 823-7148, no less than 48 hours prior to expected commencement of work, unless otherwise directed. If work is not started on the expected date, renotification will be necessary. Failure to notify will be cause for doubling of permit fees as a penalty.**

Permittee shall be responsible for obtaining approval from the City Traffic Engineer for a traffic control plan for the work zone covered under this permit, prior to commencing work.

Permittee is responsible for complying with OAR 952-001-0010 through 952-001-0080 as they relate to locating facilities and commencement of work. Call (503)232-1987 for copies of the rules.

Permittee is solely responsible for ensuring safety of existing street trees. Contact City Forester prior to commencing work if conflicts with trees or root systems are possible within permit area. Obtain City Forester's approval prior to cutting any tree or root system.

This approval covers only that portion of work which is within the dedicated or future street area. The location of the work shall not differ from the plans submitted without prior approval of the City Engineer.

Remarks:
SW Multnomah is a 5 yr paving moratorium street - consult with PW Inspector for pavement replacement
The moratorium on SW Multnomah Blvd is west of 19th.
See attached restoration comments. Moratorium streets require full lane width pavement retoration
Collect existing curb height data before removal to re-establish curb
See BWW comments attached
Contact public works inspector prior to commencement of work.
Permit extended through September 2011 - 3/23/11 RM

**NOTIFY UTILITIES BEFORE COMMENCING WORK**
**Through OREGON UTILITY NOTIFICATION CENTER:**
**246-6699**
**at least 2 business days but not more than 10 business days before commencing an excavation.**

City Engineer

By John May

Deputy

**Void after 180 days**

**NOTIFY INSPECTION SECTION 48 HRS BEFORE COMMENCING WORK: 823-7148**

APPROVED BY RYAN MACE
CONTINGENT UPON COVERING CITY CODE & FRANCHISES
OF THE CITY OF PORTLAND OFFICE OF TRANSPORTATION

**Mar 23, 2011**

Oregon Department of Transportation

# APPLICATION AND PERMIT TO OCCUPY OR PERFORM OPERATIONS UPON A STATE HIGHWAY

See Oregon Administrative Rule, Chapter 734, Division 55

PERMIT NUMBER

CLASS : 4 | KEY#

## GENERAL LOCATION

HIGHWAY NAME AND ROUTE NUMBER: I-5 / 1 / Pacific

HIGHWAY NUMBER: 001

COUNTY: Multnomah

BETWEEN OR NEAR LANDMARKS: Mulnomah , Tewilliger Interchanges

HWY. REFERENCE MAP: Straight Line

DESIGNATED FREEWAY: [X] YES [ ] NO

IN U.S. FOREST: [ ] YES [X] NO

APPLICANT NAME AND ADDRESS

City of Portland - BES
1120 SW 5th Avenue Rm 1100
Portland, OR 97204
attn: Patty Nelson 503 823 7710

## PURPOSE OF APPLICATION (TO CONSTRUCT/OPERATE/MAINTAIN)

| | | |
|---|---|---|
| [ ] POLE LINE | TYPE | MIN. VERT. CLEARANCE |
| [ ] BURIED CABLE | TYPE | |
| [X] PIPE LINE | TYPE: Sanitary sewer | |
| [ ] NON-COMMERCIAL SIGN | FEE AMOUNT: $0.00 | |
| [ ] MISCELLANEOUS OPERATIONS AND/OR FACILITIES AS DESCRIBED BELOW | | |

FOR ODOT USE ONLY

BOND REQUIRED: [ ] YES [X] NO — REFERENCE: OAR 734-55 035(2) — AMOUNT OF BOND:

INSURANCE REQUIRED: [X] YES [ ] NO — REFERENCE: OAR 734-55 035(1) — SPECIFIED COMP. DATE: 02/28/12

## DETAIL LOCATION OF FACILITY(For more space attach additional sheets)

| MILE POINT | TO MILE POINT | ENGINEERS STATION | TO ENGINEERS STATION | SIDE OF HWY OR ANGLE OFCROSSING | DISTANCE FROM CENTER OF PVMT | DISTANCE FROM R/W LINE | BURIED CABLE OR PIPE DEPTH/VERT. | BURIED CABLE OR PIPE SIZE AND KIND | SPAN LENGTH |
|---|---|---|---|---|---|---|---|---|---|
| 296.56 | 297.17 | | | L/R/X | | | varies/36" Min | 30" sanitary | |

DESCRIPTION AND LOCATION OF NON-COMMERCIAL SIGNS OR MISCELLANEOUS OPERATIONS FACILITIES

Permit is issued for the lining and upgrading of 30" sanitary sewer line. All work and traffic control shall be to ODOT standards and specifications. Work hrs for I 5 lane restrictions are 9pm to 5am. Project mobility notice must approved and in place 30 days prior starting work.

SPECIAL PROVISIONS (FOR MORE SPACE ATTACH ADDITIONAL SHEETS)

TRAFFIC CONTROL REQUIRED

◆ [X] YES [OAR 734-55-025(6)] [ ] NO

OPEN CUTTING OF PAVED OR SURFACED AREAS ALLOWED?

◆ [X] YES [OAR 734-55-100(2] [ ] NO (OAR 734-55-100(1)

◆ **AT LEAST 48 HOURS BEFORE BEGINNING WORK, THE APPLICANT OR HIS CONTRACTOR SHALL NOTIFY THE DISTRICT REPRESENTATIVE AT TELEPHONE NUMBER:** 503 229 5002 Jim
**OR FAX A COPY OF THIS PAGE TO THE DISTRICT OFFICE AT:** 503 297 6058 **SPECIFY TIME AND DATE IN THE SPACE BELOW.**

◆ A COPY OF THIS PERMIT AND ALL ATTACHMENTS SHALL BE AVAILABLE AT THE WORK AREA DURING CONSTRUCTION.

◆ **ATTENTION: Oregon Law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center at (503) 232-1987.**
***CALL BEFORE YOU DIG 1-800-332-2344***

COMMENTS - ODOT USE ONLY

1. Work will comply with permit, attached provisions (5pg.), and approved plans to satisfaction of District Manager or representative.
2. Work not in compliance shall be removed, repaired to meet ODOT standards, approval by District Manager or representative.
3.Applicant shall call 503 969 1035 for any electrical locates within ODOT's right of way prior to starting any work

IF THE PROPOSED APPLICATION WILL AFFECT THE LOCAL GOVERNMENT, THE APPLICANT SHALL ACQUIRE THE LOCAL GOVERNMENT OFFICIAL'S SIGNATURE BEFORE ACQUIRING THE DISTRICT MANAGER'S SIGNATURE.

| LOCAL GOVERNMENT OFFICIAL SIGNATURE | | TITLE | DATE |
|---|---|---|---|
| X | | | |
| APPLICANT SIGNATURE | APPLICATION DATE | TITLE | TELEPHONE NO. |
| X | | | |
| When this application is approved by the Department, the applicant is subject to, accepts and approves the terms and provisions contained and attached: and the terms of Oregon Administrative Rules, Chapter 734, Division 55, which is by this reference made a part of this permit. | | DISTRICT MANAGER OR REPRESENTATIVE<br>X | APPROVAL DATE |

734-3457(2-06)

Oregon Department of Transportation

# GENERAL PROVISIONS FOR POLELINE, PIPELINE, BURIED CABLE, AND MISCELLANEOUS PERMITS

Revised May 2010

| APPLICANT: CITY OF PORTLAND - BES | |
|---|---|
| HIGHWAY: 001 | MP: 296.56 - 297.17 |

All checked (☒) provisions apply.

## WORKSITE

☒ 1. Permittee must call for utility locates before digging ("Call Before You Dig!" 1-800-332-2344) per Oregon Administrative Rules (Chapter 952, Division 1). You may be held liable for damages. Premarking of excavation areas is required.

☒ 2. Permittee shall have a copy of this permit and all attachments at the work site. They shall be available to the District Manager or representative at their request.

☒ 3. Permittee shall acknowledge, in writing, receipt and review of Oregon Administrative Rules (Chapter 734, Division 55) governing miscellaneous facilities and operations on the highway right of way as the governing provisions of permit or agreement. Copies of this rule may be obtained from any district maintenance office.

☒ 4. Permittee shall review the Oregon Administrative Rules (Chapter 734 Division 55) governing miscellaneous facilities and operations on the highway right of way as the governing provisions of this permit or agreement. Web site: http://arcweb.sos.state.or.us/rules/OARS_700/OAR_734/734_055.html

☒ 5. Access control fence must be maintained during construction and restored to its original or better condition after construction is complete.

☒ 6. The permittee shall not use state highway right of way to display advertising signs or merchandise of any kind.

☒ 7. The stopping and parking of vehicles upon state highway right of way for the maintenance of adjoining property or in furtherance of any business transaction or commercial establishment is strictly prohibited.

☐ 8. All grass and small brush within the work area shall be rotary or flail mowed to ground level prior to the beginning of work to facilitate clean up.

☒ 9 Disturbed areas shall be reseeded with grass native to the area in an appropriate seeding time.

☒ 10. The spreading of mud or debris upon any state highway is strictly prohibited and violation shall be cause for immediate cancellation of the permit. Clean up shall be at the applicant's expense. The highway shall be cleaned of all dirt and debris at the end of each work day, or more frequently if so determined by the District Manager or representative.

☒ 11. Permittee shall replace any landscape vegetation or fences that are destroyed. Any damage that is not fully recovered within 30 days (weather permitting) shall be replaced by ODOT at the expense of the permittee. A "plant establishment" shall be understood to be part of the planting work to assure satisfactory growth of planted materials. The plant establishment period will begin when the original planting and all landscape construction has been completed and approved. The length of the establishment period will be one calendar year or as defined in the permit Special Provisions.

☐ 12. Permittee shall install and maintain landscaped area as shown on the attached drawings. Planting shall be limited to low-growing shrubs, grass or flowers that do not attain sufficient height to obstruct clear vision in any direction. The Oregon Department of Transportation (ODOT) shall have the right to remove said landscaping at any time such removal may appear to be in the public interest, without liability or loss, injury, of damage or any nature whatsoever.

## TRAFFIC

☒ 13. During construction or maintenance, the work area shall be protected in accordance with the current Manual on Uniform Traffic Control Devices (MUCTD) , Federal Highway Administration, U.S. Department of Transportation, and the Oregon Department of Transportation supplements thereto. Flaggers must have a card or certificate indicating their completion of an approved work zone traffic control course. All traffic control devices shall be maintained according to the American Traffic Safety Services Association (ATSSA), Quality Standards for Work Zone Traffic Control Devices handbook.

☒ 14. Permittee shall provide a detailed traffic control plan for each phase of the work, showing signs and cones. Plans shall be reviewed by Oregon Department of Transportation in advance of construction or maintenance.

☒ 15. All damaged or removed highway signs shall be replaced by the permittee. Installation shall be according to MUTCD standards or ODOT specifications, and shall be completed as soon as possible but no later than the end of the work shift.

☐ 16. No lane restrictions are permitted on the roadway during the hours of darkness, on weekends, or between 6:00 AM and 9:00 AM, or 3:00 PM and 6:00 PM (Monday through Friday) without prior approval by ODOT.

☒ 17. Hours of work shall be 9pm - 5am.

## DRAINAGE

☐ 18. On-site storm drainage shall be controlled within the permitted property. No blind connections to existing state facilities are allowed.

☐ 19. Excavation shall not be done on ditch slopes. Trench excavation shall either be at ditch bottom or outside ditch area. (Minimum depth at bottom of ditch shall be 36 inches; minimum depth outside of ditch shall be 42 inches).

☐ 20. Only earth or rock shall be used as fill material and shall slope so as not to change or adversely affect existing drainage. Fine grade and seed the finished fill with native grasses to prevent erosion.

☐ 21. A storm drainage study stamped by an Oregon Registered Professional Engineer (PE) is required. The study must meet standards of the National Pollution Discharge Elimination Systems (NPDES) when any of the following conditions apply:

- Whenever a four inch pipe is inadequate to serve the developed area,
- development site is one acre or larger in size and directly or indirectly affects state facilities,
- or as directed by the District Manager or representative.

☐ 22. Permittee shall provide on-site retention for storm water runoff that exceeds that of the undeveloped site.

☐ 23. All water discharged to an ODOT drainage system must be treated prior to discharge. All requests for connection to an ODOT storm system must meet any requirements of the National Pollutant Discharge Elimination System (NPDES). This may include local jurisdiction approval of on-site water quality treatment facilities and/or development of an operation and maintenance plan for any on-site water quality treatment facility, as determined by local jurisdiction.

## EXCAVATION / CONSTRUCTION

☒ 24. The following ODOT documents and any supplements and subsequent revisions thereto, where applicable and not otherwise superseded by the permit language herein, but only to the extent that they provide standards and performance requirements for work to be performed under the permit, shall be incorporated for use in the permit:

"Oregon Standard Specifications for Construction (2008)". ODOT shall have authority over acceptance of all materials and workmanship performed under this permit as stated in Section 00150.00 of the "Oregon Standard Specifications for Construction (2008)."

For additional Supplemental and Special Provisions please refer to: http://www.oregon.gov/ODOT/HWY/SPECS/standard_specifications.shtml Standard Specification books are available on this site.

☒ 25. Open cutting of pavement is allowed in areas specifically approved by District Manager or representative.

☐ 26. Trench backfill shall be according to the attached typical drawing, marked as Exhibit A.

☐ 27. Open cutting of the highway is allowed with construction in accordance with OAR 734-55-0100. All excavation in paved areas shall be backfilled and the roadway surface patched before the end of each shift. In special cases where steel plates are allowed, said plates shall be pinned and a temporary cold patch applied to the edges. The permittee shall be fully responsible for monitoring and maintenance of temporary patching and steel plating.

☐ 28. Compaction tests shall be required for each open cut per Oregon Standard Specification for Construction. Compaction tests shall be conducted once for every 300 lineal feet per lift of continuous trench according to the Manual of Field Test Procedures (MFTP), published by ODOT. Percent Compaction shall be 95%. At the discretion of the District Manager or representative, results of compaction test shall be provided to District Manager or representative at applicants' expense.

☒ 29. Control Density Fill (CDF) shall be used as surface backfill material in place of crushed rock in open trenches that impact the travel portions of the highway. A ¾"-0, or 1"-0 rock will be used for the aggregate. The amount of cement used shall not exceed 3.0% of the total mixture's weight. Maximum compressed strengths must not exceed 250 pounds per square inch (psi).

☐ 30. Surface restoration shall be a minimum of eight inches of hot asphalt-concrete (AC), compacted in two inch lifts, or match existing pavement depth, whichever is greater. Sand-seal all edges and joints.

☒ 31. All aggregate shall conform to Oregon Standard Specification for Construction, Section 02630 - Base Aggregate.

☒ 32. Any area of cut or damaged asphalt shall be restored in accordance with the included attachment "T-Cut Typical Section" drawing. For a period of two years following the patching of paved surface, permittee shall be responsible for the condition of permittee's pavement patches, and during that two year period shall repair to District Manager or representative satisfaction any of the patches which become settled, cracked, broken, or otherwise faulty.

☐ 33. An overlay to seal an open-cut area shall be completed prior to the end of the construction season, or when minimum temperature allows per "Oregon Standard Specification for Construction (2008)" and any subsequent revisions thereto. Typical overlay shall be 1.5 inches deep and cover the affected area from edge of pavement to edge of pavement, and taper longitudinally at a fifty feet to one inch (50' : 1") ratio. Taper may be adjusted by the District Manager as required. For a period of two years following this patching of the surface, the permittee shall be responsible for the condition of said pavement patches, and during that time shall repair to the District Manager or representative's satisfaction any of the patches which become settled, cracked, broken or otherwise faulty.

☐ 34. Highway crossings shall be bored or jacked. Bore pits shall be located behind ditch line or in areas satisfactory to the District Manager or representative. Unattended pits shall either be protected by a six-foot fence, backfilled, or steel plated and pinned.

☒ 35. Permittee shall install a "tracer wire" or other similar conductive marking tape or device, if installing any non-conductive, unlocatable underground facility, in order to comply with Oregon Utilities Coordination Council (OUCC), per OAR 952-01-0070 (6).

☒ 36. Trench backfill outside of ditch line or in approved areas can be native soil compacted at optimum moisture in twelve inch layers to 90% or greater of the maximum density.

☒ 37. Native material that is found to be unsatisfactory for compaction shall be disposed of off the project and granular backfill used.

☒ 38. Trench backfill in rock slope or shoulder shall be crushed 1"-0 or ¾"-0 size rock compacted at optimum moisture in eight-inch layers. Compaction tests shall be conducted according to the Manual of Field Test Procedures (MFTP), published by ODOT. Percent compaction shall be 95%. At the discretion of the District Manager or representative, results of compaction tests shall be provided to District Manager or representative at applicant's expense.

☒ 39. Where excavation is on fill slope steeper than a two to one (2:1) ratio, slope protection shall be provided using four-inch size rock laid evenly to a minimum depth of twelve inches.

☒ 40. No more than 300 feet of trench longitudinally along the highway shall be left open at any one time and no trench shall be left in an open condition overnight.

☒ 41. Areas of disturbed cut and fill slopes shall be restored to a condition suitable to the District Manager or representative. Areas of erosion to be inlaid with an acceptable riprap material.

☐ 42. All underground utilities shall be installed with three-foot or more of horizontal clearance from existing or contract plans guardrail posts and attachments. All non-metallic water, sanitary and storm sewer pipe shall have an electrically conductive insulated Number 12-gauge copper tracer wire the full length of the installed pipe using blue wire for water and green for storm and sanitary sewer piping.

☒ 43. Any area of cut or damaged concrete shall be restored in accordance with the attached Typical Section-Pipe Section under sidewalk.

☐ 44. Utility markers and pedestals shall be placed as near the highway right-of-way line as practical. In no case shall pedestals and line markers be located within the highway maintenance area.

☐ 45. No cable plowing is allowed within the lateral support of the highway asphalt (i.e. at six feet lower than the edge of the asphalt, no plowing within nine feet of the edge of the asphalt).

☐ 46. Review by ODOT Bridge Engineers is required for all proposed bridge and structure attachments and for utility or any facilities to be installed within sixteen feet of bridge foundations, supports, walls or related, or within the influence zone of bridge facilities.

## MISCELLANEOUS

☒ 47. Permittee shall be responsible and liable for (1) investigating presence/absence of any legally protected or regulated environmental resource(s) in the action area; (2) determining any and all restrictions or requirements that relate to the proposed actions, and complying with such, including but not limited to those relating to hazardous material(s), water quality constraints, wetlands, archeological or historic resources(s) state and federal threatened or endangered species, etc., (3) complying with all federal, state, and local laws, and obtaining all required and necessary permits and approvals.

☒ 48. If the permittee impacts a legally protected/regulated resource, permittee shall be responsible for all costs associated with such impact, including, but not limited to all costs of mitigation and rehabilitation, and shall indemnify, and hold ODOT harmless for such impacts and be responsible and liable to ODOT for any associated costs or claims that ODOT may have.

☒ 49. Plans are approved by ODOT in general only and do not relieve the permittee from completing construction improvements in a manner satisfactory to ODOT. The District Manager or representative may require field changes. When revisions are made in the field, permittee is responsible to provide "as built" drawings, within 60 days from completion of highway improvements, and shall submit them to the District Office issuing the permit.

☒ 50. Permittee shall be responsible for locating and preserving all existing survey monumentation within the work area in accordance with ORS 209.150 and/or 209.155. If monumentation or its accessories are inadvertently or otherwise disturbed or destroyed, applicant shall be responsible for all costs and coordination associated with it's reestablishment by a professional licensed surveyor.

By this signature applicant accepts all checked (☒) provisions (4 pages).

| Applicant signature: | Date: |
|---|---|

City of Portland, Oregon
Bureau of Development Services
Compliance Services - Noise Control Program

1900 SW 4th Avenue, Suite 5000
Portland, Oregon 97201
503-823-7350
Fax 503-823-7915
TTY 503-823-6868
www.portlandonline.com/bds

# Noise Review Board Decision
# May 12th, 2010 Board meeting

**Application #:** 11-117774 NV

**Applicant:** PATTY NELSON

**Organization:** BUREAU OF ENVIRONMENTAL SERVICES

**Activity:** BURLINGAME TRUNK SEWER REHABILITATION PROJECT

**Event Location:** PROJECT BY BUREAU OF ENVIRONMENTAL SERVICES

**Date(s):** February 1, 2011 through October 31, 2011

**Hours:** 24 HRS/DAY for some activities

Application for the above has been reviewed by the Noise Control Officer, City of Portland

## FINDINGS:

1. Within the scope of this variance, noise levels are not expected to be injurious at residential receivers. They are expected to be audible and intermittently intrusive.

2. The variance shall apply specifically to the activities as described by the applicant to the Noise Control Officer in the application. Any additional activities shall require clearance from the Noise Office prior to commencing with the work activities.

3. The project is located in areas that are primarily Industrial and Commercial zoning. However, there are sufficient lines of sight to a number of residential locations at several of the shafts. The direct line of sight and distance to any neighbors will have impact on residential use locations.

4. Extending the hours of construction is requested to facilitate timely completion of the work.

5. This variance is only for the duration from February 1, 2011 through October 31, 2011. The project is anticipated to be longer in duration. As this particular variance has been

handled administratively by the Noise Control Officer, only one year may be applied to the varianced time frame. Any additional dates will require an application for the additional time period and not merely an extension of this permit.

## DECISION:

## The Variance was approved with the following conditions , the motion was made by Julie Greb and seconded by Susan Pearce, motion passed.

The following variance conditions will be used to mitigate significant noise impacts during nighttime construction on this administratively reviewed variance:

1. This variance is approved for 88 varianced nights and Sundays only for the duration from February 1, 2011 through October 31, 2011. Area one (1) shall include 14 days, area two (2) shall include 14 days, areas three (3), four (4),and five (5) shall run concurrently for thirty (30) days; and area six (6) is along I-5 for thirty days. The project is not initially anticipated to be longer in duration than this first varianced period.
2. Construction activities from the application each night shall not exceed 68 dBA Leq (15 minute Leq) as measured at 50 feet from the source. All haul truck noise shall not exceed 75 dBA at 50 feet from the source.
3. The contractor shall use "smart alarms" or a "spotter" instead of standard reverse signal alarms between 7:00 p.m. to 10:00 p.m. A "guide person" or "spotter" shall be used for equipment backup between 10:00 p.m. to 6:00 a.m, and throughout the day on Sundays.
4. The contractor will have portable noise meters on the job during all night construction activity for noise level measurement during specific operations. The Project Manager will ensure compliance with the noise abatement requirements, and remediate any infractions of those requirements if they should occur.
5. The applicant shall notify the Noise Officer and the neighborhood residents of the construction schedule prior to commencing any work. The notice shall advise the residents of the current night work schedule. The notice will include a number to reach a live person during construction activities to have noise concerns addressed ina timely fashion.
6. There will be a 24 hour telephone response line (in addition to the construction information line) available to the nearest receptors. Complaints will be investigated by the onsite BES inspector or the contractor's supervisor. Complaints will be investigated and addressed within 24 hours or before the next scheduled night work. In addition, the contractor will employ an individual trained to use the noise meter and with working knowledge of sound measurements and their meaning and use as applied to this variance. Complaints will be investigated to determine if they are violations; if so, the applicant shall commence developing a mitigation plan.

7. The applicant shall be prepared to develop a mitigation plan with the Noise Control Officer if complaints are not easily resolved.

8. The Project Manager will notify the City's Noise Control Officer of any and all complaints within a 24-hour period.

9. The Project Manager shall maintain a log of varianced nights for each work location and each work activity. The log will be made available on a weekly basis.

## APPROVED SOUND LEVEL INFORMATION:

- **All Leq levels are based on a 15 minute Leq measurement, taken with a FAST meter response, and an A weighting.**

- **Ambient sound levels shall be considered a 15 minute Leq level recorded outside to any construction work period in each area, or when there is a break in work activities. It is not the average hourly or 15 minute Leq for the entire evening.**

**The applicant understands that this variance is subject to review upon complaint. The Noise Control Officer may modify conditions to resolve community impact from noise emanating from the project.**

**This decision becomes effective on May 12, 2010.**

APPEAL PROCEDURES: PCC Section 18.14.020 (i) states that "A variance decision of the Noise Control Officer or the Noise Review Board may be appealed to the City Council as follows: (1) A variance decision may be appealed by the applicant, his legal representative, or by any person who has submitted oral or written testimony on the application. (2) Notice of intent to appeal shall be submitted in writing to the City Auditor's Office within 10 day of the effective date of the decision. The notice shall identify the decision that is being appealed, and shall include the appellant's name, address and signature, phone number, relationship to the variance decision action, and a clear statement of the specific reason(s) for the appeal including alleged misapplication of City Codes. (3) Upon receipt of such appeal, the Auditor shall then place the matter upon the Calendar of the City Council. At the time of hearing, the City Council may consider such new matters as it deems appropriate, as well as the record developed before the Noise Control Officer or the Noise Review Board, and thereafter may affirm, reverse, modify or remand the decision."

**Date:** of written copy March 3, 2011

Paul van Orden
Noise Control Officer
City of Portland

# APPENDIX

# MANHOLE SKETCHES

**Job:** # 59096

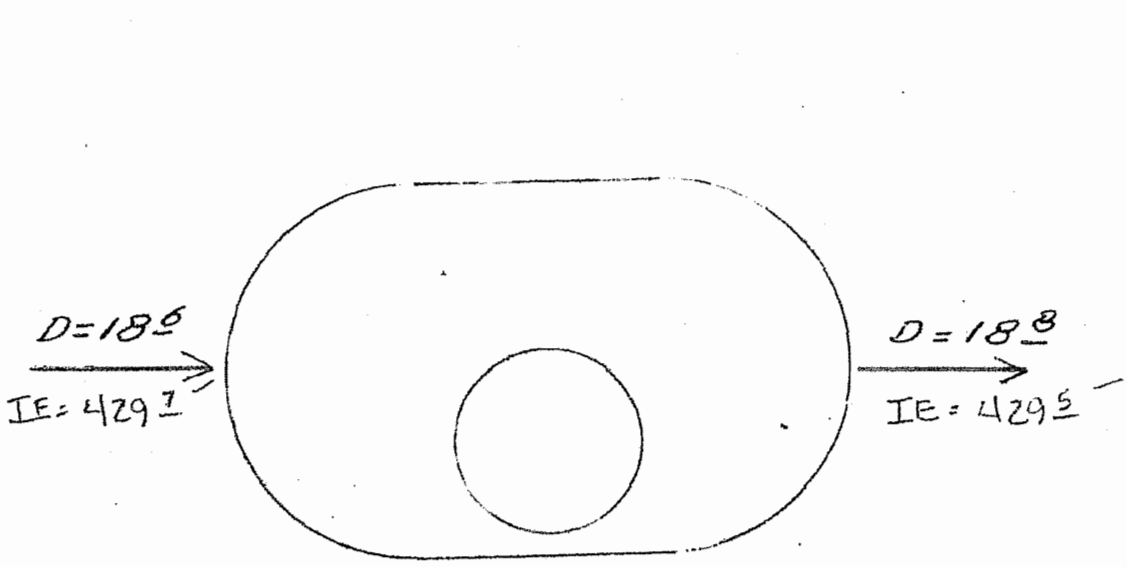
**Detail – Manhole #** 20 (ACX-6509)

**Date:** 9-13-09 **Crew:** 511

**Location:** SW MULTNOMAH ST & BARBUR BLVD

**Rim Elev.** 448 30 ✓ **Point #** 52524 **File:** _____

**NOT TO SCALE** * = Measured down from Rim Elev.



**Job:** # 59096

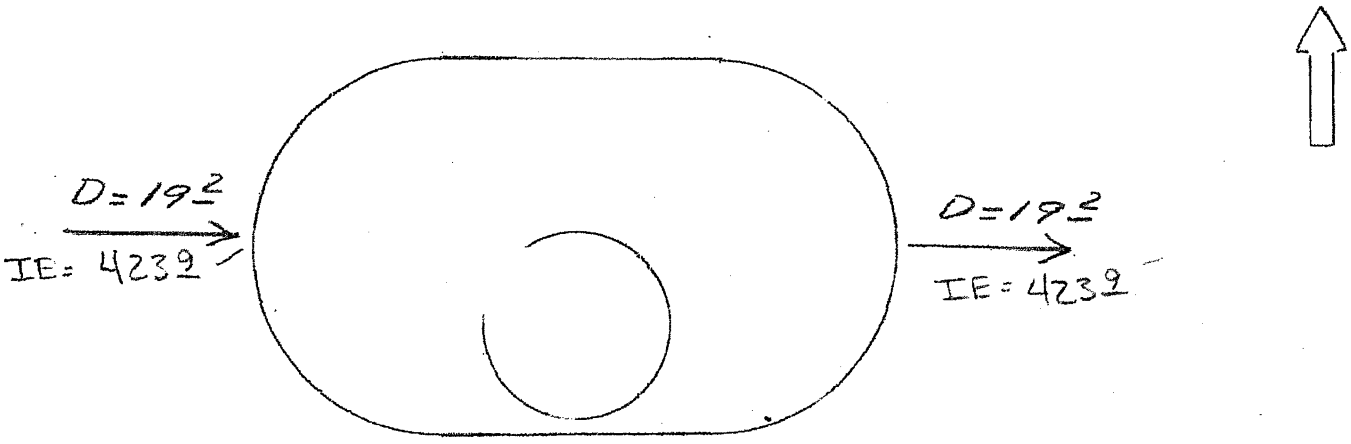
**Detail – Manhole #** 21 (ACX-651?)

**Date:** 9-13-09 **Crew:** 511

**Location:** SW MULTNOMAH ST &

**Rim Elev.** 443.06 **Point #** 52534 **File:** _____

**NOT TO SCALE** * = Measured down from Rim Elev.



**Job:** 59096 **Burlingame Trunk Sewer Rehab**

**Detail – Manhole #** 23 (ACX 722?)

**Date:** 08-18-09 **Crew:** 510

**Location:** _____

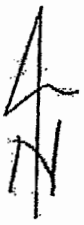
**Rim Elev.** 444.15 **Point #** 52532 **File:** 59096 EB

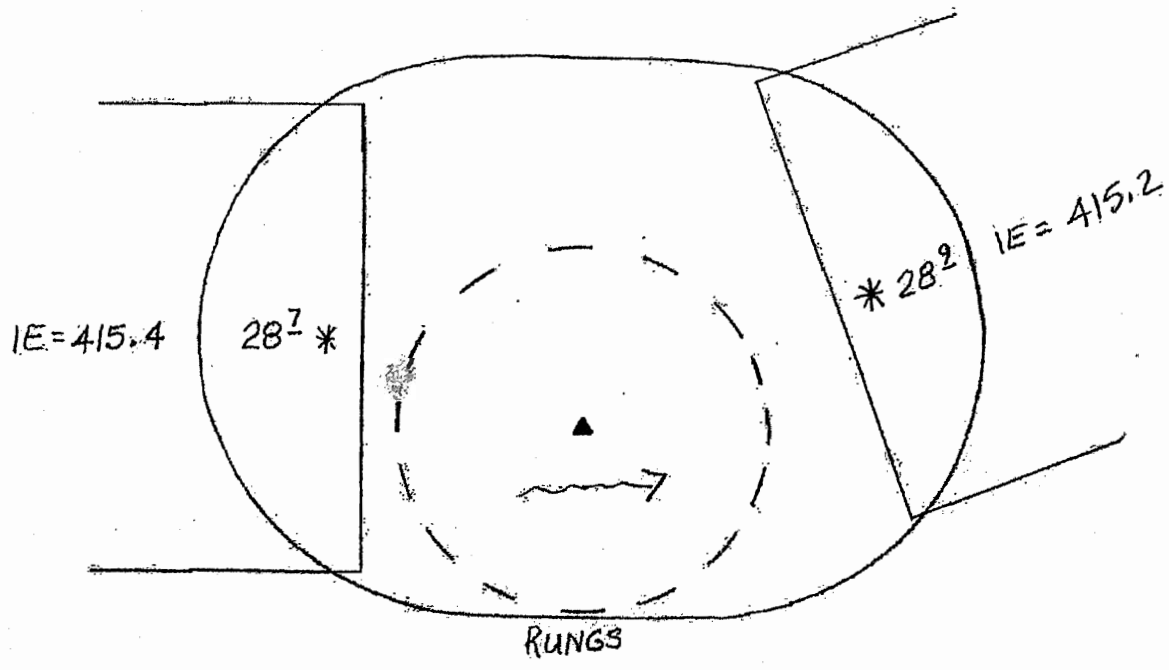
▲ **Shot taken C/L Lid**

**NOT TO SCALE** * **= Measured down from Rim Elev.**

+/- 3' x 4' CONC. OVAL

N 663350.03
E 7638591.56






✓ RLL

**Job:** 59096 **Burlingame Trunk Sewer Rehab**

**Detail – Manhole #** 24 (ACX 687?)

**Date:** 08-18-09 **Crew:** 510

**Location:** I-5 OFF RAMP TO SW MULTNOMAH

**Rim Elev.** 427.99 **Point #** 52543 **File:** 59096 EB

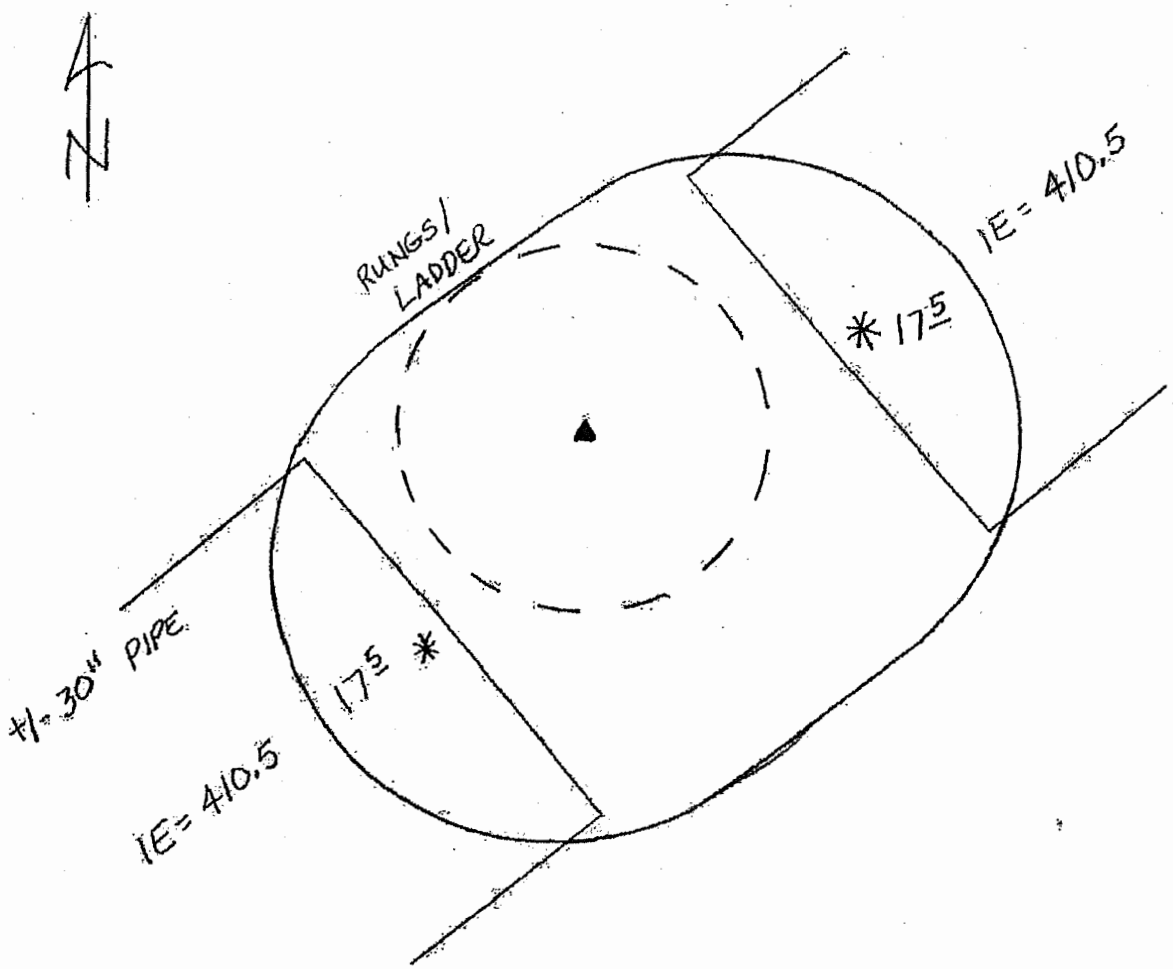
▲ **Shot taken C/L Lid**

* **= Measured down from Rim Elev.**

**NOT TO SCALE**

+/- 3' x 4' CONC. OVAL

**N** 663438.78
**E** 7638772.33




✓ RLD

**Job:** 59096 **Burlingame Trunk Sewer Rehab**

**Detail – Manhole #** 29 (ACX 673)?

**Date:** 08-07-09 **Crew:** 510

**Location:** _____

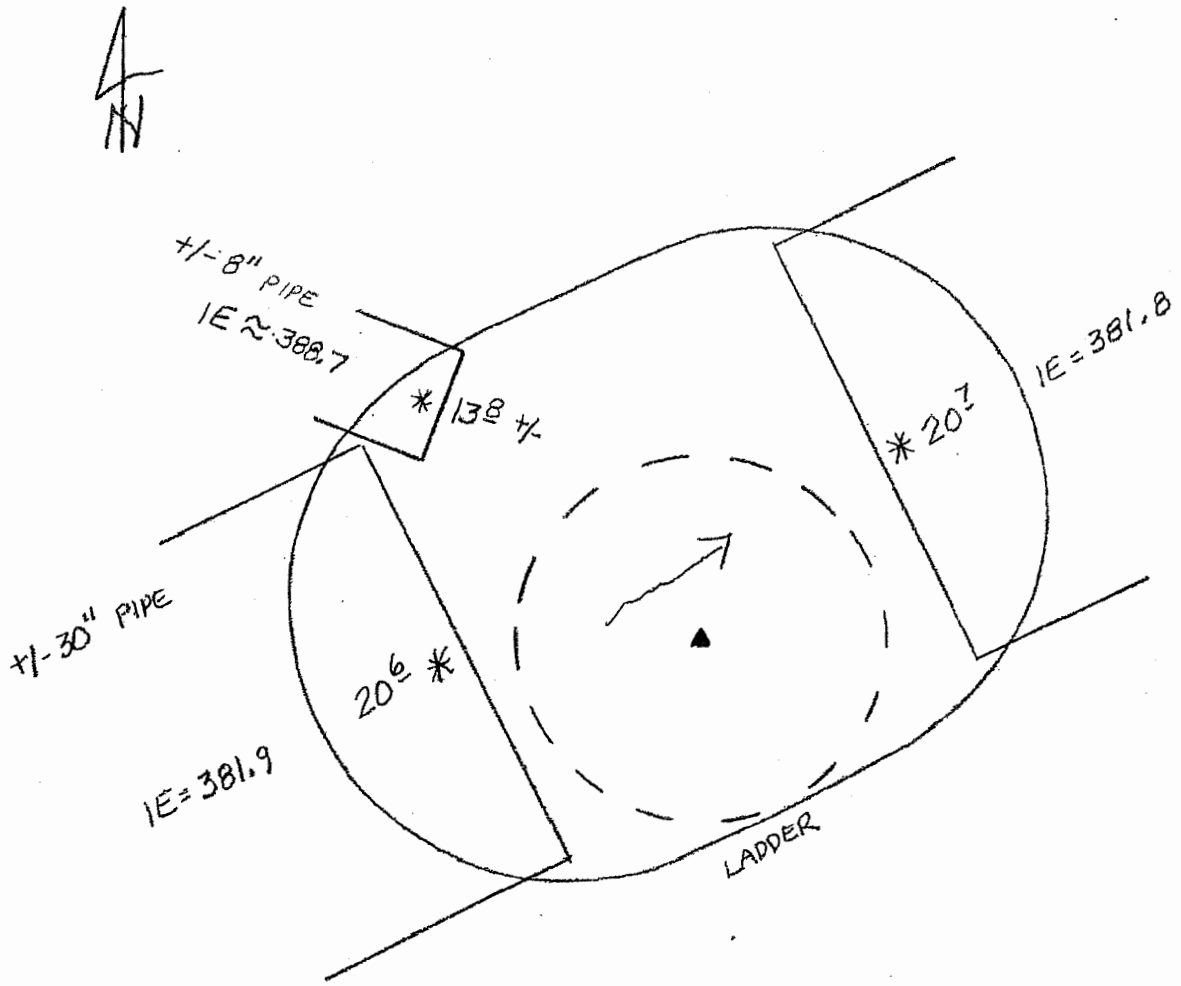
**Rim Elev.** 402.52 **Point #** 52547 **File:** 59096 EB

▲ Shot taken C/L Lid

**NOT TO SCALE** * = Measured down from Rim Elev.

+/- 3' x 4' CONC. OVAL

N 663978.68
E 7639417.78




RLM

**Job:** 59096 **Burlingame Trunk Sewer Rehab**

**Detail – Manhole #** 35 (ACX 677)?

**Date:** 08-18-09 **Crew:** 510

**Location:** _____

**Rim Elev.** 382.88 **Point #** 52571 **File:** 59096 EB

▲ **Shot taken C/L Lid**

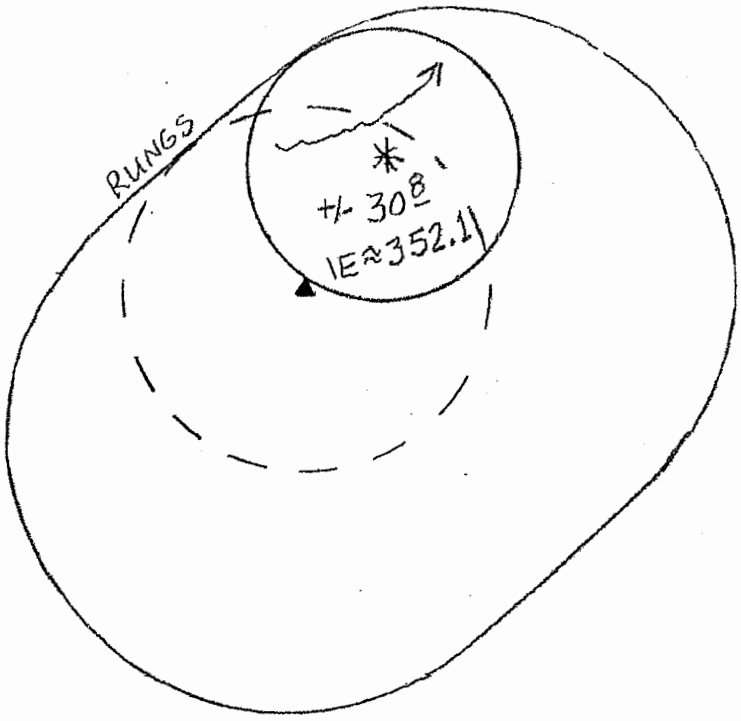
**NOT TO SCALE** * **= Measured down from Rim Elev.**

+/- 3' x 4' CONC. OVAL

**N** 663961.68
**E** 7639759.13

N

STRONG FLOW VISIBLE THROUGH HOLE - ENTIRE PIPE NOT VISIBLE. MEASURE-DOWN IS APPROXIMATE.




RLT

**Job:** 59096 **Burlingame Trunk Sewer Rehab**

**Detail – Manhole #** 25 (ACX 686?)

**Date:** 08-07-09 **Crew:** 510

**Location:** IN GRASS BETWEEN I-5 AND SW MULTNOMAH

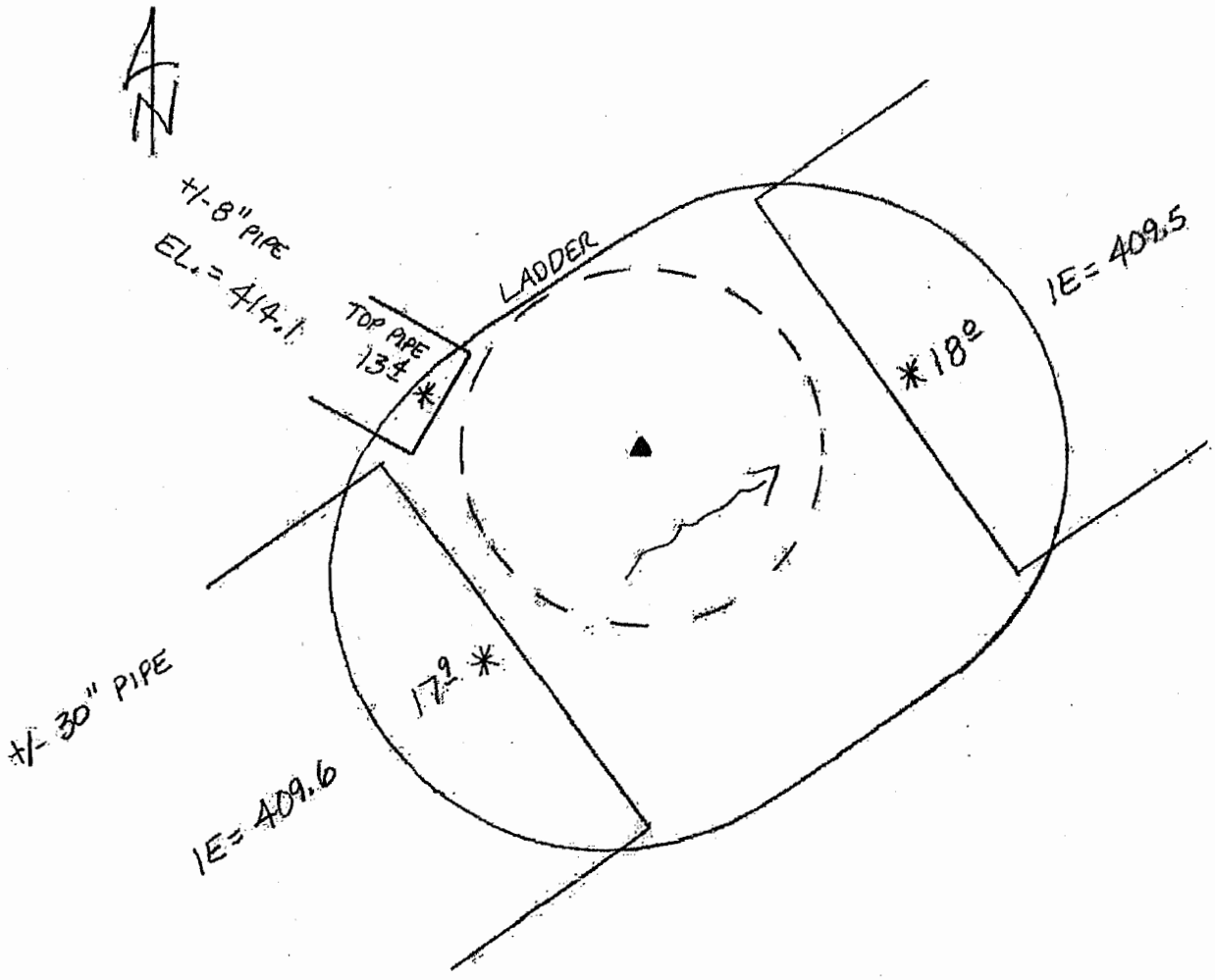
**Rim Elev.** 427.53 **Point #** 52541 **File:** 59096 EB

▲ Shot taken C/L Lid

**NOT TO SCALE** * = Measured down from Rim Elev.

+/- 3' x 4' CONC. OVAL

N 663477.18
E 7638776.90




✓ RLT

**Job:** 59096 **Burlingame Trunk Sewer Rehab**

**Detail – Manhole #** 28 (ACX 682?)

**Date:** 08-07-09 **Crew:** 510

**Location:** _____

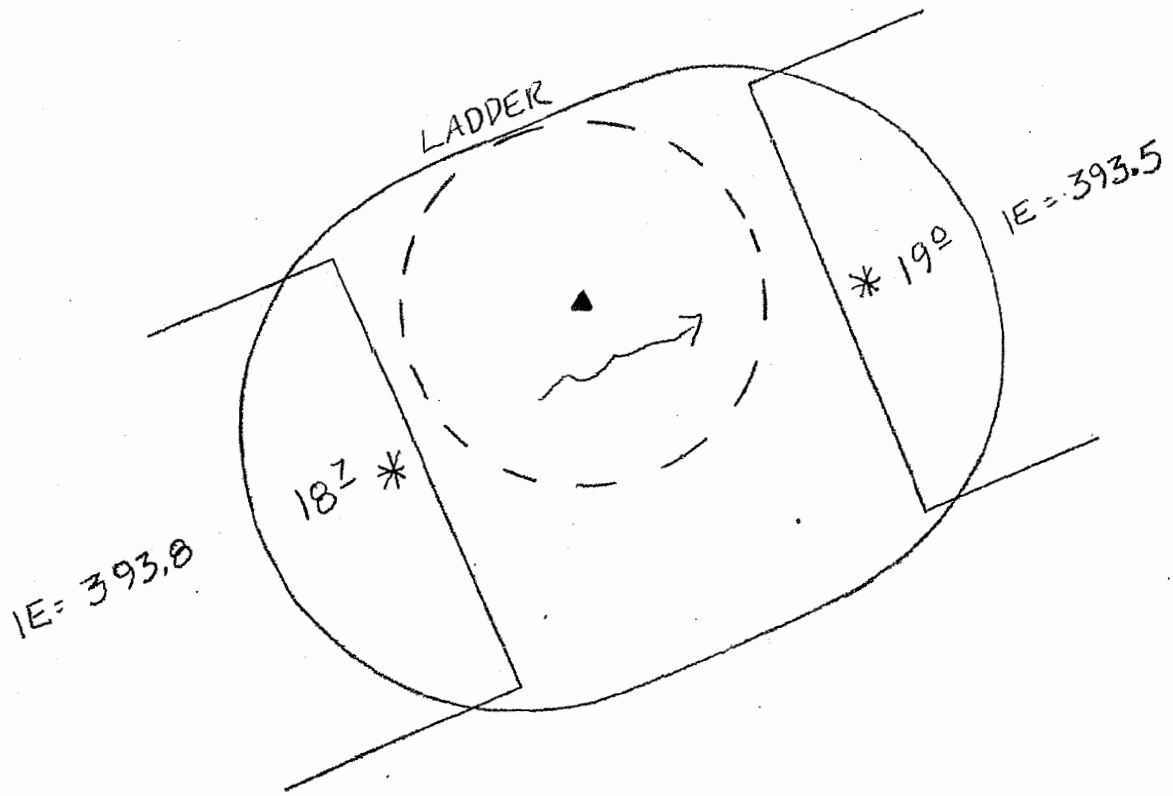
**Rim Elev.** 412.48 **Point #** 52544 **File:** 59096EB

▲ **Shot taken C/L Lid**

**NOT TO SCALE** * **= Measured down from Rim Elev.**

+/- 3'x4' CONC. OVAL

N 663725.95
E 7639100.25




RLD

**Job:** 59096 **Burlingame Trunk Sewer Rehab**

**Detail – Manhole #** 38 (ACX870)?

**Date:** 08-18-09 **Crew:** 510

**Location:**

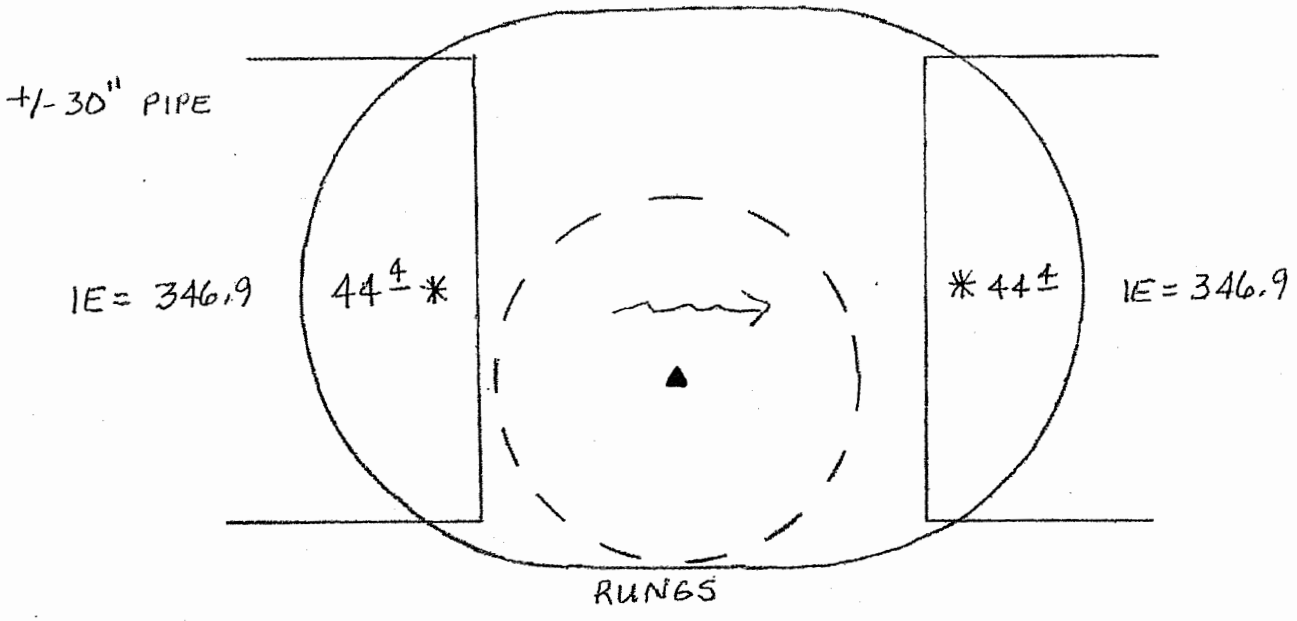
**Rim Elev.** 391.30 **Point #** 52558 **File:** 59096EB

▲ **Shot taken C/L Lid**

**NOT TO SCALE** * **= Measured down from Rim Elev.**

+/- 3'x4' CONC. OVAL

**N** 664142.63
**E** 7639887.87




✓RLD

# GEOTECHNICAL DATA

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

Materials Testing Laboratory

1405 North River Street, Bldg 117, Portland, Oregon 97227 ▪ Dan Saltzman, Commissioner ▪ Dean Marriott, Director

March 24, 2010

Patty Nelson
City of Portland
Bureau of Environmental Services
Building 813/WRCSO
Portland, Oregon

**Geotechnical Investigation**
**Burlingame Trunk Sewer**
**Portland, Oregon**
**BES Project E09052**

## INTRODUCTION

This letter report presents the results of the geotechnical study completed for the Burlingame Trunk Sewer project in Portland, Oregon. This geotechnical study was done at the request of Patty Nelson, a project manager with the City of Portland Bureau of Environmental Services (BES). Patty provided us a copy of the 90% Design Plan and Profile drawings to assist us in preparing this report. The project area is located in southwest Portland on SW Multnomah Boulevard between SW 31st Avenue and 180 feet northeast of SW 14th Avenue. The site consists of mixed residential and light commercial developments.

As part of this project, BES is planning new construction of about 930 linear feet of HDPE-lined Reinforced Concrete Pipe (RCP), Fiberglass Reinforced Pipe (FRP) or Polyvinyl Chloride Pipe (PVC) pipe sections and replacing about 2375 linear feet of existing 30-inch sewer pipe with either HDPE-lined RCP pipe or FRP pipe by conventional open cut methods. Proposed pipe diameters range between 15 and 48 inches. The project also includes construction of numerous manholes and rehabilitating several existing sewer pipe sections with cured in place pipe and manholes with polyurethane coating.

Based on the 90% Design, excavation depths for the system are anticipated to be between 12 and 20 feet below the ground surface (bgs) along SW Multnomah Boulevard northeast of SW 19th Avenue. Along SW Multnomah Boulevard between SW 31st and SW 22nd Avenues excavation depths are anticipated to range from 10 to 27 feet bgs. Much of the installed pipe will be placed in the existing trench at the same depth as the existing system. Several of the new sections will be placed in a new trench or at a greater depth within the same trench.

The purpose of the geotechnical investigation was to evaluate and report subsurface conditions along each proposed sewer alignment and identify potential construction challenges. The geotechnical investigation consisted of site reconnaissance, subsurface explorations, laboratory testing, and a review of pertinent historical records and geologic maps.

## HISTORY

In 2002 a geotechnical investigation was performed for the Taylor Trunk Relief (BES project No. 6693) as part of an earlier phase of this project. As part of the Taylor Trunk Relief project a total of five borings were completed during May 2002. Copies of the logs are attached in appendix A of this report. The results of the 2002 investigation have been incorporated into this report and utilized to develop the conclusions and recommendations of this report.

SW Multnomah Boulevard occupies an abandoned inter-urban passenger railway right of way. Oregon Electric Railroad began construction of the line in 1905 and established passenger service in 1908. Construction of the rail line through the rolling hills of southwest Portland required extensive earthmoving. The existing 30-inch diameter sewer was first constructed in the 1950's.

## FIELD EXPLORATION AND LABORATORY TESTING

### Geotechnical Borings

The field investigation for the Taylor Trunk Relief project, completed on May 17 and 24, 2002, consisted of five geotechnical borings (B-1 through B-3, and Probe 1 and Probe 2) drilled to a maximum depth of about 33.9 feet bgs. Five additional borings (BT-1 through BT-5), completed on January 15 and 18, 2010, were drilled as part of the most recent phase of this project to a maximum depth of 26.5 feet bgs. Locations of all the borings were surveyed in by surveyors with the City of Portland. The approximate locations of the borings are shown on the Exploration Location Map, Plate 1.

Borings B-1 through B-3 and BT-1 through BT-5 were advanced using hollow stem auger drilling methods. Soil samples were obtained from the borings at 2.5 to 5-foot depth intervals to the maximum depth explored in each boring by driving a 3-inch outside diameter (O.D.), split spoon sampler or a 2-inch O.D. standard split spoon (SPT) sampler with a 140-pound hammer, falling freely from a height of about 30-inches. In 2002 the system used to drive the hammer was a rope and cathead and in January of this year the system used was an auto-trip. Borings Probe 1 and Probe 2 were obtained from the 1.5 inch diameter GeoProbe™ Macrocore sampler.

Recorded uncorrected blows for each 6 inches of sampler penetration are shown on the boring logs. The cumulative blow count (N-value) for the second and third six-inch increments of driven sample provide a qualitative measure of the relative density of cohesionless soils, or the relative consistency of fine-grained soils and are shown as corrected values ($N_{60}$) on the logs (corrected for sampler size and hammer type). Samples were collected at selected depths in the borings for general soil classification. The boring logs for BT-1 through BT-5 are presented on

Plates 2 through 6. The boring logs for B-1 through B-3 and Probe 1 and Probe 2 are in Appendix A.

**Test Pit Exploration**

The test pit exploration (TP-1) was completed on February 3, 2010 down to a maximum depth of 18 feet bgs using a Deere D120 track excavator. The purpose of the test pit exploration was to observe the soil and groundwater conditions, see how the excavation would stand with no support, and to install a 1-inch piezometer. Test pit TP-1 was located in the grass area to the east of SW Multnomah Boulevard about 3 feet east of Boring BT-1. Based on locate markings, underground utility lines (water, existing sewer, gas, and fiber optic) were located on both sides of the excavation at distances of at least 10 feet from the test pit. The approximate location of the test pit exploration is shown on the Exploration Location Map, Plate 1. The width of the trench was approximately 3 to 4 feet at the base and about 6 feet at the top. The length of the trench was about 13 to 15 feet. We observed similar soil types in Test Pit TP-1 as in Boring BT-1. No samples were taken from Test Pit TP-1. A summary of the soil and groundwater conditions is presented in the Site Conditions section of this report. A log for Test Pit TP-1 is presented on Plate 7.

We observed that the soils in the test pit could be excavated using the Deere D120 excavator down to the maximum depth explored. During the excavation we took several photos and a video recording. The upper 5 to 6 feet of excavated material was placed approximately 1 foot away from the west side of the trench. The material below 5 to 6 feet was placed approximately 4 feet away from the east side of the trench. Between 0 and 9 feet bgs we observed the walls of the excavation to stand freely with minor sloughing. As the excavation proceeded between 9 and 10 feet bgs we observed a seam of perched water flowing slowly into the trench and a 6 to 8 foot long section of the west wall of the excavation between 4 and 8 feet bgs to cave slowly into the trench. Between 13.5 and 15 feet bgs we observed a second seam of perched water flowing rapidly into the trench. At 14 feet bgs we observed the west wall between 0 and 10 feet bgs to cave violently into the trench. Between 14 and 18 feet bgs we observed sections of the west wall to slide into the trench, which made excavation more difficult. At the end of the excavation we observed that the west edge of the trench had widened by several feet, so that the total width at the top of the trench was about 10 feet. Before backfilling the hole, we placed a 1-inch piezometer in the northeast corner of the trench. Details of the piezometer installation are found on the attached log for Test Pit TP-1. The excavated materials were placed back in the hole and lightly compacted using the excavator. A hoe pack attached to the excavator was used to compact the upper 6 feet of material.

**Laboratory Testing**

Routine laboratory tests were conducted on selected soil samples from the borings to assist in the characterization of certain soil physical properties. Testing was limited to determining moisture content, Atterberg Limits, and grain size analysis testing (percent fines). The results of these tests are shown on the boring logs. The materials are classified in accordance with ASTM D2488 (Standard Practice for Description and Identification of Soils [Visual-Manual Method]), as explained on Plate 8. Relative density and consistency of soil is also described on Plate 8. Plate 9 defines rock quality, weathering and strength terms.

## SITE CONDITIONS

### Surface Conditions

SW Multnomah Boulevard slopes up from 22nd Avenue to 27th Avenue at about a 1.4 percent grade and then slopes down toward 31st Avenue at about a 0.6 percent grade. Embankment fills up to 14 feet deep appear to have been placed along SW Multnomah Boulevard from 22nd Avenue to just west of 25th Avenue and again between 30th and 31st Avenues. Long cut slopes, up to 25 feet above the adjacent grade, are visible on the south side of Multnomah Boulevard between 25th and 28th Avenues and on the north side of Multnomah Boulevard west of 31st Avenue. The embankment construction interrupted the natural drainage of the hillside above the project area. Two small creeks, one midway between 30th and 31st Avenues and another between 25th and 28th Avenues, were replaced with culverts. To the northeast of 19th Avenue, Multnomah Boulevard becomes a narrow frontage road between Interstate 5 and the base of a hill. The road generally slopes down to the northeast at about 2 to 3 percent, except for within about 300 feet of 19th Avenue. Within 300 feet of 19th Avenue SW Multnomah Boulevard comes down a steeper embankment with slopes between 10 and 14 percent.

Borings B-1 through B-3 and Borings BT-2 through BT-5 were completed on pavement within the public right-of-way. Borings Probe 1 and Probe 2 were located in the shoulder and Boring BT-1 and Test Pit TP-1 were located in a grassy area. Pavements consisted of Asphaltic Concrete (AC) above aggregate base course (AGG). Between the SW Barbur Boulevard overpass and SW 31st Avenue on SW Multnomah Boulevard we observed 4 to 10 inches of AC over 4 to 8 inches of aggregate base. On SW Multnomah Boulevard to the north of SW 19th Avenue we observed 3 inches of AC over 9 to 21 inches of aggregate base. In boring BT-5, we observed an 8 inch subbase layer of what appeared to be recycled AC below the aggregate base. Table 1 below shows the pavement type and thicknesses based on our test borings. All the holes were located off the proposed sewer alignment to avoid conflicts with existing utilities and traffic and may not adequately characterize the pavement section at trench centerline. If the pavement section at the trench centerline needs to be adequately characterized than we recommend additional coring be done within the pay limits of the trench.

**Table 1: Pavement Type and Thickness**

| Boring | AC (in) | AGG (in) | Total Thickness (in) |
|---|---|---|---|
| B-1 | 10 | 6 | 16 |
| B-2 | 4 | 8 | 12 |
| B-3 | 7 | 4 | 11 |
| Probe 1 | n/a | n/a | n/a |
| Probe 2 | n/a | n/a | n/a |
| BT-1 | n/a | n/a | n/a |
| BT-2 | 3 | 21 | 24 |
| BT-3 | 3 | 9* | 12* |
| BT-4 | 5 | 7* | 12* |
| BT-5 | 6 | 4 | 10 |
| TP-1 | n/a | n/a | n/a |

* Thicknesses are estimated based on observation

**Subsurface Conditions**

The project area is located on the lower, western slopes of the Tualatin Mountains (Portland West Hills). The mountains were formed by a complex sequence of volcanic flows, uplift and folding that occurred 6 to 17 million years ago. Since their formation the mountains have eroded significantly and have become mantled by layers of wind blow silt.

Geologic maps of the Portland area identify the surficial soils of the project area as Loess (Ql), a homogeneous, nonstratified soil composed primarily of silt-sized particles with small amounts of clay and fine sand. It is underlain by many hundreds of feet of Basalt bedrock (Tcr) belonging to the Columbia River Basalt Group that dates from the middle Miocene epoch. Basalt is strong, extrusive volcanic rock that hardens as it cools above the ground surface. Basalt's strength and structure is controlled by the chemistry and viscosity of the lava flows, the thickness of the flows and rates of crystallization (cooling). The time basalt weathers to a clayey residual soil, created by the decomposition of the rock in-situ. Most of the basalt encountered to the west of this project during the construction of the Fanno Creek Force Main Project belongs to the Boring Lavas Group and is several million years younger and less weathered (Madin, 1990).

The explorations generally encountered deposits of silty and gravelly fill, native gravel, silt, and clay, and weathered basalt. Fill was encountered in Borings B-1, B-3, Probe 1, Probe 2, BT-1, and BT-3 and in Test Pit TP-1 below the pavement section or directly at the surface. Fill thicknesses were between 2.5 and 14 feet. Proposed pipe invert depths are shown to be below the fill at the location of our borings.

Loose to very dense poorly to well graded gravel to silty gravel was observed in Borings BT-4 and BT-5 below the pavement section. In Boring BT-5 the silty gravel graded into gravelly silt at depth. Gravels were rounded to subangular and had varying amounts of sand. Thicknesses were between 4 and 13.5 feet. Laboratory testing on selected samples indicated a moisture content of 14 percent within the silty gravel layer and 28 percent within the gravelly silt layer.

Deposits of very soft to hard silt and clay were encountered below the fill and gravel deposits. In Borings B-2 and BT-2, silt and clay deposits were encountered below the pavement section. In Boring Probe 2 silt was encountered at the surface. In Borings B-2, Probe 2, and BT-2 the silt is underlain by stiff to hard clay. In Borings BT-2 and BT-4, clay and silt layers were interbedded. The layers of silt and clay extended down to the maximum depth explored, except for Borings B-2, Probe 2, and BT-5, which terminated in basalt rock. Laboratory testing on selected samples of the silt and clay indicated moisture contents between 20 and 77 percent.

Extremely Soft (R0) to soft (R2) basalt was encountered between 1 and 6 feet below the proposed invert in Borings B-2, Probe 2, and BT-5. The samples recovered were decomposed to moderately weathered and discolored gray. The top of this unit appears sandy and is extremely soft, but the rock becomes harder with depth. The rock observed in our explorations could be carved with a pocket knife and dented or fractured with a single hammer blow. As-builts of the original sewer construction in the 1950's noted approximately 310 cubic yards (CY) of rock excavation with the project limits.

## Groundwater

Groundwater was encountered between 5 and 30 feet bgs in all of the borings and the test pit exploration, except for Boring B-1. No groundwater was encountered in Boring B-1 at the time of drilling. In Borings B-2, Probe 2, BT-1, BT-3, BT-4, and BT-5 and in Test Pit TP-1 we encountered groundwater that was perched on an underlying impermeable layer. In Boring BT-3 and BT-5 we did not observe any water accumulation in the hole prior to backfilling. In Borings B-3, Probe 1, and BT-2 groundwater was observed to extend down to the maximum depth explored. Groundwater levels were observed between 4 feet below to 11 feet above proposed invert elevations. Table 2 below is a summary of groundwater levels from our explorations. A 2-inch diameter PVC monitoring well was installed at Boring B-2 and a 1-inch diameter PVC monitoring well was installed at TP-1.

**Table 3: Groundwater Levels**

| Site Location [1] (ID) | Surface Elev. (ft) [2] | Boring Depth (ft) | Invert Elev. (ft) | Groundwater Elev. (ft) | Date |
|---|---|---|---|---|---|
| SW 31st Ave (BT-5) | 459.6 | 25.5 | 443.0 | 439.6 [3] | 1/15/2010 |
| 3015 SW Multnomah Blvd (B-3) | 459.7 | 26.5 | 441.0 | 436.4 | 5/17/2002 |
| SW 28th Ave (B-2) | 463.7 | 33.7 | 440.0 | 442.0 [3]<br>442.4 [3] | 5/17/2002<br>6/21/2002 |
| 2730 SW Multnomah Blvd (Probe 2) | 466.1 | 33.9 | 439.0 | 436.0 [3] | 5/24/2002 |
| SW 25th Ave (B-1) | 459.5 | 23.0 | 437.0 | Not observed | |
| SW 22nd Ave (Probe 1) | 452.0 | 25.0 | 431.5 | 433.7 | 5/24/2002 |
| 189 feet E of SW 22nd Ave (BT-4) | 449.0 | 26.5 | 430.0 | 429.0 [3] | 1/15/2010 |
| 1725 SW Multnomah Blvd (BT-1) | 420.1 | 26.5 | 403.5 | 415.1 [3] | 1/18/2010 |
| 1725 SW Multnomah Blvd (TP-1) | 420.1 | 18 | 403.5 | 411.1 [3]<br>406.6 [3]<br>414.3[4]<br>414.7[4] | 2/3/2010<br>2/3/2010<br>2/15/2010<br>3/1/2010 |
| 1641 SW Multnomah Blvd (BT-2) | 412.5 | 26.5 | 395.0 | 402.5 | 1/18/2010 |
| SW 14th Ave (BT-3) | 398.3 | 26.5 | 383.0 | 383.3 [3] | 1/15/2010 |

1 All locations are along SW Multnomah Boulevard
2 All elevations are based on COP datum
3 Perched groundwater
4 reading from inclined monitoring well installed in test pit, elevations are +/- 0.5 feet

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our subsurface investigation and engineering analyses, using conventional open cut excavation, is practical. However, there are several pertinent issues that need to be considered. Trench stability, rock excavation, and dewatering are the principle geotechnical and construction issues for this project. Due to the proposed system being up to 27 feet beneath SW Multnomah Boulevard and many utilities that cross above it, open cut excavation may be more difficult. Observations during our field investigation and the provided drawings indicate there are several adjacent utilities within close proximity to the existing sewer line on several of the alignments, including aged cast iron water lines.

### Trench Stability

We observed that typical soils in the project area consist of a mix of clay, silt, sand, and gravel. For preliminary design of shoring systems and excavation methods, we have classified the above mentioned soil types according to OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926.

| | |
|---|---|
| Native Silt and Clay | Type B |
| Native Sand and Gravel | Type C |
| Native Silt and Clay (Saturated) | Type C |
| Manmade Fill | Type C |

Based on the soil and groundwater conditions observed in our explorations, a moderate to severe amount of sloughing and caving should be anticipated to occur within the trenches. In shallow excavations above the groundwater level, we anticipate that the native silt and clay soil will exhibit little sloughing and caving during short term exposures. Increasing amounts of sloughing and caving will likely occur if any surcharge loads are placed adjacent to the trench excavation. Trench spoils should be setback from the trench excavation at a minimum horizontal distance that is equal to the depth of the trench. Excavations will intersect existing utility trench line backfill that may ravel or run. Existing utility trenches that are exposed during the excavation should be properly shored to prevent loss of ground support of the utility. It is recommended that the trench walls not be left unsupported.

Due to soft saturated soil in the area of BT-1 and TP-1, basal heave is possible in deeper excavations. If basal heave occurs, pipe grade will be difficult to maintain and the lateral earth pressures behind the shoring will increase. In areas where basal heave is possible, we recommend that the basal soils be isolated from the influence of soils on the outside of the trench by providing a shoring system that extends to a sufficient depth below the bottom of the excavation to provide and effective cutoff. We can supply recommendations for the cutoff sheet depth if required.

Based on site plans, several of the proposed alignments are adjacent to existing water, fiber optic, storm, and gas lines. In some areas the utilities are within the zone of influence to the proposed trench. The zone of influence is defined as a soil wedge extending upward from the bottom corner of the excavation at a 45 degree angle (a gradient of 1H:1V). Soils supporting adjacent utilities within the zone of influence should be shored to prevent utility movement or damage. If buried cast iron water lines or other buried utilities are within 5 feet of the trench wall, we

recommend that the methods used to install the shoring use non-vibration techniques or that preventative measures are taken in order to protect them from vibrations that could cause damage (Atalah, 2006).

The design of temporary shoring systems utilized is the responsibility of the contractor, subject to the approval of the City of Portland. Construction site safety is the responsibility of the contractor, who is solely responsible for the means, methods, and sequencing of construction operations. At a minimum, excavations must comply with current OSHA excavation standards. For any excavation, including a utility trench that is extended more than 20 feet, the side slopes and/or shoring must, according to OHSA, be designed by a professional engineer registered in the State of Oregon.

**Rock Excavation**

Basalt was encountered in a few of our explorations along SW Multnomah Boulevard between SW 31st Avenue and SW 22nd Avenue. The depth of the basalt observed in our explorations was between 1 and 6 feet below the proposed invert. The basalt encountered in our investigations was extremely soft to soft and should be rippable using a toothed bucket. If harder rock is encountered, excavation may be more difficult and special equipment may be required. The difficulty of excavating the rock is more a function of the depth of the trench than the hardness of the rock. A larger excavator may be required.

**Dewatering**

Groundwater and seepage is expected to be encountered in many of the excavations for this project. The contractor should be prepared to dewater excavations. Clayey soils may perch groundwater locally throughout the project area. The soils encountered in our investigation are fine grained and are relatively impermeable. The total amount of water expected to seep into excavations will vary across the proposed alignment. Groundwater may seriously impact trench stability and could significantly increase pressures behind shoring systems. Perched groundwater should be allowed to drain fully and removed by pumping from a sump or other suitable means or shoring systems should be designed for the increase in pressures due to the water head. We recommend that the static groundwater levels be lowered to at least 2 feet below the bottom of the excavation. The actual design of the temporary dewatering systems is the responsibility of the contractor. The design of the dewatering system should always consider the impact on local utilities and structures. The type of dewatering system and its method of installation physically affects the condition of the subgrade and the stability of the excavated trench walls. We recommend that the contractor submit a detailed dewatering plan. Construction Services should review these plans prior to construction.

**Pipe Bedding**

Pipe bedding for this project should be in accordance with the 2007 City of Portland Standard Construction Specifications Section 405.45. The ground conditions encountered underneath the proposed pipe invert elevation are composed of very soft to stiff silt and clay. In areas where the groundwater is at least 2 feet below the proposed invert elevation and where medium stiff to stiff silt and clays exist underneath the proposed invert, the subgrade is likely to provide suitable support for the pipe provided that a 4-inch thick bedding layer is placed. The subgrade should be

scraped free of any loose and soft material. The pipe bedding material should be placed in one lift and compacted until it is firm and unyielding.

If groundwater is within 2 feet of the proposed invert elevation and/or very soft to soft silt or clay exists an additional 6 to 12 inches of pipe bedding material above filter fabric at the base of the excavation may be necessary. This decision should be made at the time of excavation. The pipe bedding material should be placed in 1 lift and compacted to a firm and unyielding condition.

**Backfill**

It is our opinion that the silt and clay soils observed in our explorations are not suitable to be used as trench backfill without additional handling and treatment. Clays, silts, and silty sands are moisture sensitive and may be too wet to attain minimum compaction requirements. Backfill from trenches may be reused provided it is relatively clean and meets the general requirements of trench backfill as specified in the City of Portland Standard Specifications or it is cement treated. We can provide design parameters for the cement treated soil if requested. Imported backfill for this project should consist of granular backfill in accordance with the City of Portland Standard Specifications. Representative samples of proposed backfill should be submitted to the Materials Testing Laboratory for testing as soon as the contractor begins excavation.

**Wet Weather Earthwork**

Earthwork should be performed in small areas to minimize exposure to wet weather. Open trenches should be limited to one and a half pipe lengths ahead of backfill operation under wet weather circumstances. The contractor should follow excavation or removal of native unsuitable materials with prompt placement and compaction of imported backfill materials.

**FURTHER WORK**

Complete project plans and specifications should be submitted to this office for review prior to bidding. The Materials Testing Laboratory should also test the backfill during construction to verify compaction.

**CLOSURE**

We appreciate the opportunity to provide our services for this project. If you have questions or concerns regarding the recommendations provided in this report, please do not hesitate to contact us at 823-2340.

Respectfully,

Ryan Christie
Engineering Staff

3/24/2010

Thomas S. Pfeiffer, P.E.
Supervising Engineer
Geotechnical Services Division
Materials Testing Laboratory

Attachments:

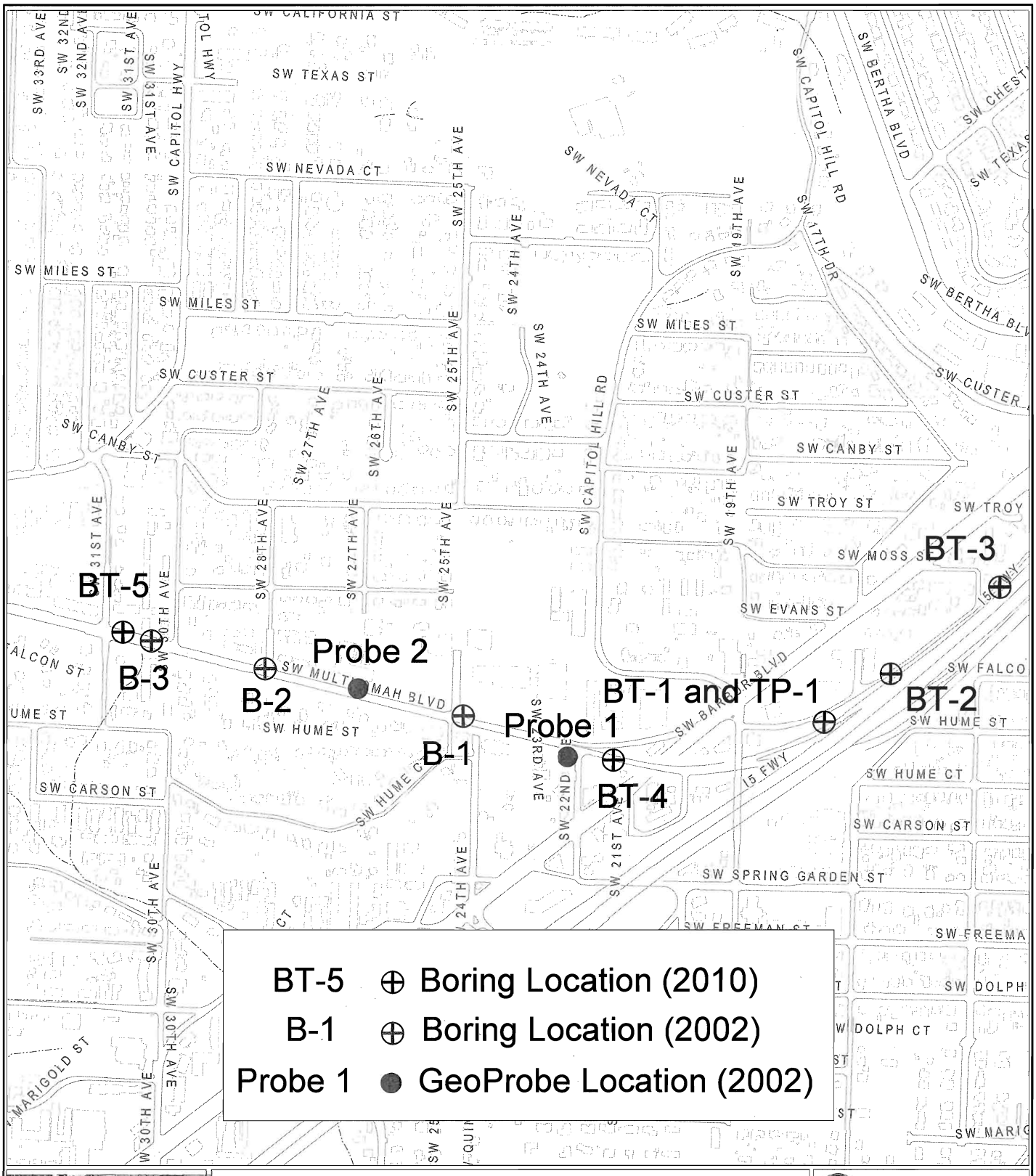
| | |
|---|---|
| Plate 1 | Exploration Location Map |
| Plate 2 to 7 | Logs of Boring and Test Pit Explorations |
| Plate 8 | Soil Type Legend and Relative Density and Consistency of Soil |
| Plate 9 | Legend of Rock Descriptions |
| Plate 10 | Atterberg Limits' Results |

Appendix A:
Vicinity Map and Borings from City of Portland, Bureau of Environmental Services, *Geotechnical Investigation, Taylor Trunk Relief, SW Multnomah Boulevard,* BES 6693, dated July 31, 2002.

## REFERENCES

Atalah, A., 2006, *Safe Distance between Large-Diameter Rock Pipe Bursting and Nearby Buildings and Buried Structures*, Journal of Transportation Engineering, ASCE 132(4), 350-356.

Madin, I.P., 1990, *Earthquake-Hazard Geology Maps of the Portland Metropolitan Area, Oregon; Text and Map Explanation.* Oregon Department of Geology and Mineral Industries, Open-file Report 0-90-2.



# Exploration Location Map

N
W E
S

CITY OF PORTLAND
Bureau of Environmental Services

| | |
|---|---|
| REF | BES E09052 |
| PLATE | 1 |
| DATE | 03/05/2010 |

File Location (\W09817\C:\Data\Borehole\projects\)

# LOG OF BORING BT-1

Equipment ***See Below

Elevation 420.1** Date 1/18/10

| Laboratory Test Results or Remarks | Sample No. | Blows/6" | N-60_Value* | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 | | **SILT with Gravel (ML);** soft to medium stiff; low plasticity; trace sand and organics (rootlets); brown; moist. |
| | | 1<br>2<br>2 | 6 | 27.6 | | | | **SILT (ML);** some clay; medium stiff; medium plasticity; gray with orange-brown mottles; moist. |
| | | 0<br>0<br>0 | 0 | | | 5 | | ▽ grades to very soft; trace sand and gravel; becomes saturated |
| | | 0<br>0<br>0 | 0 | 36.4 | | | | **Sandy SILT (ML);** very soft; low to medium plasticity; trace clay; light brown-gray; saturated. |
| LL=39;PI=12 | | 0<br>0<br>0 | 0 | | | 10 | | **SILT (ML);** some clay; very soft; low to medium plasticity; trace to some sand; gray; saturated. |
| | | 1<br>2<br>5 | 11 | 38.7 | | 15 | SEWER | **SILT with Sand (ML);** stiff; low plasticity; gray; saturated. |
| | | 0<br>0<br>1 | 2 | | | 20 | | grades to very soft |
| | | 0<br>1<br>3 | 6 | | | 25 | | **SILT (ML);** some clay; medium stiff; low to medium plasticity; trace to some sand; gray; saturated. |
| | | | | | | | | End of boring at 26.5 feet bgs. Perched groundwater observed at 5 feet bgs during drilling, see TP-1 for additional information. |
| | | | | | | | | ***CME 55 8-1/4" HSA w/ 140-lb Autotrip Hammer |

**Elevation from C.O.P Survey (NAD 83/91)

COP40REV BORING WITH SEWER BES 9052 BURLINGAME TRUNK SEWER 01192010.GPJ 3/15/10

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Burlingame Trunk Sewer**
**1725 SW Multnomah Blvd**
**Portland, Oregon**

PLATE **2**

JOB NUMBER **BES E09052**

REVIEWED BY

DATE PRINTED **2/25/2010**

# LOG OF BORING BT-2

Equipment ***See Below

Elevation 412.5** Date 1/18/10

| Laboratory Test Results or Remarks | Sample No. | Blows/6" | N-60_Value* | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 | | **3" Asphaltic Concrete**<br>**21" Aggregate Base Course** |
| | | 2<br>2<br>4 | 9 | 26.8 | | | | **CLAY (CL);** some silt; stiff; medium plasticity; trace to some sand and gravel; gray-brown with orange mottles and dark brown iron staining; moist. |
| | | 1<br>2<br>3 | 8 | | | 5 | | grades to stiff; without gravel and mottles; brown |
| | | 1<br>1<br>1 | 3 | 33.0 | | | | **SILT with Sand and Gravel (ML);**soft; low to medium plasticity; red-brown; moist. |
| | | 0<br>1<br>0 | 2 | | | 10 | | ▽ grades to very soft; becomes saturated |
| | | | | | | | | **CLAY (CL);** some silt; very soft; medium to high plasticity; gray; saturated. |
| LL=39;PI=13 | | 0<br>1<br>2 | 5 | 78.6 | | 15 | | **SILT (ML);** some clay; soft to medium stiff; medium plasticity; gray; saturated. |
| | | | | | | | SEWER | |
| | | 1<br>2<br>2 | 6 | 35.7 | | 20 | | grades to medium stiff; light brown with brown mottles<br>grades to gray |
| | | 1<br>2<br>2 | 6 | | | 25 | | grades with trace clay; low plasticity |
| | | | | | | | | End of boring at 26.5 feet bgs. Groundwater observed at 10 feet bgs during drilling.<br>***CME 55 8-1/4" HSA w/ 140-lb Autotrip Hammer |

**Elevation from C.O.P Survey (NAD 83/91)

COP40REV BORING WITH SEWER BES 9052 BURLINGAME TRUNK SEWER 01192010.GPJ 2/25/10

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Burlingame Trunk Sewer**
**1641 SW Multnomah Blvd**
**Portland, Oregon**

PLATE
**3**

JOB NUMBER **BES E09052**

REVIEWED BY

DATE PRINTED **2/25/2010**

# LOG OF BORING BT-3

Equipment ***See Below

Elevation 398.3** Date 1/15/10

| Laboratory Test Results or Remarks | Sample No. | Blows/6" | N-60_Value* | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 | | **3" Asphaltic Concrete** |
| | | | | | | | | **Aggregate Base Course** |
| | | 5 6 6 | 12 | 19.7 | | | | **Poorly Graded GRAVEL with Sand and Silt (GP-GM);** dense; brown; moist. (FILL) |
| | | 1 2 1 | 5 | | | 5 | | **SILT with Gravel (ML);** stiff, medium plasticity; gray; moist.<br>with trace gravel and organics (grass)<br>without gravel<br>grades to soft; with trace to some sand and trace organics (rootlets, grass); dark brown<br>grades to medium stiff; trace to some clay; without organics and sand; gray |
| | | 1 2 3 | 8 | 33.2 | | | | |
| | | 2 4 4 | 12 | 32.0 | | 10 | | grades to stiff; brown<br>thin sand lense (<1" thick) |
| | | | | | | | SEWER | |
| | | 1 3 2 | 8 | 31.7 | | 15 | | ▽ grades to medium stiff to stiff; wet to saturated |
| | | 0 1 3 | 6 | 30.8 | | 20 | | grades to medium stiff; saturated |
| | | 4 7 8 | 23 | 48.6 | | 25 | | **CLAY (CL);** some silt; very stiff; medium to high plasticity; trace to some sand; dark gray-brown; moist (Decomposed Basalt).<br>with lenses of yellow-green clay |
| | | | | | | | | End of boring at 26.5 feet bgs. Groundwater observed at 15 feet bgs during drilling. No water observed in the hole at the end of drilling.<br><br>***CME 55 8-1/4" HSA w/ 140-lb Autotrip Hammer |

**Elevation from C.O.P Survey (NAD 83/91)

COP40REV BORING WITH SEWER BES 9052 BURLINGAME TRUNK SEWER 01192010.GPJ 4/5/10

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Burlingame Trunk Sewer**
**SW 14th and SW Multnomah**
**Portland, Oregon**

PLATE
**4**

JOB NUMBER
**BES E09052**

REVIEWED BY

DATE PRINTED
**2/25/2010**

# LOG OF BORING BT-4

Equipment ***See Below

Elevation 449.0** Date 1/15/10

| Laboratory Test Results or Remarks | Sample No. | Blows/6" | N-60_Value* | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 | | **5" Asphaltic Concrete** |
| | | | | | | | | **Aggregate Base Course** |
| | | | | | | | | **Poorly Graded GRAVEL (GP);** dense to very dense; subanguler to round, fine to course gravel; trace sand and silt; brown; dry to moist. |
| | | 11<br>7<br>3 | 10 | | | | | |
| | | | | | | | | **Poorly Graded GRAVEL with Sand and Silt (GP-GM);** loose to medium dense; subangular to round, fine to medium gravel; brown; moist. |
| | | 0<br>0<br>1 | 2 | 28.1 | | 5 | | **SILT (ML);** very soft; medium plasticity; trace sand and gravel; gray; wet. |
| | | 0<br>0<br>0 | 0 | | | | | with trace organics |
| LL=47;PI=27 | | 0<br>2<br>4 | 9 | | | 10 | | **CLAY (CL);** some silt; stiff; medium to high plasticity; gray; moist. |
| | | 3<br>4<br>5 | 14 | 27.9 | | 15 | | |
| | | | | | | | SEWER | |
| | | 6<br>8<br>8 | 24 | 50.4 | | 20 | | **SILT (ML);** some clay; very stiff; medium plasticity; trace sand and gravel; gray; moist (decomposed basalt). ▽ |
| | | | | | | | | at 20 feet bgs grades with trace clay; low to medium plasitcity; dark red and brown; saturated |
| | | 7<br>9<br>14 | 35 | | | 25 | | grades with some clay; medium plasticity; trace sand and gravel; gray; moist |
| | | | | | | | | End of boring at 26.5 feet bgs. Perched groundwater observed between 20 and 25 feet bgs during drilling. |
| | | | | | | | | ***CME 55 8-1/4" HSA w/ 140-lb Autotrip Hammer |

**Elevation from C.O.P Survey (NAD 83/91)

COP40REV BORING WITH SEWER BES 9052 BURLINGAME TRUNK SEWER 01192010.GPJ 3/12/10

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Burlingame Trunk Sewer**
**189 feet E of SW 22nd on SW Multnomah**
**Portland, Oregon**

PLATE **5**

JOB NUMBER **BES E09052**

REVIEWED BY

DATE PRINTED **2/25/2010**

# LOG OF BORING BT-5

Equipment ***See Below

Elevation 459.6** Date 1/15/10

| Laboratory Test Results or Remarks | Sample No. | Blows/6" | N-60_Value* | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 | | **6" Asphaltic Concrete** |
| | | | | | | | | **4" Aggregate Base Cours** |
| | | | | | | | | **Silty SAND with Gravel (SM);** medium dense to dense; dark brown to black; dry (recycled AC). |
| | | 4<br>4<br>2 | 9 | | | | | **Silty GRAVEL with Sand (GM);** loose; subrounded to angular, fine to coarse gravel; brown-orange; moist. |
| | | 4<br>6<br>7 | 13 | 14.4 | | 5 | | becomes very dense<br>becomes medium dense |
| | | 6<br>7<br>5 | 12 | 28.4 | | | | **Gravelly SILT (ML);** stiff; medium plasticity; subrounded to subanguler, fine to medium gravel; trace sand; orange-brown with gray mottles; moist to wet. |
| | | 3<br>3<br>2 | 5 | | | 10 | | grades to medium stiff; with sand |
| | | 2<br>2<br>2 | 4 | 32.7 | | 15 | SEWER | **SILT (ML);** soft to medium stiff; medium plasticity; trace sand; light brown-gray with dark brown mottles; wet. |
| | | 4<br>7<br>9 | 24 | 47.4 | | 20 | | **Sandy SILT (ML);** very stiff; light yellow-brown; saturated. |
| | | 75/6" | | | | 25 | | **Basalt;** extremly soft to soft (R0 to R1); highly weathered; light gray; moist. |
| | | | | | | | | End of boring at 25.5 feet bgs. Refusal in rock. Perched groundwater observed at 20 feet bgs. No groundwater observed in the hole after drilling. |
| | | | | | | | | ***CME 55 8-1/4" HSA w/ 140-lb Autotrip Hammer |

**Elevation from C.O.P Survey (NAD 83/91)

COP40REV BORING WITH SEWER BES 9052 BURLINGAME TRUNK SEWER 01192010.GPJ 3/15/10

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Burlingame Trunk Sewer**
**SW 31st and SW Multnomah**
**Portland, Oregon**

PLATE
**6**

JOB NUMBER **BES E09052**

REVIEWED BY

DATE PRINTED **2/25/2010**

# LOG OF TEST PIT TP-1

Equipment **Deere D120 Excavator**

Elevation **420.1**** Date **2/3/10**

| Laboratory Test Results or Remarks | Sample No. | Blows/6" | N-60_Value* | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0 | | **SILT with Gravel (ML);** soft to medium stiff; low plasticity; trace sand and organics (rootlets); brown; moist. |
| | | | | | | | | **SILT (ML);** some clay; medium stiff; medium plasticity; gray with orange-brown mottles; moist. |
| | | | | | | 5 | | grades to very soft; trace sand and gravel |
| | | | | | | | | **Sandy SILT (ML);** very soft; low to medium plasticity; trace clay; light brown-gray; moist to wet. |
| | | | | | | | | Severe Caving observed between 4 and 8 ft bgs on west side of trench. |
| | | | | | | 10 | | Perched water at 9 ft bgs; slow seepage |
| | | | | | | | | **SILT (ML);** some clay; very soft; low to medium plasticity; trace to some sand; gray; saturated. |
| | | | | | | | | Perched water between 13.5 and 15 ft bgs; rapid seepage |
| | | | | | | | | Severe Caving observed between 0 and 10 ft bgs on west side of trench. |
| | | | | | | 15 | SEWER | **SILT with Sand (ML);** stiff; low plasticity; gray; moist to wet. |
| | | | | | | | | End of exploration at 18 feet bgs. TP-1 located about 3 feet east of BT-1. Perched groundwater observed at 9 and 13.5 feet bgs during excavation. Trench spoils placed within 1 foot on west side of trench and about 4 feet from the edge on the east side of the trench. 1-inch piezo installed (slotted interval between 13 and 18 feet bgs). |
| | | | | | | | | ***CME 55 8-1/4" HSA w/ 140-lb Autotrip Hammer |

****Elevation from C.O.P Survey (NAD 83/91)**

COP40REV BORING WITH SEWER BES 9052 BURLINGAME TRUNK SEWER 01192010.GPJ 3/15/10

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Burlingame Trunk Sewer**
**1725 SW Multnomah Blvd**
**Portland, Oregon**

PLATE **7**

JOB NUMBER **BES E09052**

REVIEWED BY

DATE PRINTED **2/25/2010**

## SOIL CLASSIFICATION CHART

based on ASTM D2487 and D2488

| MAJOR DIVISIONS | | | SYMBOLS GRAPH | SYMBOLS LETTER | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|---|
| COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE | GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | CLEAN GRAVELS (LITTLE OR NO FINES) | | GW | WELL-GRADED GRAVEL |
| | | | | GP | POORLY-GRADED GRAVEL |
| | | GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES) | | GM | SILTY GRAVEL |
| | | | | GC | CLAYEY GRAVEL |
| | SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE | CLEAN SANDS (LITTLE OR NO FINES) | | SW | WELL-GRADED SAND |
| | | | | SP | POORLY-GRADED SAND |
| | | SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES) | | SM | SILTY SAND |
| | | | | SC | CLAYEY SANDS |
| FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE | SILTS AND CLAYS | LIQUID LIMIT LESS THAN 50 | | ML | INORGANIC SILT |
| | | | | CL | LEAN CLAY |
| | | | | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| | SILTS AND CLAYS | LIQUID LIMIT GREATER THAN 50 | | MH | ELASTIC SILT |
| | | | | CH | FAT CLAY |
| | | | | OH | ORGANIC SILT OR CLAY |
| HIGHLY ORGANIC SOILS | | | | PT | PEAT, HUMUS, SWAMP SOIL |

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

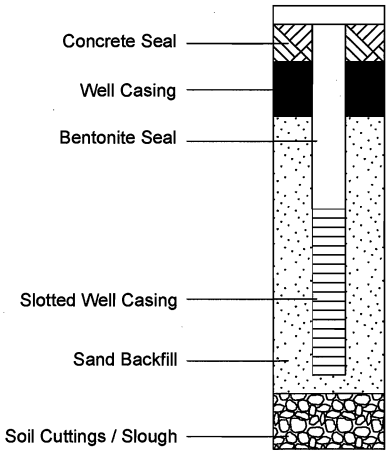
## SAMPLER TYPE LEGEND

- 2" O.D. Split Spoon Sampler
- 3" O.D. Modified California Sampler
- GeoProbe Push
- Grab Sample

SEWER — Approximate Sewer Pipe Invert Depth

Groundwater Level and Date (ATD = At Time of Drilling)

## WELL INSTALLATION DETAILS




## APPARENT/RELATIVE DENSITY OR CONSISTENCY VERSUS SPT BLOW COUNTS

| COHESIONLESS SOILS | | COHESIVE SOILS | |
|---|---|---|---|
| APPARENT DENSITY | SPT N-VALUE (# BLOWS/FT) | CONSISTENCY | SPT N-VALUE (# BLOWS/FT) |
| VERY LOOSE | < 4 | VERY SOFT | < 2 |
| LOOSE | 4 - 10 | SOFT | 2 - 4 |
| MEDIUM DENSE | 10 - 30 | MEDIUM STIFF | 4 - 8 |
| DENSE | 30 - 50 | STIFF | 8 - 15 |
| VERY DENSE | > 50 | VERY STIFF | 15 - 30 |
| | | HARD | > 30 |

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Burlingame Trunk Sewer**
**Portland, Oregon**
**Soil Type Legend**

PLATE **8**

JOB NUMBER **BES E09052**

APPROVED

DATE **3/15/10**

## Explanation of Common Terms Used in Rock Descriptions

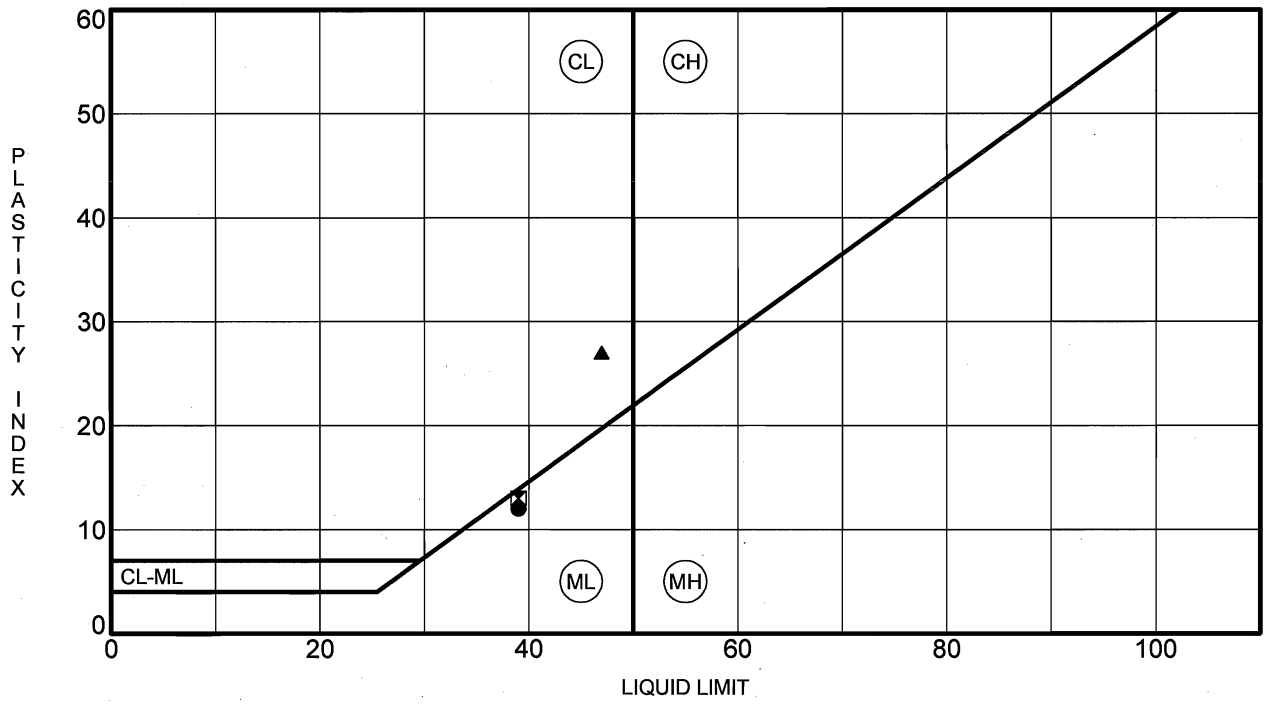
| Field Identification | Designation | Unconfined Compressive Strength (PSI) | Point Load Index (PSI) | Strength (Hardness) |
|---|---|---|---|---|
| Indented by thumbnail. | R0 | < 100 | | Extremely Weak (Extremely Soft) |
| Crumbles under firm blows with a geological hammer, can by peeled by a pocket knife or scratched with a finger nail. | R1 | 100 - 1000 | | Very Weak (Very Soft) |
| Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with geological hammer. | R2 | 1000 - 4000 | | Weak (Soft) |
| Cannot by peeled but scratched with a pocket knife, speciman can be fractured with a single blow of a geological hammer. | R3 | 4000 - 8000 | 145 - 290 | Medium Strong (Medium Hard) |
| Can be scratched with knife or pick only with difficulty, specimen requires more than one blow of geological hammer to fracture it. | R4 | 8000 - 16000 | 290 - 480 | Strong (Hard) |
| Cannot be scratched with knife or sharp pick, specimen requires many blows of geological hammer to fracture it. | R5 | 16000 - 36000 | 480 - 960 | Very Strong (Very Hard) |
| Speciman can only be chipped with geological hammer. | R6 | > 36000 | > 960 | Extremely Strong (Extremely Hard) |

| Term | Weathering Field Identification |
|---|---|
| Fresh | Crystals are bright. Discontinuities may show some minor surface staining. No discoloration in rock fabric. |
| Slightly Weathered | Rock mass is generally fresh. Discontinuities are stained and may contain clay. Some discoloration in rock fabric. |
| Moderately Weathered | Significant portions of rock show discoloration and weathering effects. Crystals are dull and show visible chemical alteration. Discontinuities are stained and may contain secondary mineral deposits. |
| Highly Weathered | Rock can be excavated with geologist's pick. All discontinuities exhibit secondary mineralization. Complete discoloration of rock fabric. Surface of core is friable and usually pitted ude to washing out of highly altered minerals by drilling water. |
| Decomposed | Rock Mass is completely decomposed. Original rock "fabric" may be evident. May be reduced to soil with hand pressure. |

### Rock Quality Designation

| RQD % | Designation |
|---|---|
| 0 - 25 | Very Poor |
| 25 - 50 | Poor |
| 50 - 75 | Fair |
| 75 - 90 | Good |
| 90 - 100 | Excellent |

RQD is the percent of a core run with intact lengths greater than 0.1m (4 inches) excluding breaks caused by drilling.




| | Specimen Identification | | LL | PL | PI | Fines | ASTM Soil Description |
|---|---|---|---|---|---|---|---|
| ● | **BT-1** | **10.0** | **39** | **27** | **12** | | **SILT (ML)** |
| ⊠ | **BT-2** | **15.0** | **39** | **26** | **13** | | **SILT (ML)** |
| ▲ | **BT-4** | **10.0** | **47** | **20** | **27** | | **CLAY (CL)** |

City of Portland
1405 N. River St.
Portland, OR 97214
Telephone: 503.823.2340
Fax: 503.823.2342

## ATTERBERG LIMITS' RESULTS

Project: Burlingame Trunk Sewer

Location: Portland, Oregon

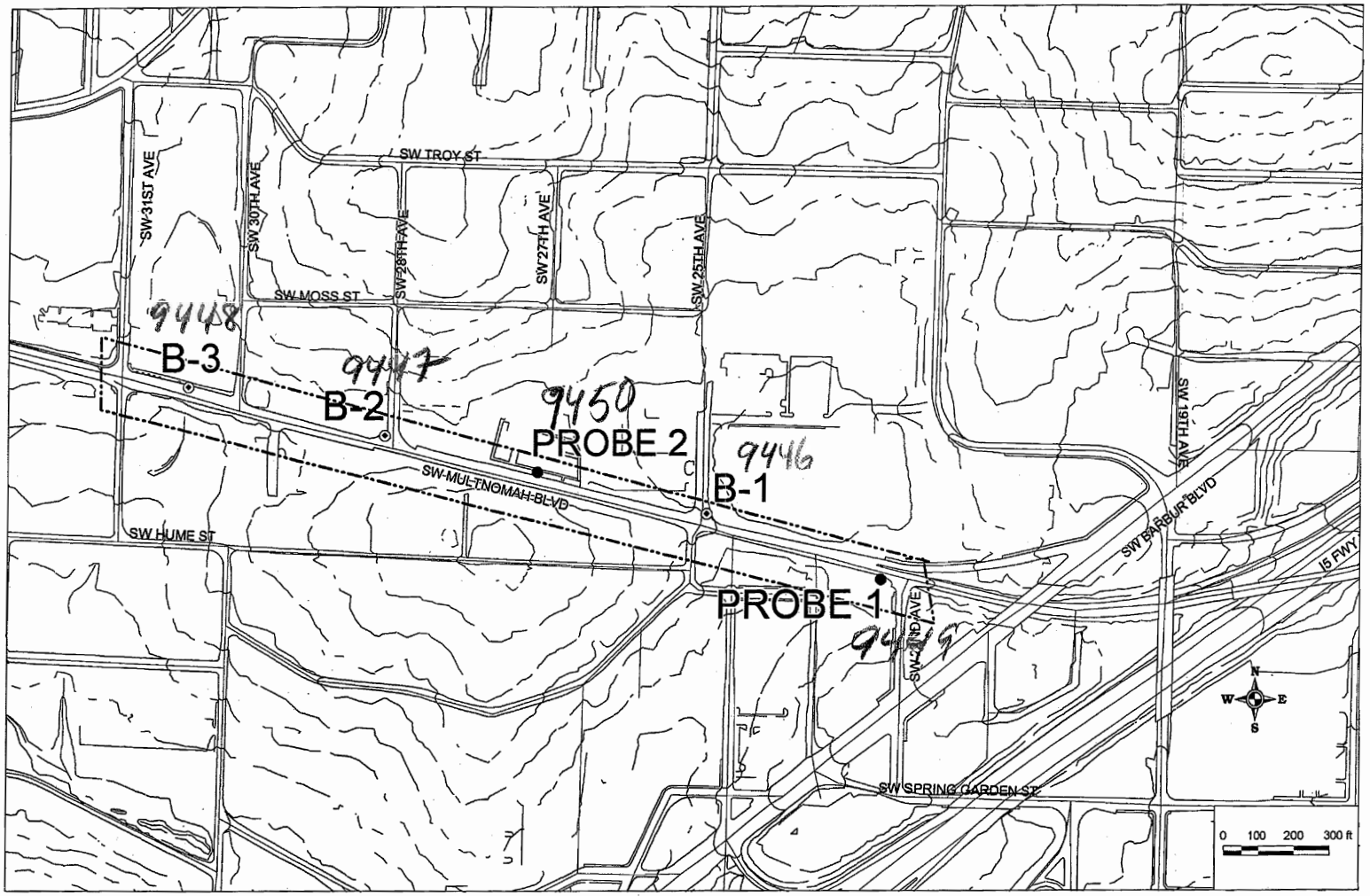
Number: BES E09052

**PLATE 10**

US_ATTERBERG_LIMITS BES 9052 BURLINGAME TRUNK SEWER 01192010.GPJ US_LAB.GDT 3/15/10

# APPENDIX A

Vicinity Map and Borings from City of Portland, Bureau of Environmental Services, *Geotechnical Investigation, Taylor Trunk Relief, SW Multnomah Boulevard,* BES 6693, dated July 31, 2002.




Project Limits ● GeoProbes ⊙ Rotary Borings

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Taylor Trunk Relief**

**Vicinity Map**

PLATE **1**

| JOB NUMBER | APPROVED | DATE |
|---|---|---|
| BES 6693 | | 5/24/02 |

9446

# LOG OF BORING 1

Equipment: Mobile B59--8" O.D. HSA

Elevation: 459.5* Date: 5/17/02

| Laboratory Test Results or Remarks | Blows/6" | N-Values | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|---|---|
| see text for explanation of the N-value corrections | | | | | 0 | | **10-inches Asphaltic Concrete (AC)**<br>**6-inches Well Graded Gravel base (GW)**<br>**SILT (ML) (fill)**<br>stiff, dry to moist, some fine sand and mica, red brown |
| P.I.D. = 0.0 ppm | 19<br>17<br>10 | 19 | | | 5 | | charcoal flecks, trace organics |
| Sand = 8 %<br>P200 = 92 % | 7<br>16<br>18 | 24 | 24.6 | | 10 | | becomes medium stiff |
| | 3<br>5<br>4 | 6 | 30.6 | | 15 | | **SILT (ML) (Original Ground?)**<br>stiff below 16.5 feet bgs, moist to wet, non-plastic, some clayey inclusions, trace organics, fine decayed rock nodules, gray with orange mottles |
| | 4<br>7<br>14 | 15 | 24.0 | 111 | 20 | | |
| Approximate Sewer Invert | | | | | | | Boring terminated at 23 feet bgs<br>No groundwater accumulated while drilling |

Sampler Legend

- 2" O.D. Split Spoon Sampler
- 3" O.D. Modified California Sampler
- GeoProbe Push
- Grab Sample

*** Elevations from CoP Survey dated June 2002**
**City of Portland Datum**

COP40REV BES6693.GPJ 6/28/02

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Taylor Trunk Relief**
**SW Multnomah Boulevard**
**Portland Oregon**

PLATE **2**

JOB NUMBER **BES 6693**

APPROVED

DATE **5/24/02**

9447

# LOG OF BORING 2

Equipment **Mobile B59--8" O.D. HSA**

Elevation **463.7*** Date **5/17/02**

| Laboratory Test Results or Remarks | Blows/6" | N-Values | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|---|---|
| see text for explanation of the N-value corrections | | | | | 0 | | **4-inches Asphaltic Concrete (AC)**<br>**8-inches Well Graded Gravel base (GW)**<br>**SILT (ML)**<br>medium stiff, moist, moderately plastic, trace to some fine sand and mica, brown |
| | 2<br>3<br>3 | 6 | | | 5 | | |
| | 5<br>5<br>7 | 8 | | | 10 | | **SILT with Sand (ML)**<br>medium stiff, moist, slightly to moderately plastic, some gray inclusions, fine nodules of decomposed rock, brown with orange mottles |
| P.I.D. = 0.0 ppm<br>Sand = 13%<br>P200 = 87% | 4<br>11<br>14 | 18 | 28.4 | | 15 | | **Lean CLAY (CL) (residual soil)**<br>stiff to hard, moist to wet, fine nodules of decomposed rock, dark to red brown |
| Top of Well Screen | 11<br>20<br>30 | 35 | 41.1 | | 20 | | |
| Drilling slows to about 3 min/ft below 24 feet bgs<br>Approximate Sewer Invert | 16<br>31<br>50/5"<br>23<br>50/5" | | 31.6 | | 25 | | **BASALT**<br>friable to weak, gray with iron stained vertical and horizontal veins |
| | 50/4" | | | | 30 | | |
| | 50/3" | | | | | | Boring terminated at 33.7 feet bgs<br>Groundwater accumulated to 21.75 feet bgs |

Sampler Legend

- 2" O.D. Split Spoon Sampler
- 3" O.D. Modified California Sampler
- P GeoProbe Push
- Grab Sample

*** Elevations from CoP Survey dated June 2002**
**City of Portland Datum**

COP40REV BES6693.GPJ 6/28/02

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Taylor Trunk Relief**
**SW Multnomah Boulevard**
**Portland Oregon**

PLATE **3**

JOB NUMBER **BES 6693**

APPROVED

DATE **5/24/02**

9448

# LOG OF BORING 3

Equipment: Mobile B59--8" O.D. HSA

Elevation: 459.7* Date: 5/17/02

| Laboratory Test Results or Remarks | Blows/6" | N-Values | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|---|---|
| see text for explanation of the N-value corrections | | | | | 0 | | 7-inches Asphaltic Concrete (AC)<br>4-inches Well Graded Gravel base (GW)<br>**SILT (ML)(fill)**<br>soft to stiff, moist, moderately plastic, trace to some fine roots, olive brown to olive gray |
| | 5<br>15<br>9 | 17 | | | 5 | | Sand increases |
| Approx. Steel Culvert Invert | 2<br>3<br>5 | 6 | 54.9 | | 10 | | softer, abundant charred wood and organic fragments |
| P.I.D. = 0.0 ppm | 6<br>12<br>14 | 18 | 20.7 | | 15 | | **SILT (ML)**<br>stiff, moist, abundant mica, trace to some organics, gray with orange mottles below 16' bgs |
| Approximate Sewer Invert | 3<br>8<br>10 | 13 | 34.9 | | 20 | | fine nodules of decomposed rock, color changes to green gray |
| | 2<br>2<br>3 | 4 | 38.2 | | 25 | | becomes soft to medium stiff, saturated, moderately plastic, somewhat sticky, micaeous, gray |
| | | | | | | | Boring terminated at 26.5 feet bgs<br>Groundwater accumulated to 23.3 feet bgs |

Sampler Legend

- 2" O.D. Split Spoon Sampler
- 3" O.D. Modified California Sampler
- GeoProbe Push
- Grab Sample

* **Elevations from CoP Survey dated June 2002 City of Portland Datum**

COP40REV BES6693.GPJ 6/28/02

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Taylor Trunk Relief**
**SW Multnomah Boulevard**
**Portland Oregon**

PLATE **4**

JOB NUMBER **BES 6693**

APPROVED

DATE **5/24/02**

9449

# LOG OF PROBE 1

Equipment **GeoProbe--1.5" O.D. Macrocore**

Elevation **452.0*** Date **5/24/02**

| Laboratory Test Results or Remarks | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|
| | | | 0 | | **4-inches Well Graded Gravel (GW)** unpaved shoulder |
| | | | | P | **SILT (ML)(fill?)** medium stiff, moist, non-plastic, trace to some fine sand and mica, 5-10% gravel, brown |
| | 30.6 | | 5 | | |
| | | | | P | becomes saturated, color changes to brown with orange mottles |
| | | | 10 | | **SILT (ML)** medium stiff, wet, fine sand and mica, rootlets, some gray clayey inclusions, brown with orange mottles |
| | | | | P | |
| | 37.0 | | 15 | | becomes stiff, moist to wet, moderately plastic, color changes to olive gray |
| | | | | P | ▽ |
| Approximate Sewer Invert | 33.6 | | 20 | | becomes soft to medium stiff to 23 feet bgs |
| | | | | P | |
| | | | 25 | | Probe terminated at 25 feet bgs<br>Groundwater accumulated to 18.3 feet bgs<br>Water sample collected |

Sampler Legend

- 2" O.D. Split Spoon Sampler
- 3" O.D. Modified California Sampler
- P GeoProbe Push
- Grab Sample

*** Elevations from CoP Survey dated June 2002 City of Portland Datum**

COP40REV BES6693.GPJ 6/28/02

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Taylor Trunk Relief**
**SW Multnomah Boulevard**
**Portland Oregon**

PLATE **5**

| JOB NUMBER | APPROVED | DATE |
|---|---|---|
| **BES 6693** | | **5/24/02** |

4460

# LOG OF PROBE 2

Equipment GeoProbe--1.5" O.D. Macrocore

Elevation 466.1* Date 5/24/02

| Laboratory Test Results or Remarks | Moisture Content(%) | Dry Dens.(pcf) | Depth(ft) | Sample | |
|---|---|---|---|---|---|
| | | | 0 | P | **SILT (ML)** medium stiff, moist, non plastic, trace to some organics, brown, grass at ground surface |
| | 30.2 | | 5 | | |
| Sand = 7 %<br>P200 = 93 % | | | | P | **SILT with Sand (ML)** medium stiff, moist to saturated, trace to some organics, brown with gray and orange mottles |
| | | | 10 | | becomes stiff |
| Sand = 25 %<br>P200 = 75 % | | | | P | |
| | | | | | **Lean CLAY (CL) (residual soil)** stiff to very stiff, moist to wet, low plasticity, red brown with dark brown nodules of decomposed rock |
| | 20.8 | | 15 | P | |
| | 49.3 | | 20 | P | softens from 22 to 23 feet bgs, color changes to gray |
| | | | 25 | P | dispersed small nodules and fragments of decomposed Basalt |
| Approximate Sewer Invert | 51.5 | | 30 | P | ▽ **BASALT** friable to weak, angular gravel-sized fragments recovered, fine vesicles, gray with iron stains |
| | | | | | Probe refusal at 33.9 feet bgs<br>Groundwater accumulated to 30 feet bgs<br>Water sample collected |

Sampler Legend

- 2" O.D. Split Spoon Sampler
- 3" O.D. Modified California Sampler
- P GeoProbe Push
- Grab Sample

* **Elevations from CoP Survey dated June 2002 City of Portland Datum**

COP40REV BES6693.GPJ 6/28/02

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Taylor Trunk Relief**
**SW Multnomah Boulevard**
**Portland Oregon**

PLATE **6**

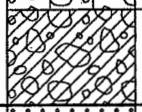
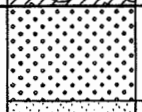
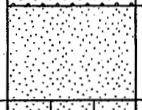
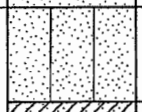
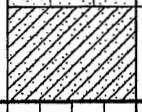
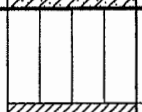
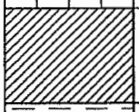
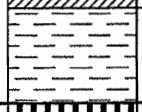
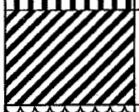
JOB NUMBER **BES 6693**

APPROVED

DATE **5/24/02**

# SOIL CLASSIFICATION CHART

based on ASTM D2487 and D2488

| MAJOR DIVISIONS | | | SYMBOLS GRAPH | SYMBOLS LETTER | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|---|
| COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE | GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | CLEAN GRAVELS (LITTLE OR NO FINES) | | GW | WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | | | GP | POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES) | | GM | SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES |
| | | |  | GC | CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES |
| | SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE | CLEAN SANDS (LITTLE OR NO FINES) |  | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | |  | SP | POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES |
| | | SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES) |  | SM | SILTY SANDS, SAND - SILT MIXTURES |
| | | |  | SC | CLAYEY SANDS, SAND - CLAY MIXTURES |
| FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE | SILTS AND CLAYS | LIQUID LIMIT LESS THAN 50 |  | ML | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | |  | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | | |  | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| | SILTS AND CLAYS | LIQUID LIMIT GREATER THAN 50 | | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS |
| | | |  | CH | INORGANIC CLAYS OF HIGH PLASTICITY |
| | | | | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS |
| HIGHLY ORGANIC SOILS | | | | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

**CITY OF PORTLAND**
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MATERIALS TESTING LABORATORY

**Taylor Trunk Relief**

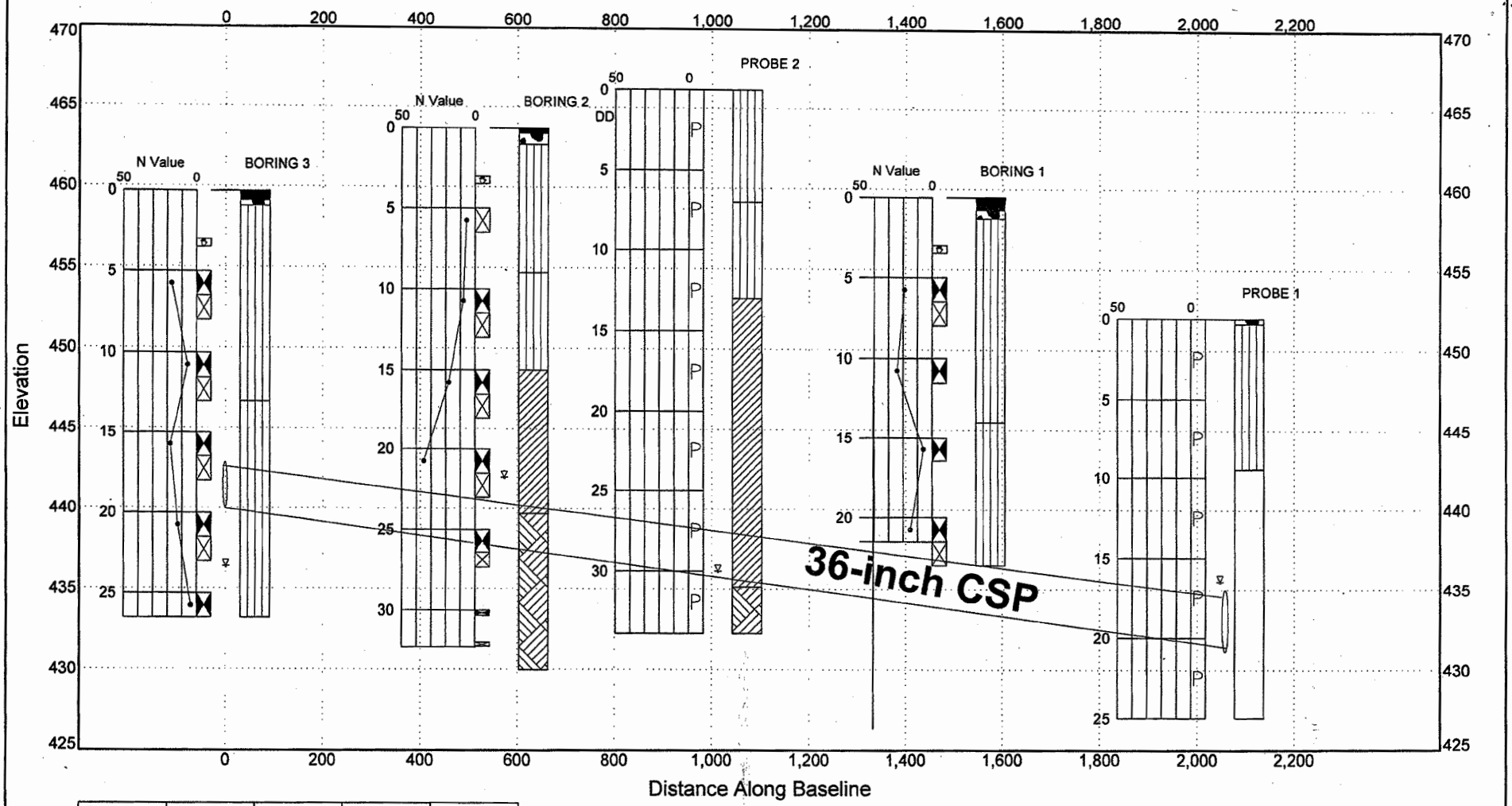
**Soil Type Legend**

PLATE **8**

JOB NUMBER **BES 6693**

APPROVED

DATE **3/22/02**




| Borehole | North | East | Elev. | Depth |
|---|---|---|---|---|
| BORING 1 | 663558 | 7637125 | 459.5 | 21.5 |
| BORING 2 | 663779 | 7636209 | 463.7 | 32.3 |
| BORING 3 | 663915 | 7635652 | 459.7 | 26.5 |
| BORING 4 | 663369 | 7637625 | 452.0 | 25.0 |
| BORING 5 | 663675 | 7636636 | 466.1 | 33.9 |

DISTANCES:

| | |
|---|---|
| Beginning | 0 |
| Ending | 2200 |

VIEWING ANGLES (degrees):

| | |
|---|---|
| Horizontal | 0.0 |
| Vertical | 0.0 |

| Position | North | East |
|---|---|---|
| Left, Front | 663928 | 7635656 |
| Right, Front | 663354 | 7637780 |
| Left, Back | 663928 | 7635656 |
| Right, Back | 663354 | 7637780 |

# SUBSURFACE FENCE DIAGRAM

**Taylor Trunk Relief**

**SW Multnomah Boulevard**

| PROJECT # | DATE | PLATE |
|---|---|---|
| BES 6693 | June 2002 | 7 |

FAGWGN01 BES6693.GPJ COP.GDT 6/29/02

## Relative Density of Coarse-Grained Soils

| Relative Density | Standard Penetration Blow Count (blows per foot) |
|---|---|
| very loose | < 4 |
| loose | 4 -10 |
| medium dense | 10 - 30 |
| dense | 30 - 50 |
| very dense | > 50 |

Standard Penetration Test (SPT) counts based on 130 lbs. hammer falling 30 inches

## Consistency of Fine-Grained Soils

| Consistency | Identification Procedure | Approximate Shear Strength (psf) |
|---|---|---|
| very soft | easily penetrated several inches with fist | less than 250 |
| soft | easily penetrated several inches with thumb | 250 - 500 |
| medium stiff | penetrated several inches with thumb | 500 - 1000 |
| stiff | readily indented several inches with thumb but requires great effort to penetrate | 1000 - 2000 |
| very stiff | readily indented by thumb nail | 2000 - 4000 |
| hard | indented with difficulty by thumb nail | greater than 4000 |

## Natural Moisture Content*

| | |
|---|---|
| dry | requires considerable moisture to obtain optimum moisture content |
| moist | near optimum moisture content for compaction |
| wet | requires drying to obtain optimum moisture content for compaction |
| saturated | near or below the water table, or from capillarity, or from perched water |

*optimum moisture content as determined by ASTM Test Method D698

**CITY OF PORTLAND**
ENVIRONMENTAL SERVICES
MATERIALS TESTING LABORATORY

**Taylor Trunk Relief**

**Glossary of Soil Terms**

PLATE **9**

JOB NUMBER **BES 6693**

APPROVED

DATE **6/18/02**

# Explanation of Common Terms Used in Rock Descriptions

| Field Identification | | UCS PSI | Point Load Index PSI | Strength (Hardness) |
|---|---|---|---|---|
| Indented by thumbnail. | R0 | < 100 | | Extremely Weak (Extremely Soft) |
| Crumbles under firm blows with geological hammer, can be peeled by a pocket knife. | R1 | 100 - 1,000 | | Very Weak (Very Soft) |
| Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with geological hammer. | R2 | 1,000 - 4,000 | | Weak (Soft) |
| Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single blow of geological hammer. | R3 | 4,000 - 8,000 | 145-290 | Medium Strong (Medium Hard) |
| Specimen requires more than one blow of geological hammer to fracture it. | R4 | 8,000 - 16,000 | 290 - 480 | Strong (Hard) |
| Specimen requires many blow of geological hammer to fracture it. | R5 | 16,000 - 36,000 | 480 - 960 | Very Strong (Very Hard) |
| Specimen can only be chipped with geological hammer. | R6 | >36,000 | >960 | Extremely Strong (Extremely Hard) |

| Term | Weathering Field Identification |
|---|---|
| Fresh | Crystals are bright. Discontinuities may show some minor surface staining. No discoloration in rock fabric. |
| Slightly Weathered | Rock mass is generally fresh. Discontinuities are stained and may contain clay. Some discoloration in rock fabric. |
| Moderately Weathered | Significant portions of rock show discoloration and weathering effects. Crystals are dull and show visible chemical alteration. Discontinuities are stained and may contain secondary mineral deposits. |
| Highly Weathered | Rock can be excavated with geologist's pick. All discontinuities exhibit secondary mineralization. Complete discoloration of rock fabric. Surface of core is friable and usually pitted due to washing out of highly altered minerals by drilling water. |
| Decomposed | Rock mass is completely decomposed. Original rock "fabric" may be evident. May be reduced to soil with hand pressure. |

## Rock Quality Designation

| RQD % | Designation |
|---|---|
| 0 - 25 | Very Poor |
| 25 - 50 | Poor |
| 50 - 75 | Fair |
| 75 - 90 | Good |
| 90 - 100 | Excellent |

RQD is the percent of a core run with intact lengths greater than 0.1m excluding breaks caused by drilling.

# ENVIRONMENTAL EASY

# REFERENCE COMPENDIUM

# Burlingame Trunk Sewer Improvement

# Easy Reference Compendium

Bureau of Environmental Services Project Number 9052

December 1, 2010

Presented By:
Coordinated Site Analysis
City of Portland
1120 SW 5th Avenue Rm 1000
Portland, OR 97204

# Burlingame Trunk Sewer Improvements BES Project # 9052 Final Compendium of Environmental Data

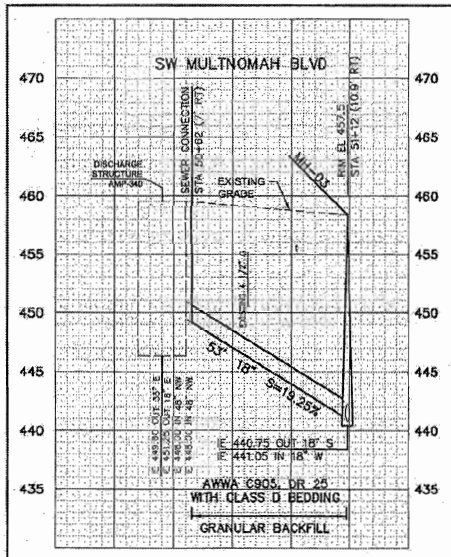


| | | | | | | | | | TOTAL METALS (mg/Kg) | | | | | | | | Leachable Metals (mg/L) | NWTPH-Dx | | Gx | Polynuclear Aromatic Hydrocarbons (PAHs) (mg/Kg) | | | | | | | | | | | | | | | | | PCBs (mg/Kg) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | DEQ Screening RBC$_{SSV}$ → | | | 13 | 60,000 | 150 | 920 | 800 | 93 | NL | 1,500 | 5 | 23,000 | 23,000 | 13,000 | 19,000 | NL | 93,000 | 21 | 2.1 | 21 | NL | 210 | 2,100 | 2.1 | 8,900 | 12,000 | 21 | 580 | NL | 6,700 | 4,4 (Total PCBs) | | |
| Sample Point | Maximum Boring Depth | Contaminated Media Sample Depth | Project Phase | Station | Project Section | Sample ID | Date Sampled | Sample Interval (feet-bgs) | Arsenic, total | Barium, total | Cadmium, total | Chromium, total | Lead, total | Mercury, total | Selenium, total | Silver, total | Lead, TCLP | Diesel | Oil | Gasoline | Acenaphthene | Acenaphthylene | Anthracene | Benz(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | Aroclor 1016/1242 | Aroclor 1254 | Aroclor 1260 |
| B-3 | 25 | | Taylor Trunk | ~52+44 | 50+00 to 55+00 | LAB020589 | 5/17/02 | 5-10 | 2.34 | | 0.15 | 48.4 | 7.1 | 0.069 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020590 | 5/17/02 | 15 | 3.59 | | ND | 50.1 | 6.47 | 0.014 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020591 | 5/17/02 | 25 | 2.03 | | ND | 33.2 | 6.42 | 0.012 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| B-7 | 30 | | Taylor Trunk | ~57+55 | 55+00 to 58+35 | LAB040482 | 3/15/04 | 5 | 3.79 | 195 | ND | 46.5 | 8 | 0.020 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB040483 | 3/15/04 | 10 | 3.41 | 182 | ND | 36.2 | 7.32 | ND | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB040484 | 3/15/04 | 30 | 0.48 | 288 | ND | 31.7 | 2.84 | ND | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| B-2a | 10 | | Burlingame | ~59+16 | 58+35 to 61+14 | LAB103883 | 8/2/10 | 5-10 | | | | | | | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| B2 | 25 | | Taylor Trunk | | | LAB020586 | 5/17/02 | 15 | 2.66 | | ND | 55.8 | 10.1 | 0.025 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020587 | 5/17/02 | 20 | 1.95 | | 0.6 | 32.6 | 4.43 | 0.024 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020588 | 5/17/02 | 25 | 5.17 | | 0.64 | 26 | 3.77 | 0.011 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| Probe -2 | 25 | | Taylor Trunk | ~63+24 | 61+14 to 64+48 | LAB020625 | 5/24/02 | 5 | 4.23 | | ND | 35.5 | 7.14 | 0.016 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020617 | 5/24/02 | 10 | 4.34 | | ND | 26.8 | 6.94 | 0.017 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020618 | 5/24/02 | 15 | 3.72 | | ND | 40.8 | 7.21 | 0.023 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020619 | 5/24/02 | 20 | 2.92 | | ND | 32 | 8.3 | 0.019 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020620 | 5/24/02 | 22 | 1.14 | | ND | 65.1 | 7.68 | 0.082 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020621 | 5/24/02 | 25 | 0.67 | | 0.11 | 48.1 | 6.91 | 0.010 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020622 | 5/24/02 | 30 | 0.35 | | ND | 63.2 | 5.76 | 0.016 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020623 | 5/24/02 | 34 | 0.81 | | 0.19 | 63.6 | 7.53 | ND | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| B-5 | 30 | | Taylor Trunk | ~65+72 | 64+48 to 67+00 | LAB040479 | 3/15/04 | 5 | 3.65 | 140 | ND | 36.7 | 18.6 | 0.015 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB040480 | 3/15/04 | 10 | 3.69 | 163 | ND | 45.4 | 7.44 | 0.019 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB040481 | 3/15/04 | 30 | 1.98 | 179 | ND | 55.8 | 8.69 | 0.041 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| B-1 | 20 | | Taylor Trunk | ~68+28 | 67+00 to 69+70 | LAB020582 | 5/17/02 | 5-10 | 4.66 | | ND | 40.4 | 7.76 | 0.038 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020583 | 5/17/02 | 15 | 4.66 | | ND | 35.1 | 6.61 | 0.019 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB020584 | 5/17/02 | 20 | 4.27 | | ND | 35.9 | 7 | 0.072 | | | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| B-4 | 30 | | Taylor Trunk | ~71+10 | 69+70 to 72+78 | LAB040476 | 3/15/04 | 5 | 3.66 | 167 | 0.14 | 39.6 | 7.83 | 0.016 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB040477 | 3/15/04 | 10 | 4.5 | 183 | ND | 38.6 | 7.71 | 0.015 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB040478 | 3/15/04 | 30 | 1.38 | 168 | ND | 43.5 | 7.82 | ND | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| Probe-1a | 30 | | Burlingame | ~74+45 | 72+78 to 75+00 | LAB103862 | 8/2/10 | 0-5 | 4.11 | 194 | 0.1 | 26.8 | 7.58 | 0.015 | 0.38 | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB103863 | 8/2/10 | 5-10 | 4.8 | 181 | ND | 30.5 | 7.57 | 0.018 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB103864 | 8/2/10 | 10-15 | 3.15 | 125 | ND | 35 | 7.86 | 0.019 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB103865 | 8/2/10 | 15-20 | 4.6 | 186 | 0.46 | 39.4 | 7.72 | 0.019 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| | | | | | | LAB103884 | 8/2/10 | 20-25 | 2.59 | 210 | ND | 53.2 | 11.4 | 0.020 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | ND | ND | ND |
| P-B3 | 21 | | Burlingame | 75+60 | 75+00 to 81+10 | LAB103542 | 5/5/10 | 1.5-2.5 | 2.79 | 67.2 | ND | 16.9 | 20.3 | 0.012 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103543 | 5/5/10 | 6-7 | 2.9 | 105 | ND | 29.9 | 7.16 | 0.015 | ND | ND | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | | | | | | LAB103544 | 5/5/10 | 11-12 | 2.5 | 167 | ND | 41 | 7.53 | 0.018 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103545 | 5/5/10 | 16-17 | 7.01 | 136 | ND | 71 | 14.5 | 0.025 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103546 | 5/5/10 | 20-21 | 3.09 | 111 | ND | 39.3 | 9.86 | 0.019 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | | | |

# Burlingame Trunk Sewer Improvements BES Project # 9052 Final Compendium of Environmental Data

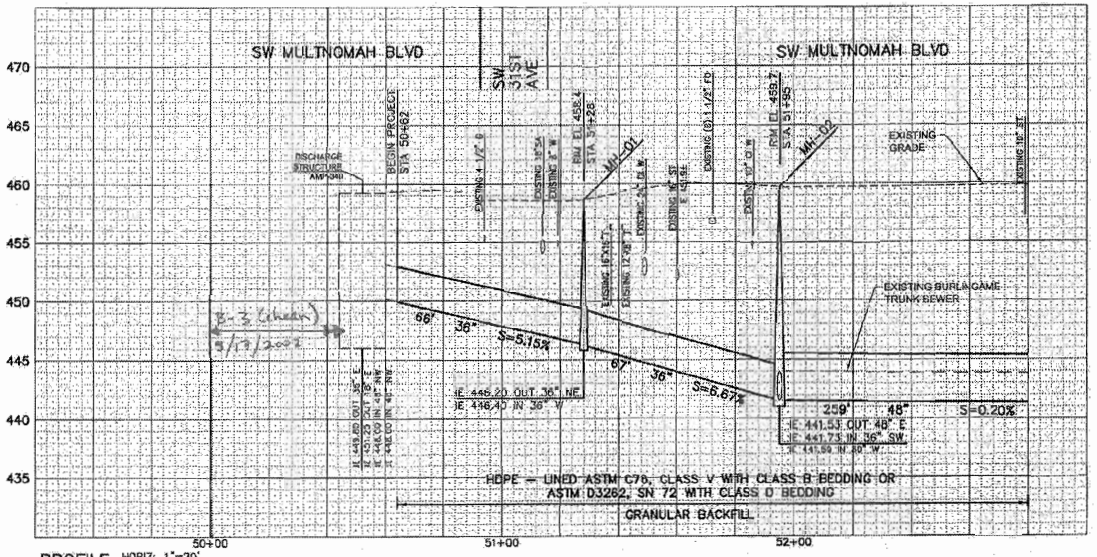
| | | | | | | | | | TOTAL METALS (mg/Kg) | | | | | | | | Leachable Metals (mg/L) | NWTPH-Dx | | Gx | Polynuclear Aromatic Hydrocarbons (PAHs) (mg/Kg) | | | | | | | | | | | | | | | | PCBs (mg/Kg) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | DEQ Screening RBC$_{ssl}$ → | | | 13 | 60,000 | 150 | 920 | 800 | 93 | NL | 1,500 | 5 | 23,000 | 23,000 | 13,000 | 19,000 | NL | 93,000 | 21 | 2.1 | 21 | NL | 210 | 2,100 | 2.1 | 8,900 | 12,000 | 21 | 580 | NL | 6,700 | 4.4 (Total PCBs) | | |
| Sample Point | Maximum Boring Depth | Contaminated Media Sample Depth | Project Phase | Station | Project Section | Sample ID | Date Sampled | Sample Interval (feet-bgs) | Arsenic, total | Barium, total | Cadmium, total | Chromium, total | Lead, total | Mercury, total | Selenium, total | Silver, total | Lead, TCLP | Diesel | Oil | Gasoline | Acenaphthene | Acenaphthylene | Anthracene | Benz(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | Aroclor 1016/1242 | Aroclor 1254 | Aroclor 1260 |
| P-B4 | 17 | | Burlingame | 86+80 | 81+10 to 87+70 | LAB103547 | 5/5/10 | 0.5-1.5 | 4.32 | 176 | 0.12 | 30.9 | 9.83 | 0.026 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103548 | 5/5/10 | 5-6 | 4.31 | 196 | 0.12 | 35.9 | 10.4 | 0.036 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103549 | 5/5/10 | 10-11 | 7.79 | 197 | ND | 50.6 | 7.92 | 0.029 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103550 | 5/5/10 | 16-17 | 2.24 | 140 | ND | 32.4 | 7.78 | 0.019 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| B-5-S | 10 | | Burlingame | 88+60 | 87+70 to 88+70 | LAB103866 | 8/2/10 | 0-5 | | | | | | | | | | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| | | | | | | LAB103867 | 8/2/10 | 5-10 | | | | | | | | | | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | |
| P-B5 | 17 | | Burlingame | 88+80 | 88+70 to 88+90 | LAB103551 | 5/5/10 | 1.5-2.5 | 3.32 | 130 | 0.12 | 32.3 | 16.1 | 0.024 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | 5'-10' | | | | LAB103552 | 5/5/10 | 6-7 | 2.85 | 157 | ND | 34.5 | 11.8 | 0.031 | ND | 0.12 | | ND | ND | ND | ND | 0.012 | 0.010 | 0.019 | 0.031 | 0.032 | 0.039 | 0.019 | 0.037 | ND | 0.045 | ND | 0.025 | ND | 0.028 | 0.061 | | | |
| | | | | | | LAB103553 | 5/5/10 | 11-12 | 2.55 | 217 | 0.11 | 37.5 | 7.46 | 0.015 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103554 | 5/5/10 | 16-17 | 5.18 | 170 | ND | 34.3 | 6.02 | 0.016 | ND | ND | | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| B-5-N | 10 | 0'-5' | Burlingame | 89+00 | 88+90 to 89+10 | LAB103868 | 8/2/10 | 0-5 | | | | | | | | | | | | | ND | ND | ND | ND | 0.012 | 0.011 | 0.014 | ND | 0.012 | ND | 0.020 | ND | ND | ND | ND | 0.027 | | | |
| | | 5'-10' | | | | LAB103869 | 8/2/10 | 5-10 | | | | | | | | | | | | | ND | ND | ND | ND | ND | ND | 0.012 | ND | ND | ND | 0.013 | ND | ND | ND | ND | 0.018 | | | |
| B5N(a) | 10 | 0'-5' | Burlingame | 89+20 | 89+10 to 89+30 | PTJ0216-01 | 10/7/10 | 0-5 | | | | | | | | | | | | | ND | ND | ND | 0.023 | 0.032 | 0.025 | 0.036 | 0.019 | 0.036 | ND | 0.078 | ND | 0.025 | 0.025 | 0.053 | 0.099 | | | |
| | | 5'-10' | | | | PTJ0216-02 | 10/7/10 | 5-10 | | | | | | | | | | | | | ND | ND | ND | ND | ND | 0.018 | ND | ND | 0.024 | ND | 0.017 | ND | ND | ND | ND | 0.020 | | | |
| B5N(b) | 10 | 0'-5' | Burlingame | 89+40 | 89+30 to 91+50 | PTJ0216-03 | 10/7/10 | 0-5 | | | | | | | | | | | | | 0.025 | 0.099 | 0.099 | 0.396 | 0.646 | 0.387 | 0.633 | 0.323 | 0.539 | 0.076 | 1.100 | 0.070 | 0.438 | 0.034 | 0.194 | 1.510 | | | |
| | | 5'-10' | | | | PTJ0216-04 | 10/7/10 | 5-10 | | | | | | | | | | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.022 | ND | ND | ND | ND | 0.021 | | | |
| P-B6 | 19 | | Burlingame | 10+60 | 91+50 to 11+40 | LAB103555 | 5/5/10 | 1.8-2.8 | 2.79 | 122 | ND | 45.7 | 8.73 | 0.069 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103556 | 5/5/10 | 3-4 | 2.91 | 157 | ND | 42.8 | 9.43 | 0.060 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103557 | 5/5/10 | 8-9 | 4.35 | 198 | ND | 49 | 8.12 | 0.030 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103558 | 5/5/10 | 14-15 | 3.03 | 141 | ND | 33.3 | 6.81 | 0.024 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103559 | 5/5/10 | 18-19 | 4.15 | 136 | ND | 25.2 | 6.33 | 0.014 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| P-B7 | 16 | | Burlingame | 12+22 | 11+40 to 13+20 | LAB103560 | 5/5/10 | 1-2 | 1.25 | 64.1 | ND | 18.7 | 3.89 | 0.011 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103561 | 5/5/10 | 6-7 | 3.91 | 192 | ND | 35.7 | 8.12 | 0.032 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103562 | 5/5/10 | 11-12 | 3.42 | 148 | ND | 27.1 | 7.01 | 0.015 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |
| | | | | | | LAB103563 | 5/5/10 | 15-16 | 2.2 | 109 | ND | 23 | 6.94 | 0.012 | ND | ND | ND | ND | ND | | | | | | | | | | | | | | | | | | |

Shaded cells represent contaminated soil
mg/Kg = milligrams per kilograms = parts per million (ppm)
ND = Not Detected
Blank cell = not analyzed

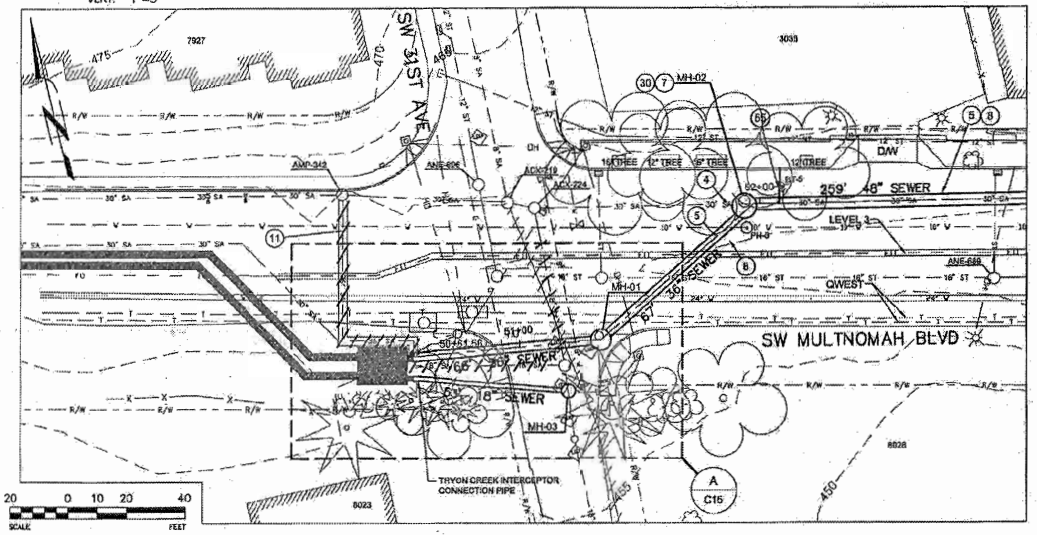



PROFILE: HORIZ: 1"=20' VERT: 1"=5'

TRYON CREEK INTERCEPTOR CONNECTION PIPE




PROFILE: HORIZ: 1"=20' VERT: 1"=5'




## CONSTRUCTION NOTES:

4. REMOVE EXISTING PIPE AS NEEDED TO INSTALL MANHOLE. CONNECT TO NEW MANHOLE ACCORDING TO DETAIL A/D03.
5. CONSTRUCT SEWER.
7. CONSTRUCT 84" MANHOLE PER DETAIL C/D03.
8. REMOVE AND DISPOSE OF EXISTING PIPE.
30. SEE MANHOLE DETAIL A/D01.
55. RECONSTRUCT EXISTING LATERAL TO CURB, FROM 3035 SW MULTNOMAH BLVD. PROTECT CURB.

| NO. | DATE | DESCRIPTION | APPD. |
|---|---|---|---|
| | | REVISION | |

KREF(S) USED:
ROTATION ANGLE:
CONSTRUCTED BY
PROJECT COMPLETED
MAP CORRECTED BY _____ CHECKED BY _____
FINAL MAP DATA

DESIGNED BY | DATE APPD.
DRAWN BY | PROGRAM MGR.
CHECKED BY | CONST. MGR.
DESIGN MGR.

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

BROWN AND CALDWELL

DRAFT FINAL DESIGN

BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
BEGIN TO STA 52+80

1/4 SECTION 3828
JOB NO. E09052
SHEET NO. C01
6 of 75

DATE: Apr 07, 2010 - 4:19pm USER: kyrado
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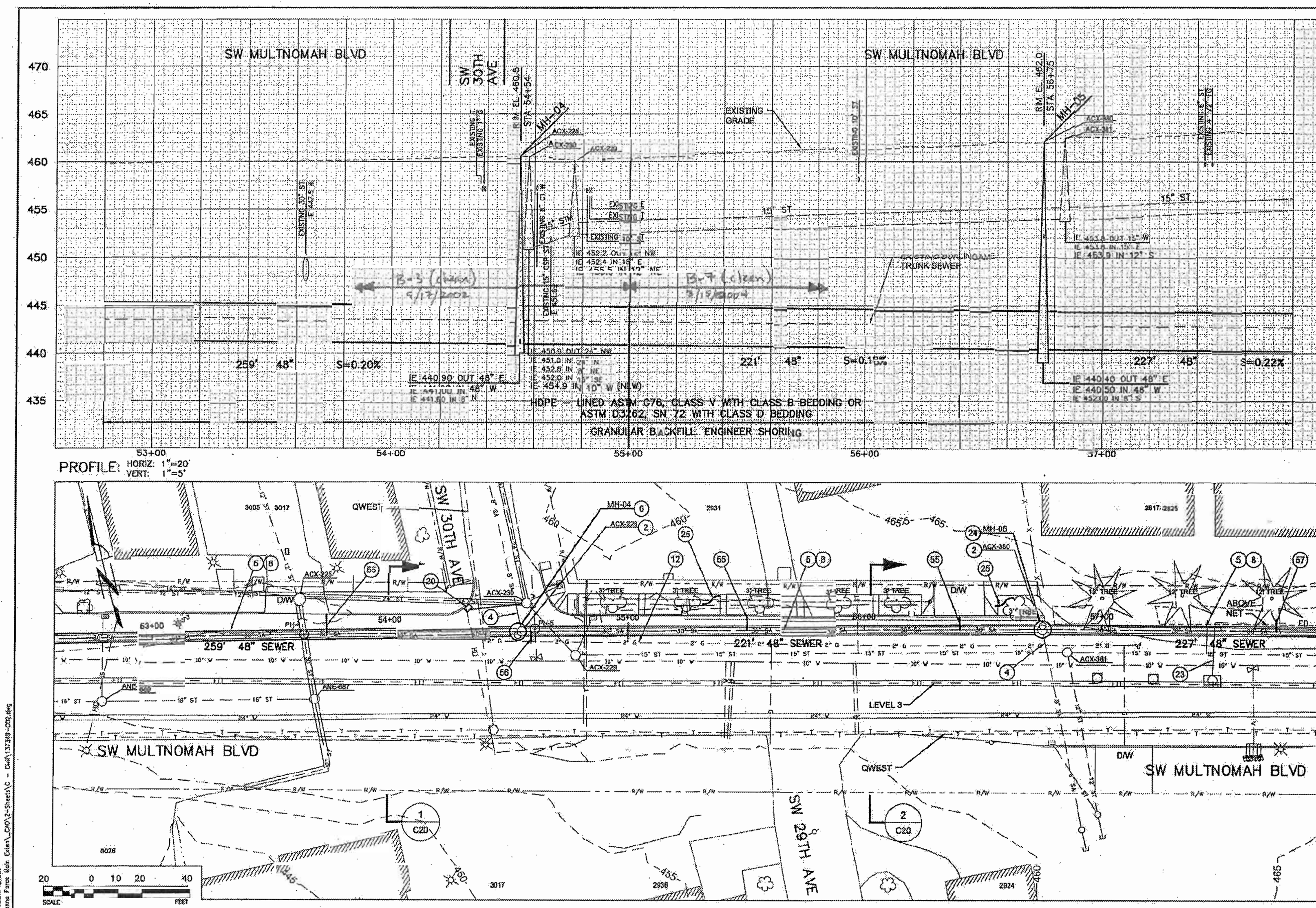


## CONSTRUCTION NOTES:

(2) REMOVE EXISTING MANHOLE.

(4) REMOVE EXISTING PIPE AS NEEDED TO INSTALL NEW MANHOLE. CONNECT TO NEW MANOLE ACCORDING TO DETAIL A/D03.

(5) CONSTRUCT SEWER.

(6) CONSTRUCT 72" MANHOLE PER DETAIL C/D03.

(8) REMOVE AND DISPOSE OF EXISTING PIPE.

(12) 2" GAS LINE TO BE RELOCATED BY NWN. SEE 00150

(20) NEW CONCRETE INLET WITH 10" LEAD. SEE STANDARD DRAWING P-200.

(23) FO TO BE RELOCATED BY ABOVE NET. SEE 00150

(24) CONSTRUCT 72" MANHOLE PER DETAIL C/D03 AND INSTALL INSIDE DROP CONNECTION FOR 8" SEWER PER STANDARD DRAWING P-253.

(25) PROTECT AND RESTORE EXISTING SWALE. SEE REFERENCE DRAWING FOR AS-BUILTS.

(55) RECONNECT EXISTING LATERAL TO CURB FROM 3005-3017 SW MULTNOMAH BLVD. AND 2931 SW MULTNOMAH BLVD. PROTECT CURB.

(56) RECONSTRUCT EXISTING LATERAL TO TRENCH LIMITS FROM 3017 SW MULTNOMAH BLVD.

(57) RECONSTRUCT 5' OF EXISTING LATERAL MEASURED FROM OD OF MAIN SEWER FROM 2817-2825 SW MULTNOMAH BLVD.

| NO. | DATE | DESCRIPTION | APPD. |
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| | | REVISION | |

XREF(S) USED:
ROTATION ANGLE:
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PROJECT COMPLETED
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FINAL MAP DATA

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DRAWN BY | PROGRAM MGR.
CHECKED BY | CONST. MGR.
DESIGN MGR.

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

BROWN AND CALDWELL

DRAFT FINAL DESIGN

BURLINGAME TRUNK
SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
STA 52+80 TO STA 57+80

1/4 SECTION 3826
JOB NO. E09052
SHEET NO. C02
7 of 75

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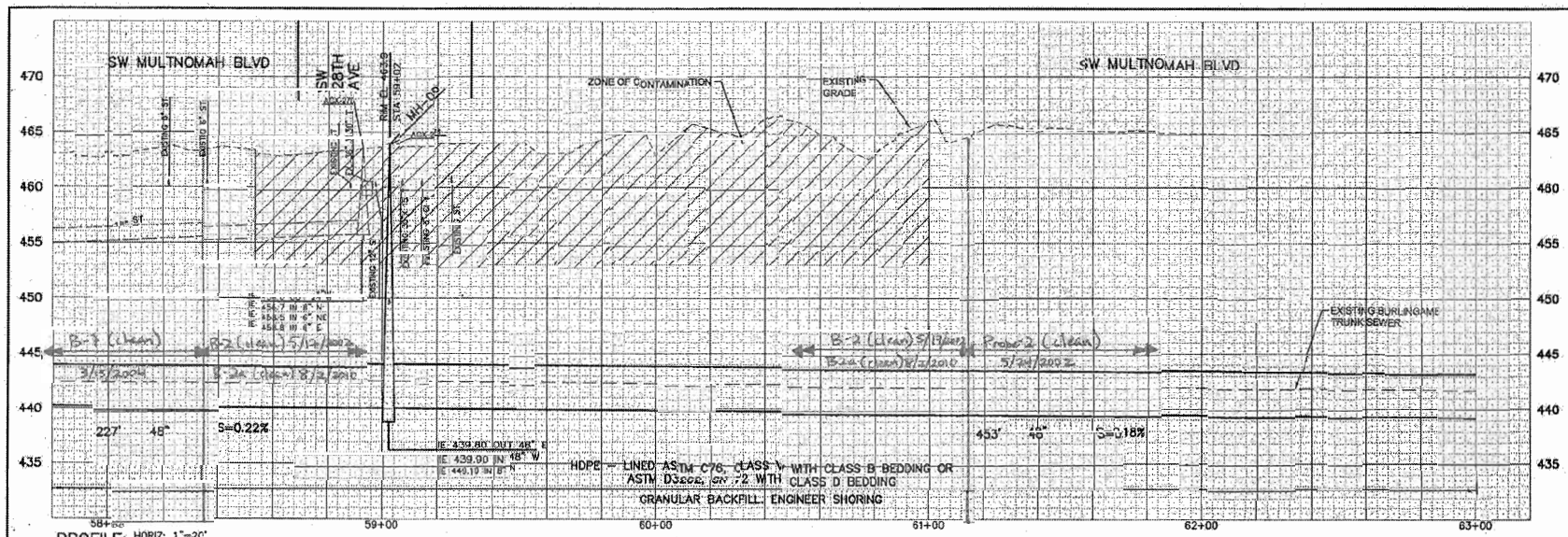
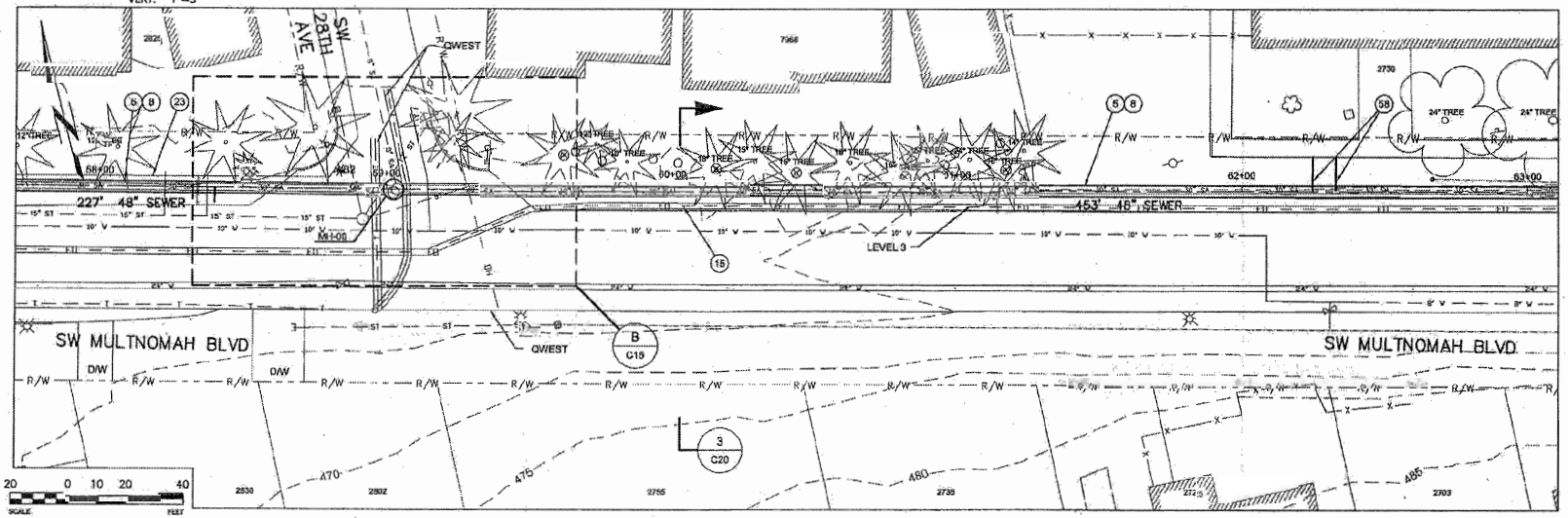



PROFILE: HORIZ: 1"=20' VERT: 1"=5'




## CONSTRUCTION NOTES:

- (5) CONSTRUCT SEWER.
- (8) REMOVE AND DISPOSE OF EXISTING PIPE.
- (15) FO TO BE RELOCATED BY LEVEL 3. SEE 00150
- (23) FO TO BE RELOCATED BY ABOVE NET. SEE 00150
- (58) RECONSTRUCT EXISTING LATERAL TO EDGE OF SIDEWALK, FROM 2730 SW MULTNOMAH BLVD.

| NO. | DATE | DESCRIPTION | APPD. |
|---|---|---|---|
| | | REVISION | |

XREF(S) USED:
ROTATION ANGLE:
CONSTRUCTED BY:
PROJECT COMPLETED:
MAP CORRECTED BY: CHECKED BY:
FINAL MAP DATA

DESIGNED BY | DATE APPD.
DRAWN BY | PROGRAM MGR
CHECKED BY | CONST. MGR.
DESIGN MGR.

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

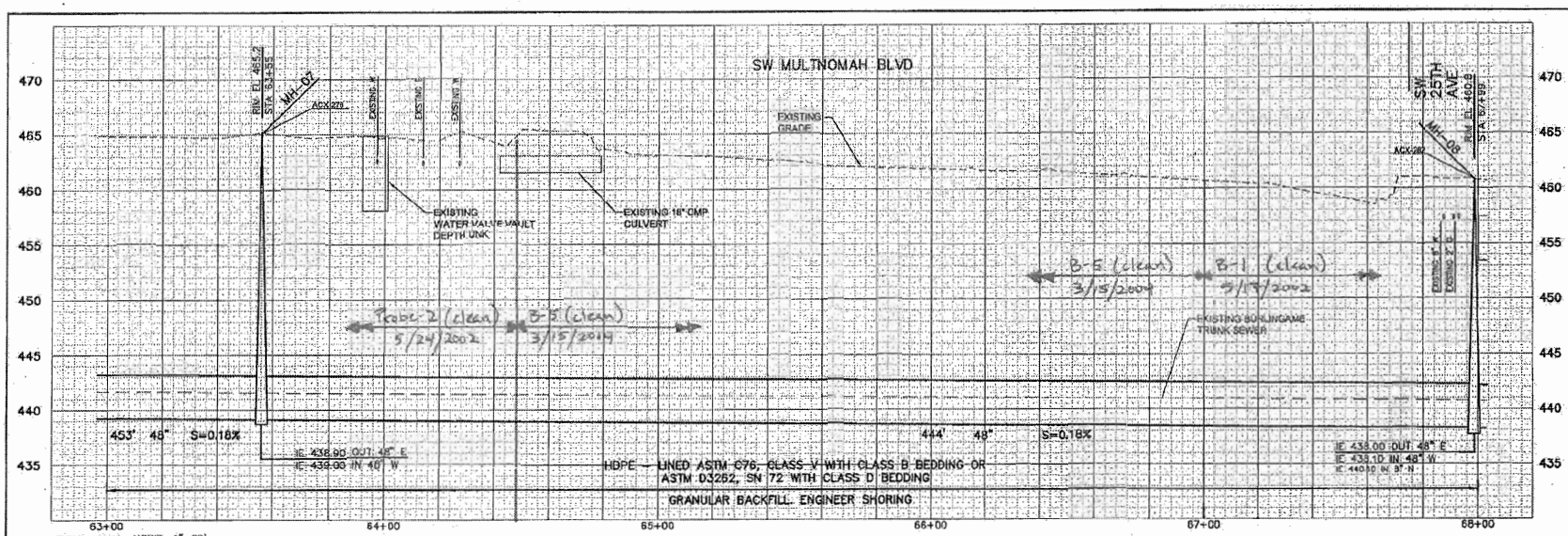
BROWN AND CALDWELL

DRAFT FINAL DESIGN

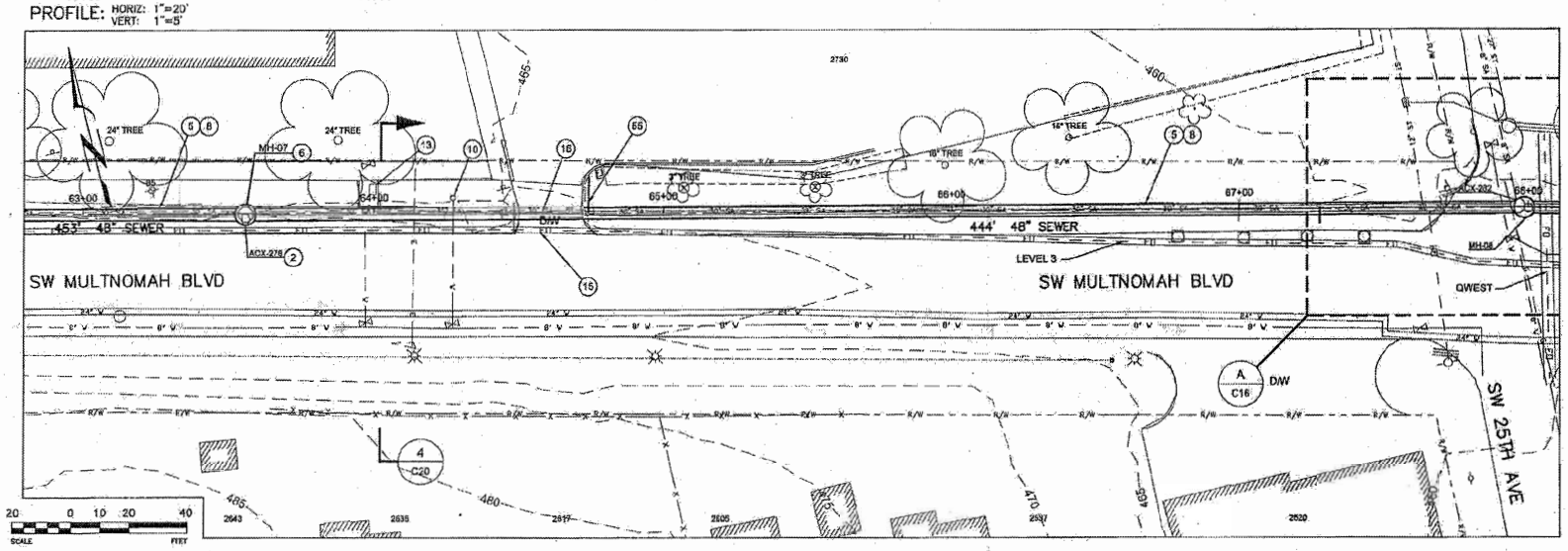
BURLINGAME TRUNK
SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
STA 57+80 TO STA 63+00

1/4 SECTION 3826
JOB NO. E09052
SHEET NO. C03
8 of 75




PROFILE: HORIZ: 1"=20' VERT: 1"=5'




## CONSTRUCTION NOTES:

2. REMOVE EXISTING MANHOLE.
5. CONSTRUCT SEWER.
6. CONSTRUCT 72" HDPE LINED STANDARD MANHOLE, PER DETAIL C/D03.
8. REMOVE AND DISPOSE OF EXISTING PIPE.
10. FIRE HYDRANT REMOVAL AND REPLACEMENT BY PWB. SEE 00150.
13. WATER VAULT TO BE RELOCATED BY PWB. SEE 00150
15. FO TO BE RELOCATED BY LEVEL 3. SEE 00150
16. REMOVE AND REPLACE EXISTING 18" CMP CULVERT LOCATED UNDER DRIVEWAY WITH 18" PVC. MATCH EXISTING SLOPE AND INVERTS.
55. RECONSTRUCT EXISTING LATERAL TO CURB FROM 2730 SW MULTNOMAH BLVD. PROTECT CURB.

| NO. | DATE | DESCRIPTION | APPD. |
|---|---|---|---|
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XREF(S) USED:
ROTATION ANGLE:
CONSTRUCTED BY:
PROJECT COMPLETED:
MAP CORRECTED BY: CHECKED BY:
FINAL MAP DATA

DESIGNED BY | DATE APPD.
DRAWN BY | PROGRAM MGR.
CHECKED BY | CONST. MGR.
DESIGN MGR.

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

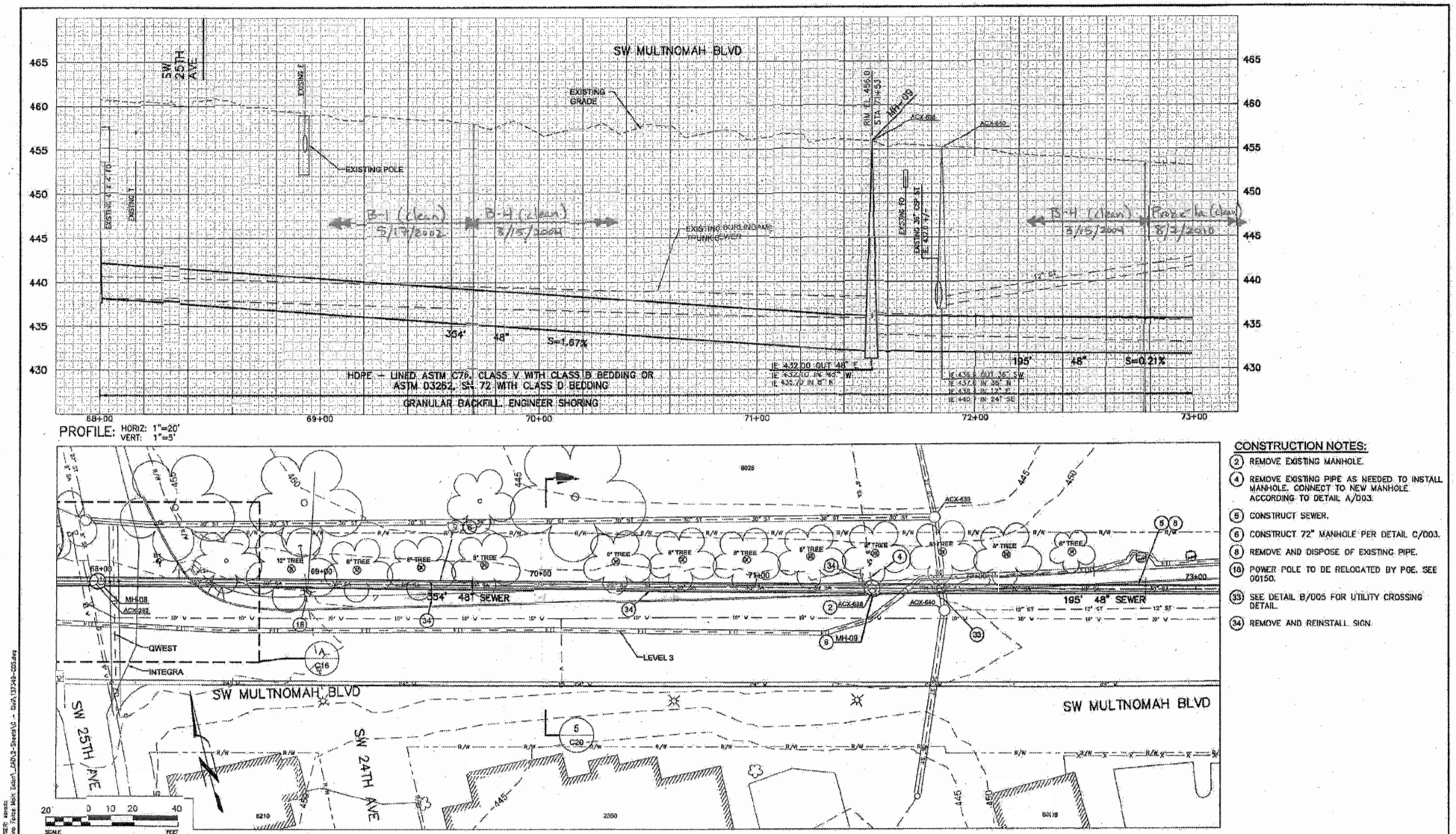
BROWN AND CALDWELL

DRAFT FINAL DESIGN

BURLINGAME TRUNK
SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
STA 63+00 TO STA 68+00

1/4 SECTION 3826
JOB NO. E09052
SHEET NO. C04
9 of 75




PROFILE: HORIZ: 1"=20'
VERT: 1"=5'




## CONSTRUCTION NOTES:

(2) REMOVE EXISTING MANHOLE.

(4) REMOVE EXISTING PIPE AS NEEDED TO INSTALL MANHOLE. CONNECT TO NEW MANHOLE ACCORDING TO DETAIL A/D03.

(5) CONSTRUCT SEWER.

(6) CONSTRUCT 72" MANHOLE PER DETAIL C/D03.

(8) REMOVE AND DISPOSE OF EXISTING PIPE.

(18) POWER POLE TO BE RELOCATED BY PGE. SEE 00150.

(33) SEE DETAIL B/D05 FOR UTILITY CROSSING DETAIL.

(34) REMOVE AND REINSTALL SIGN.

| NO. | DATE | DESCRIPTION | APPD. |
|---|---|---|---|
| | | REVISION | |

XREF(S) USED:
ROTATION ANGLE:
CONSTRUCTED BY:
PROJECT COMPLETED:
MAP CORRECTED BY: CHECKED BY:
FINAL MAP DATA

DESIGNED BY | DATE APPD.
DRAWN BY | PROGRAM MGR.
CHECKED BY | CONST. MGR.
DESIGN MGR.

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

BROWN AND CALDWELL

DRAFT FINAL DESIGN

# BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
STA 68+00 TO STA 73+00

| | |
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| 1/4 SECTION | VAR |
| JOB NO. | E09052 |
| SHEET NO. | C05 |
| | 10 of 75 |

DATE: Jul 07, 2016 - 4:25pm
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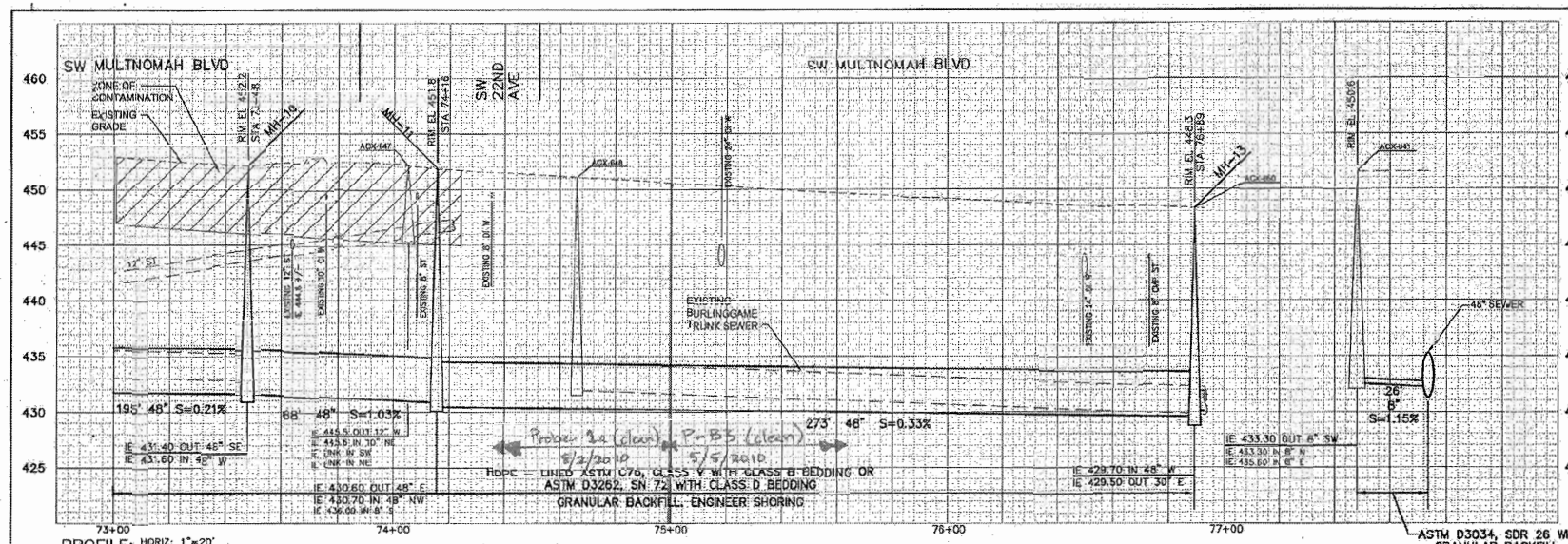
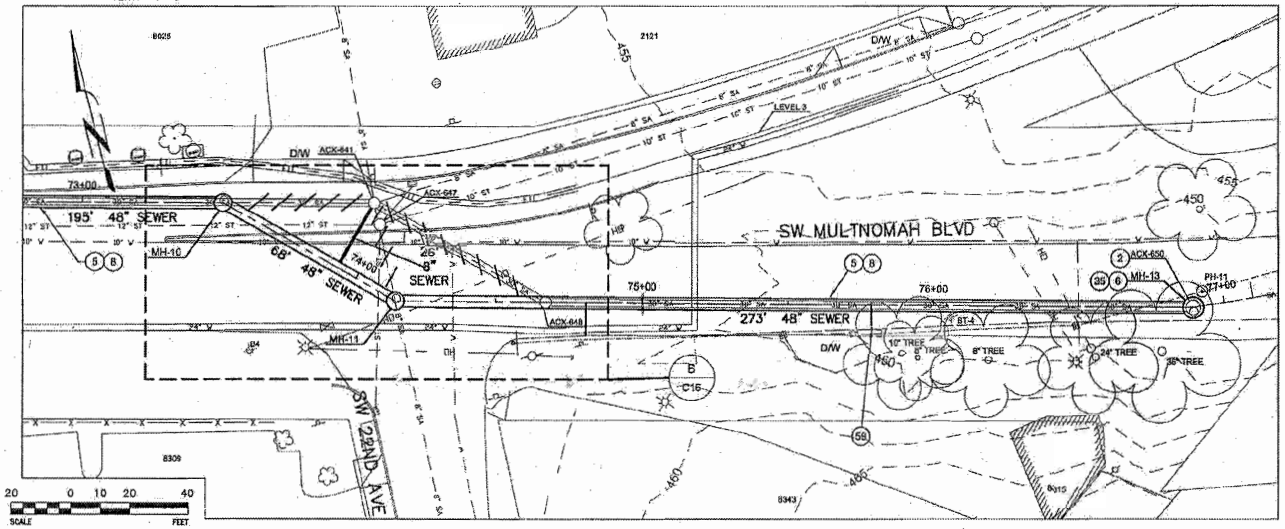



PROFILE: HORIZ: 1"=20'
VERT: 1"=5'




## CONSTRUCTION NOTES:

(2) REMOVE EXISTING MANHOLE.
(5) CONSTRUCT SEWER.
(6) CONSTRUCT 72" MANHOLE PER DETAIL C/D03.
(8) REMOVE AND DISPOSE OF EXISTING PIPE.
(36) INSTALL NEW MANHOLE PRIOR TO LINING.
(59) RECONSTRUCT EXISTING LATERAL TO EDGE OF PAVEMENT FROM 8315 SW BARBUR BLVD.

| NO. | DATE | DESCRIPTION | APPD. |
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| | | REVISION | |

XREF(S) USED:
ROTATION ANGLE:
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MAP CORRECTED BY ____ CHECKED BY
FINAL MAP DATA

DESIGNED BY | DATE APPD.
DRAWN BY | PROGRAM MGR.
CHECKED BY | CONST. MGR.
DESIGN MGR.

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

BROWN AND CALDWELL

DRAFT FINAL DESIGN

# BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
STA 73+00 TO 76+90

| | |
|---|---|
| 1/4 SECTION | 3827 |
| JOB NO. | E09052 |
| SHEET NO. | C06 |
| | 11 OF 75 |

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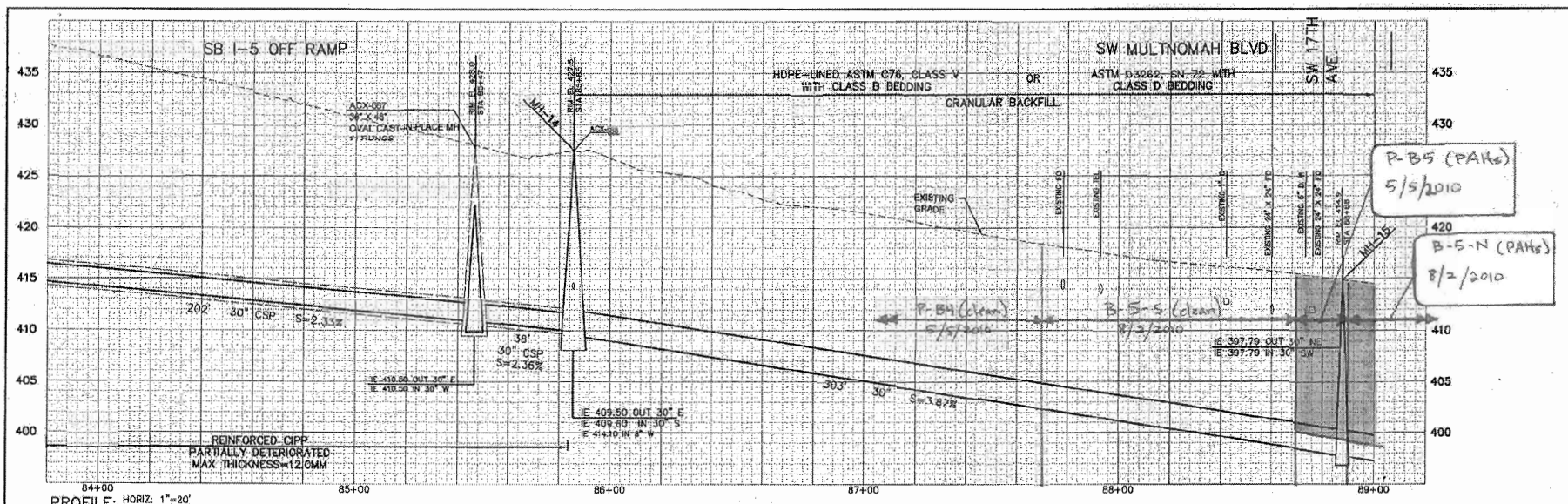
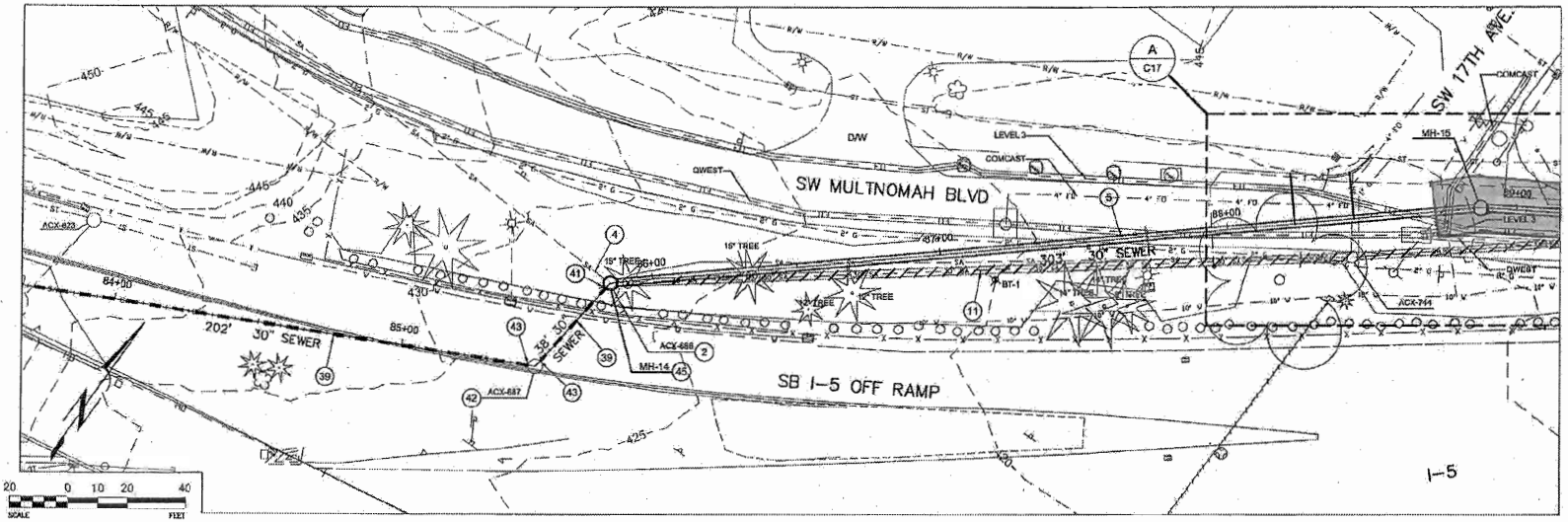



PROFILE: HORIZ: 1"=20'
VERT: 1"=5'




## CONSTRUCTION NOTES:

2. REMOVE EXISTING MANHOLE.
4. REMOVE EXISTING PIPE AS NEEDED TO INSTALL MANHOLE. CONNECT TO NEW MANHOLE ACCORDING TO DETAIL A/D03.
5. CONSTRUCT SEWER.
11. ABANDON EXISTING SEWER.
39. INSTALL CIPP LINER.
41. SEE DETAIL A/D03 FOR CONNECTION OF CIPP TO NEW MANHOLE.
42. REHABILITATE EXISTING MANHOLE WITH POLYURETHANE COATING.
43. SEE DETAIL E/D03 FOR CIPP CONNECTION TO EXISTING MANHOLE.
45. CONSTRUCT 60" MANHOLE PER DETAIL C/ D03 AND INSTALL INSIDE DROP CONNECTION FOR 8" SEWER PER STANDARD DRAWING P-253.

DATE: Apr 07, 2010 – 4:08pm
FILE: P:\137248_City of Portland_Fabre Trace Main Basin\CAD\C-Sheets\S – Civil\137248-C09.dwg
USER: lgrado

| NO. | DATE | DESCRIPTION | APPD. |
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DESIGNED BY | DATE APPD.
DRAWN BY | PROGRAM MGR.
CHECKED BY | CONST. MGR.
DESIGN MGR.

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

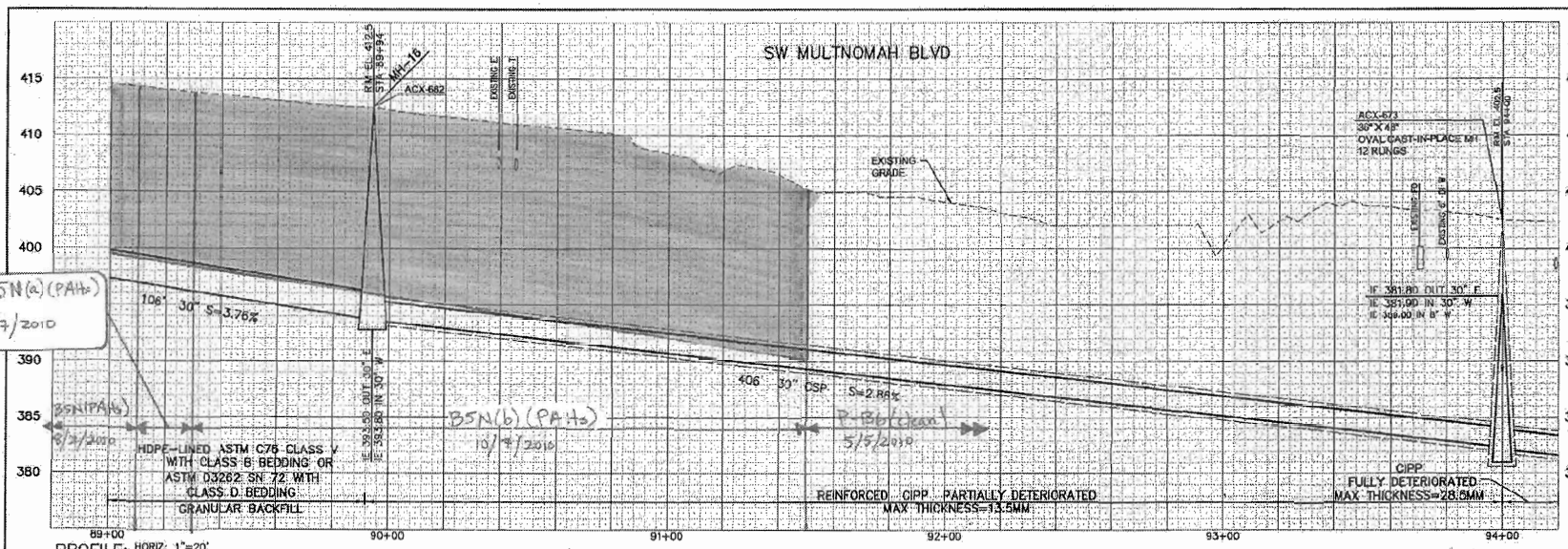
BROWN AND CALDWELL

DRAFT FINAL DESIGN

# BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
STA 83+80 TO STA 89+00

1/4 SECTION 3827
JOB NO. E09052
SHEET NO. C09 14 OF 75

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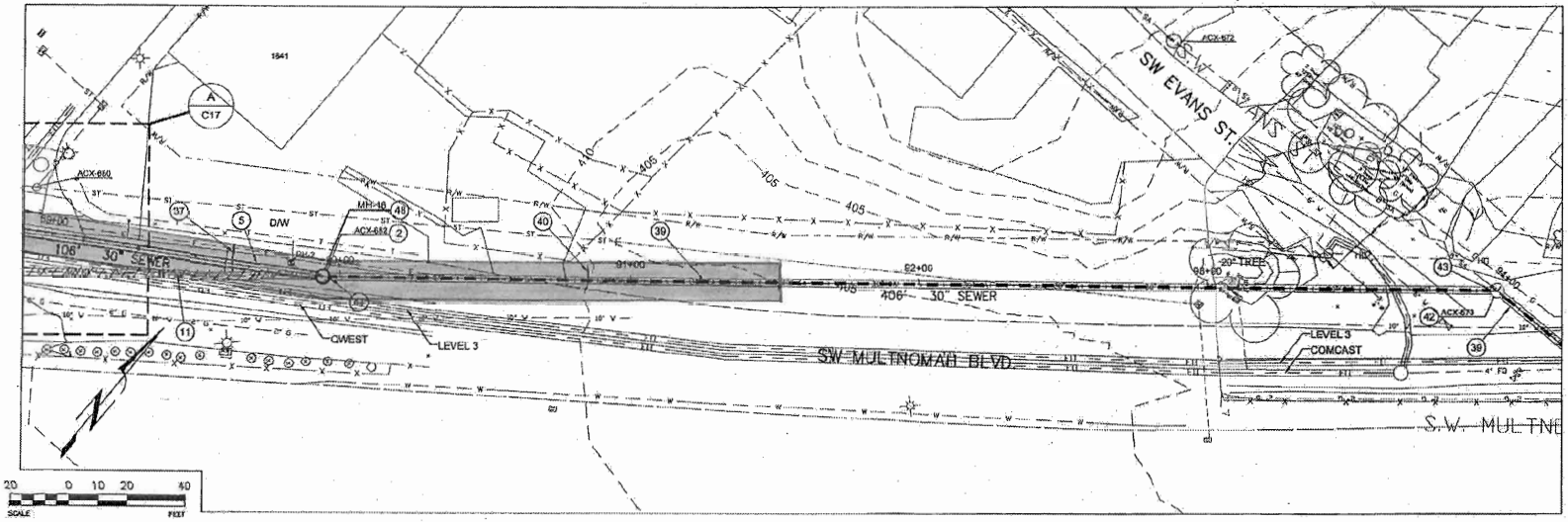


## CONSTRUCTION NOTES:

(2) REMOVE EXISTING MANHOLE.
(5) CONSTRUCT SEWER.
(11) ABANDON EXISTING SEWER.
(37) NEW LATERAL CONNECTION TO EDGE OF PAVEMENT, 1841 SW MULTNOMAH BLVD.
(39) INSTALL CIPP LINER.
(40) REINSTATE ACTIVE LATERAL, FROM 1624 SW EVANS ST.
(41) SEE DETAIL A/D03 FOR CONNECTION OF CIPP TO NEW MANHOLE.
(42) REHABILITATE EXISTING MANHOLE WITH POLYURETHANE COATING.
(43) SEE DETAIL E/D03 FOR CIPP CONNECTION TO EXISTING MANHOLE.
(48) CONSTRUCT 60" MANHOLE PER DETAIL C/D03.

B5N(a)(PAH2)
10/7/2010

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CITY OF PORTLAND
ENVIRONMENTAL SERVICES

BROWN AND CALDWELL

DRAFT FINAL DESIGN

# BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
STA 89+00 TO STA 94+20

1/4 SECTION 3827
JOB NO. E09052
SHEET NO. C10
15 OF 75

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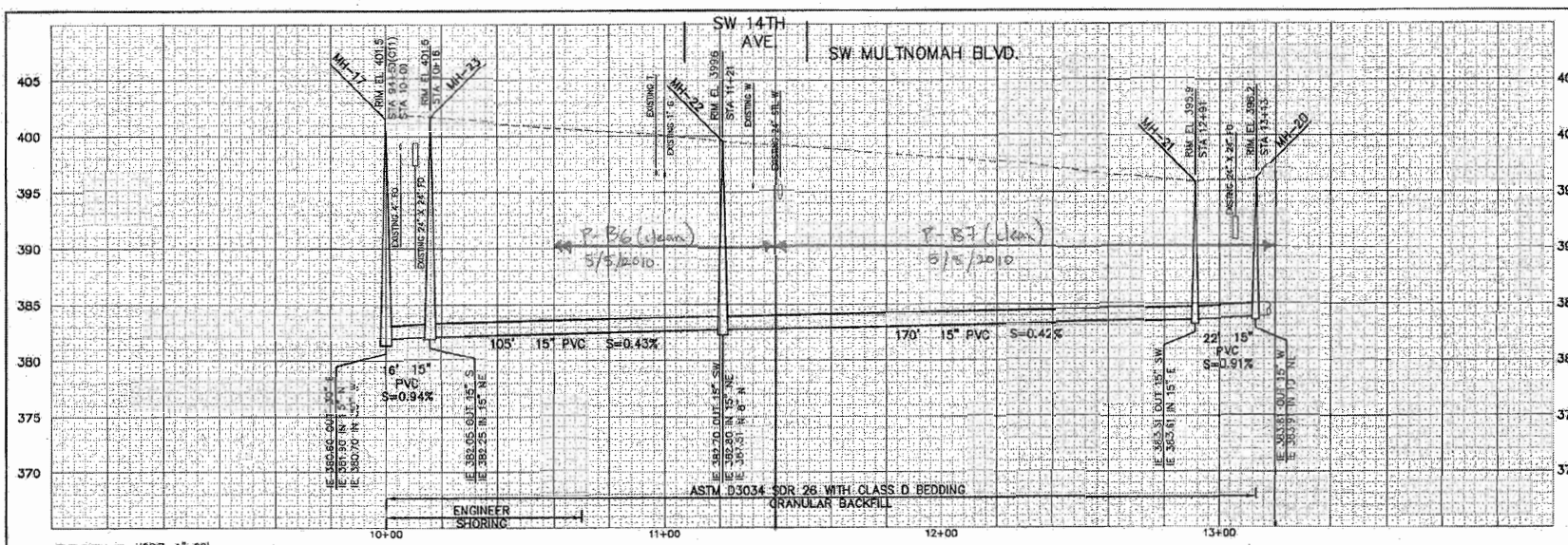


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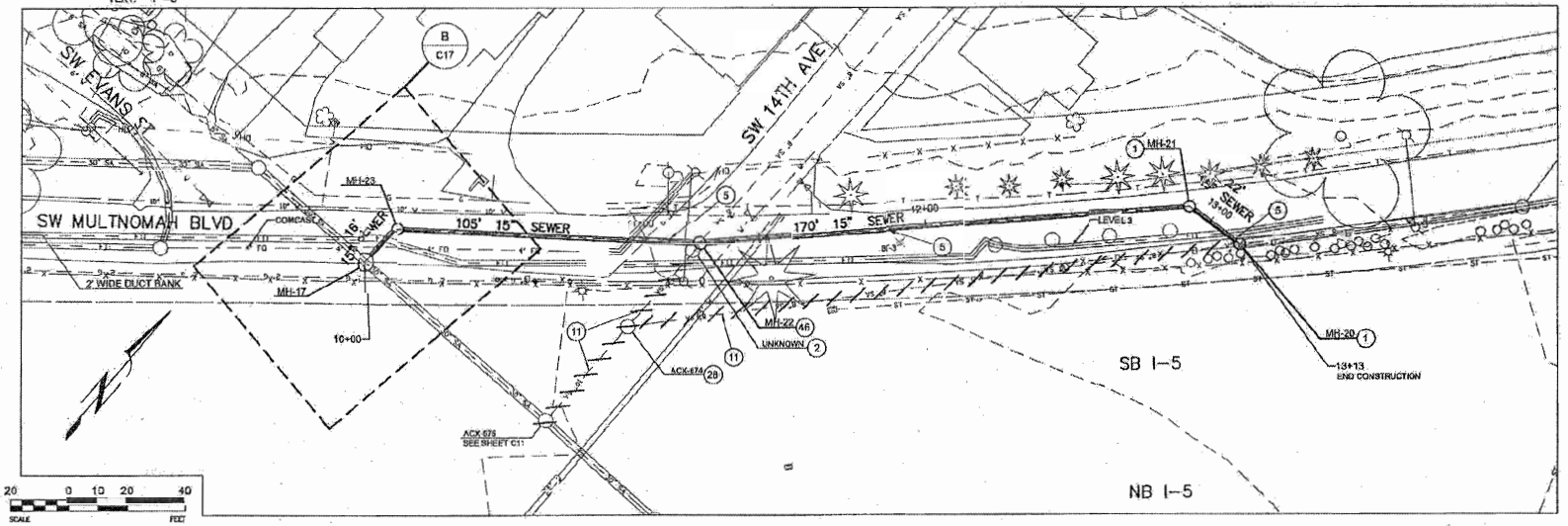


## CONSTRUCTION NOTES:

1. 48" STANDARD MANHOLE, SEE STANDARD DRAWING P-150.
2. REMOVE EXISTING MANHOLE.
5. CONSTRUCT SEWER.
11. ABANDON EXISTING SEWER.
28. ABANDON EXISTING MANHOLE.
46. CONSTRUCT 60" MANHOLE PER DETAIL C/D03 AND INSTALL INSIDE DROP CONNECTION FOR 8" SEWER PER STANDARD DRAWING P-253.

| NO. | DATE | DESCRIPTION | APPD. |
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| | | REVISION | |

AMEP(S) USED:
ROTATION ANGLE:
CONSTRUCTED BY:
PROJECT COMPLETED:
MAP CORRECTED BY: CHECKED BY:
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CHECKED BY | CONST. MGR.
DESIGN MGR.

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

BROWN AND CALDWELL

DRAFT FINAL DESIGN

# BURLINGAME TRUNK SEWER IMPROVEMENT PROJECT

PLAN AND PROFILE
15" SANITARY SEWER REALIGNMENT

W.O. / DESIGN # 3827
JOB NO. E09052
SHEET NO. C13
18 OF 75

DWG: Apr 07, 2010 - 4:07pm LOGIN: sgrieb
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# PAVEMENT MORATORIUM

**City of Portland**
**Office of Transportation**

# 5-Year Moratorium Street Cut Replacement Guidelines

## History

In an effort to better manage pavement degradation from the affects of utility cuts, the City of Portland has recently enacted a 5-year moratorium on all new pavement surfaces. This will include overlays, inlays, reconstruction, and new construction of at least a half street or greater. Sawcuts along an existing frontage will not trigger a 5-year moratorium.

Through research of other municipalities throughout the country and from the City's own trench cut inventory, it is clear that trench cuts significantly alter and degrade pavement surfaces adjacent to the actual trench line. The City of Portland Standard Construction Specifications were recently modified to require all trench cuts to be t-cuts, reducing the negative impacts of the trench cut.

Public interest in the integrity, ride-ability and appearance of new street surfaces is significant. Residents don't appreciate new streets being dug up by utility trenches. However, in the event of an emergency or a new development, it will occasionally be necessary to cut into a street that has been paved within the past five years. These guidelines establish the basis and process for determining the level of repair and replacement for utility cuts for newly paved streets.

## Definition

The City of Portland requires that anyone applying to cut open the street for utility connections or installations must have an approved street opening permit. Title 17.24.100 outlines the rules regarding the 5-year moratorium.

### 17.24.100 Street Pavement Preservation

After any street has been constructed, reconstructed, or paved by City forces, under City contract, or under permit, the pavement surface shall not thereafter be cut or opened for a period of 5 years.

The City Engineer may grant exemptions to this prohibition in order to facilitate development on adjacent properties, provide for emergency repairs to subsurface facilities, provide for underground service connections to adjacent properties or allow the upgrading of underground utility facilities.

When granting exceptions to this regulation, the City Engineer may impose conditions determined appropriate to insure the rapid and complete restoration of the street and the surface paving. Repaving may include surface grinding, base and sub-base repairs, or other related work as needed, and may include up to full-width surface paving of the roadway.

In addition to the street opening permit, any person who is required partially or fully repave a street shall obtain a street improvement permit and be responsible for the full cost of plan review, construction inspection, material testing, bonding, and all other City expenses related to the work.

If the City Engineer determines that final repaving of the street is not appropriate at that particular time for reasons relating to weather or other short term problems, the City Engineer may grant a delay until proper conditions allow for repaving.

This language was adopted by the City Council effective July 1, 2002 (Ordinance No. 176408).

## Cutting into a Moratorium Street

When it becomes necessary to cut into a moratorium street, the Office of Transportation will make a concerted effort to protect the integrity of the pavement structure, and to ensure a high quality replacement patch or overlay.

Depending on the particular trench cut size, location, and construction duration, conditions will be placed on the permittee to return the street to a similar integrity as prior to the cut occurring. This may require a larger pavement restoration area on each side of the trench, a full-lane-width pavement replacement, or a full curb-to-curb replacement.

### Goals

Each situation will be different and will require thoughtful and reasonable evaluation by the Office of Transportation to determine the optimal limits of work to achieve the following goals:

- Minimize pavement degradation
- Maintain structural integrity of street
- Maintain a smooth riding surface for all modes
- Limit visual impact and perceptions

### Parameters

Streets are classified according to the City of Portland's Transportation Element. For the purpose of this guideline, the designation of "arterials" will apply to all streets other than "local Service Streets", hereafter referred to as "local streets." Parameters to consider during the analysis to determine the pavement replacement scope include, but are not limited to:

- Street classification – "local" or "arterial"
- Will the trench cut seam be in a wheel well within a travel lane?
- Will the trench cut seam be within a bus stop area or pullout:
- Where are the seams in relationship to a bike lane, parking lane, etc.?

## Trench Cut Requirements

The actual trench cut will follow the new standard t-cut, with a minimum 6" overlap on each side of the trench for base replacement. On moratorium streets additional pavement restoration will extend beyond the limits of the trench and t-cut. The permittee will be required to remove the AC and replace to the dimensions outlined below, or as directed by the City Engineer. In most cases, full-width base replacement should not be necessary.

**Lateral Cuts** – These are generally used to cut into a pre-existing facility to allow for a single connection. This may include full street-width crossings.

Most lateral cut requests on 5-year moratorium streets can be handled through the standard street opening permit process in Street Systems Management.

Follow the City Standard Construction Specifications using a t-cut, but the pavement replacement will vary:

- Arterials – where the lateral impacts a travel lane, replace a minimum of five feet (5') on each side of the trench.

- Arterials – where the lateral impacts only the parking lane, replace a minimum of (three feet) 3' on each side of the trench.

- Local streets – replace a minimum of three feet (3') on each side of the trench.

Extend the patch to the nearest lane line or street centerline.

**Longitudinal Cuts** – These cuts generally run lengthwise in the roadway.

Most longitudinal cut request on 5-year moratorium streets will require an expended permit process (outlined below), which will be handled through the Permit Engineering section.

The extent of surface pavement replacement width will depend on the location of the longitudinal run in relationship to parking, bike and travel lanes. Generally:

- A single lane that is impacted will have full pavement restoration for the width of the lane.
- If multiple lanes are impacted, the full width of those lanes may have to be restored. Given the location and the extent of the trench repair, consideration may be giving for restoration only to the center of a lane(s).
- Impacted bike lanes will be restored in their entirety.

## Construction Methods

There are two basic systems for applying asphalt as a patch or as paving; application by paving machine and application by drag box with hand raking. For large application, the machine paving provides the best AC mix consistency and best uniform thickness. For large pavement patches (especially longitudinal cuts) the permittee may be required to apply the AC using a paving machine. Site specific characteristics (such as truck and bus routes, traffic volumes, etc.) will determine which application methodology will be allowed or required.

**Process for Longitudinal Cuts on Moratorium Streets**

1. SSM **Identifies 5-yr street**; puts permittee on notification of larger process:

2. SSM notifies PER about the request, and **begins a project number** to track costs.

3. PER organizes a **pre-design conference**, and invites the following staff:
   SSM utility coordinator
   CBD coordinator & traffic engineer
   Project manager from most recent capital or permit job
   Permitttee

4. Permittee develops a **submittal** that meets the needs identified at the pre-design.

5. Formal **utility notification** to all parties, including statement about 5-yr moratorium and encourages joint trenching opportunity.

6. Staff approves submittal upon complete review by interested parties.

7. PER develops a **permit package**, with specs, erosion control, etc. Include final date for completing pavement work (based on time of year permit is initially released).

8. Permittee pays **fees** to obtain permits:
   Utility Installation Permit fees paid – SSM
   **Performance and Warranty bonds**, and engineering & inspection (cost recovery fees) 100% of estimate is paid – PER
   Street lane and parking removal fees – CBD

9. **Permits issued** from SSM, PER, and CBD.

10. **Construction** begins:
    Parking and lane closures
    Trench work
    Pavement restoration
    If pavement work is to be delayed, a "sunset" date is established to ensure that the work is completed by the permittee (utility company, not initial contractor). A separate CBD parking and lane closure permit will have to be established at the time of actual paving operation.

11. **Punchlist**

12. **Certificate of Completion** is initiated

13. Final **Cost Accounting**; refund or amount due.

14. COC and **performance bond** is returned to permittee upon **receipt of final payment or refund.**

15. Project is formally **closed**.

# OAR REQUIREMENTS

## APPENDIX A

## SEWER PIPELINES

### (1) MINIMUM REQUIREMENTS FOR SEWER - PIPELINES

(a) Capacity:

Sewers shall be of such diameter as to pass without overflow, bypass, or back flow onto damageable property of a user the design peak flow including sewage and infiltration. All unavoidable inflow from roof, surface, footing, foundation, or other groundwater or surface water sources shall be excluded from capacity allowance.

(b) Velocity:

Sewers shall be designed to have a velocity to "self clean" or transport constituent solids to the treatment facility or the owner shall periodically service sewers to flush, transport, or remove solids from sewers with minimal velocity.

### (2) GUIDELINES FOR SEWER PIPELINES

(a) Capacity:

(A) Collection sewers should be designed for the ultimate development of the tributary areas as determined by master sewerage and land use plans of the owner.

(B) The design of sewers should be based upon initial and ultimate flows. Flows should be broken down into domestic, industrial, and infiltration/inflow fractions. A peaking factor should be applied to domestic and industrial fractions.

(C) Domestic flows should be between 50 and 100 gallons per capita per day (gpcd). Peaking factors should be between 1.8 and 4.0. Infiltration allowance should be normally less than 2,000 gallons per acre per day; any greater allowance should be justified. Any significant inflow allowance should be justified.

(D) The minimum diameter of sewers should be 8 inches for maintenance purposes. Short nonextendable 6 inch sections of up to 250 feet are permissible.

(E) Replacement sewers should be designed commensurate with flow conditions.

(b) Velocity:

(A) Sewers should be laid on a gradient which will produce a mean velocity, when flowing full or half full, of at least (2) two feet per second, based upon the Manning formula with "n", the coefficient of roughness, valued at 0.013.

(b) Sewers with minimal flow such as upper

reaches of laterals or those sewers serving few dwellings should be steepened and/or reduced in diameter to approach a (2) two feet per second selfcleaning velocity. Actual flows during initial years of use should be carefully evaluated in this regard.

(C) Force mains and inverted siphons should be designed for (3) three feet per second at average flows.

(D) The minimum gradient for 8 inch sewers should be no less than 0.4 percent regardless of pipe material.

(E) The minimum gradient for 6 inch sewers should be no less than 0.6 percent, preferably 0.75 percent.

(F) The flow channel(s) through manhole bases should be smooth and conform to the shape and slope of the inlet sewer(s).

(G) Intersecting sewers, sewer connections, etc., should be made without causing backup into the smaller sewer. For intersecting unequal sized sewers in manholes, the elevation at 0.8 of full depth of flow in each sewer should match.

(c) Watertightness:

Completed sewer construction shall result in limited infiltration/exfiltration through pipe walls, joints, fittings, and connection fittings, etc., and no inflow. The limit shall be consistent with the pipe and manhole materials and with what is obtainable at the time by the construction industry on representative jobs for the same type of construction using high quality materials and state-of-the-art methods of workmanship. All completed sewer lines in new work shall be tested for watertightness using either recognized air or water testing requirements and procedures.

(c) Watertightness:

(A) Watertightness begins with good material and finally depends upon sound field practices. Good inspection and tests should be supplemented with an initial television inspection after trench backfilling is complete. Since many defects do not appear initially, an eleventh month final inspection should be performed where that capability is available and determined necessary to obtain acceptable in-place work. If only one television inspection is considered, the eleventh month inspection is recommended.

(B) Exfiltration testing or the low pressure air test for sanitary sewers should be a pres-

sure at least 6 feet greater than the groundwater conditions which the sewer is subject to at test time.

(C) Pipe materials, joints, fittings, and appurtenances should be selected for their watertight capabilities.

(D) Acceptance or performance standards should not necessarily be uniform for all pipe materials since average testing results with good workmanship for work will vary depending upon pipe materials. The range of allowable exfiltration/infiltration for work acceptance should be between 50 and 200 gallons per day per inch-of-diameter per mile (gpdidm). Nonporous (non-airpermeable) pipe should sustain pressure for twice the computed time for the same one pound per square inch (psi) air pressure drop required by the air test. Test sections should be from manhole-to-manhole or about 700 feet maximum.

(E) The watertightness of all building sewers should conform to the State Plumbing Code and be tested without exception.

(F) Manholes should be water tested for exfiltration during construction and/or visually inspected during first wet weather season after construction for infiltration. Leaks should be promptly repaired.

(G) Curved sewers should be as watertight as other sewers and be tested. While not recommended, horizontal/vertical curves at times may be allowed but should be limited in use. When used, the minimum radius of curvature should be not less than 200 feet and the maximum computed joint opening no more than 3/8 inch. Complete and accurate records should be kept of the exact location of such curved sewers for future reference. Reasonable field control should be exercised to not compound joint deflections and compromise watertightness.

(d) Structural Strength:

The completed installation including the excavated trench, the pipe, the bedding, and the pipe zone materials shall resist imposed loads from backfill, impact, and live loads (construction and design) without pipe failure through crushing, loss of watertightness, settlement, or significant capacity loss.

(d) Structural Strength:

(A) Bedding material should be placed full trench width from at least 4 inches under to spring line of all pipe for a leveling course and proper pipe support. Hand shaping of the native trench bottom for rigid pipe is not recommended but may be allowed, if appropriate, and uniform pipe support can be obtained and grade/ alignment can be maintained.

(B) Cantilevering of nonreinforced rigid pipe at manholes should be limited to the least distance practicable to make a flexible connection. A flexible joint should be within 12 inches of manhole for smaller pipe sizes. A second flexible joint should be provided within 4 feet of the manhole.

(C) Where cover from top of pipe to finished grade is less than 36 inches, special design and/or construction requirements should be considered including, but not limited to, raising finish grade, increasing class of pipe and/or pipe bedding, use of ductile iron, concrete encasement and restriction of construction equipment from travel over partially backfilled trench.

(e) Ability to Pass Solids:

Sewer systems shall be free of depressions, sharp edges, roughness, side sewer projections, obstructions, restrictions, displaced "0" rings, etc., which can cause solids to accumulate or deposit.

(e) Ability to Pass Solids:

(A) New sewers should be thoroughly flushed and visually inspected for accumulated debris prior to use.

(B) Building sewer connections should be made with fittings which prevent any projection into the main sewer. The main sewer should not be cracked, crushed, or otherwise damaged in making taps. All taps should be watertight.

(C) A tolerance for vertical deviation from true grade line should be plus or minus 0.02 feet. Depressions for solids deposition should be avoided. Similarly, the horizontal tolerance for deviation from line should be plus or minus 3/8 inch.

(D) Drop manhole piping should be easily maintained, self cleaning or able to "overflow" into the manhole. Pressure sewer piping connections, flow measuring devices, etc., in manholes should be designed to not obstruct flow.

(E) Flow channels in manholes should slope at least 0.1 feet from inlet to outlet.

(f) Durability:

(A) The materials and details of construction shall provide an inplace sewerage system which will resist corrosion of the pipe and manhole materials caused by any source or condition. Any corrosive effect shall be consistent with the design life of the sewer.

(B) Resistance to erosion of surfaces by grit, high velocity flow, etc., shall be addressed if appropriate.

(C) Temperature effect upon thermoplastic materials shall be appropriate.

(f) Durability:

(A) Sewers should be constructed of materials resistant to or protected from biological degradation, acid and alkaline solutions, normal sewer temperature variations, abrasion and industrial wastes (where applicable), or other harmful service conditions which may exist in the sewerage system.

The owner should have a user ordinance which restricts discharge of harmful substances into the sewerage system.

(B) Velocities over 15 feet per second in sewers should have special consideration for erosion control.

(g) Stability:

(A) Line and Grade: Horizontal alignment and vertical grade of inplace sewers upon construction completion and construction acceptance shall be relatively stable.

Design considerations, construction specifications, inspections, etc., shall preclude pipe settlement, shifting, or flotation such that capacity, watertightness structural integrity, ability to pass solids, maintainability, etc., are not compromised either at construction or any later time.

(B) Diameter: Rigid, flexible and

(g) Stability:

(A) Appropriate foundation stabilization or soils should be employed in unstable soils. Back fill should be in small lifts and compacted uniformly to specified density along and around the pipe.

(B) The Soil Class and density for bedding and pipe zone materials should be carefully selected and then compacted in the field to the required in-place density.

PVC and ABS composite sewer pipe should be deflection tested upon construction completion prior to acceptance with an approved nine blade go-no-go gauge. Initial deflection at construction completion should be no more than the following:

semiflexible pipes tend to lose minimum inside diameter if not designed and/or installed properly. Design considerations, construction specifications, field inspections, etc., shall preclude diameter loss such that capacity, watertightness, structural integrity, ability to pass solids, maintainability, etc., are not compromised either at construction or any later time.

(i) PVC (ASTM D-3034) sewer pipe should deflect no more than 4 to 5 percent based upon inside base diameters of 7.76, 9.71, 11.56 and 14.14 inches for 8, 10, 12, and 15 inch nominal pipe respectively.

(ii) ABS (ASTM D-2680) composite sewer pipe should deflect no more than 2 to 3 percent based upon inside average diameters of 7.75, 9.75, 11.75 and 14.75 inches for 8, 10, 12, and 15 inch nominal pipe respectively.

(C) Sewers on slopes over 25 percent should be evaluated for slippage or pipe bedding depending upon soil type, groundwater presence, construction conditions, etc. Appropriate anchors should be provided if necessary.

(h) Operation, Maintenance, and Safety:

Sewer systems require periodic and unscheduled maintenance for sustained operation. Designs shall conform to requirements of the sewage works owner for manhole construction, spacing, size, details and easements. All parts of the sewerage system shall be readily accessible. The minimum inside bottom diameter of manholes shall be 42 inches.

(h) Operation, Maintenance. and Safety:

(A) Access to the sewer by the sewer owner is essential to perform maintenance tasks. Easements should be granted along the sewer line to the system owner for any sewer for emergency repairs. Manholes and cleanouts are necessary for routine access. Structures should not be located over sewers.

(B) Owners should review own procedures, equipment, construction standards, etc., for sewer maintenance. Requirements of the owner should be obtained by designers upon start of sewer design since the owner must assume all future maintenance. Stricter standards of the owner should prevail if in conflict with these guidelines.

(C) General Manhole/Cleanout Standards for Sewers:

(i) The minimum inside bottom diameter should be no less than 48 inches. The least inside dimension may be reduced 38 inches where an integral

inside drop is acceptable to the owner. No more than one inside drop should be installed in a manhole.

(ii) Minimum cover opening diameter should be 22 inches.

(iii) Manholes should be located at:

(I) Every change in grade or alignment of sewer.

(II) Every point of change in size or elevation of sewer.

(III) Each intersection or junction of sewers.

(IV) Upper end of a lateral sewer.

(V) At intervals of 500 feet or less except for 24 inch and larger sewers.

(iv) Cleanouts should not be substituted for manholes except at the upper end of lateral sewers 250 feet or less in length.

(v) Channel width and depth should be equal pipe diameter. Manhole base ledges should be sloped to drain at least I in 12.

(vi) Access to manholes may be by portable ladder. Manhole rungs and in-place ladders which are subject to considerable corrosion and sliming are not recommended.

(vii) Where free fall of sewage into a manhole exceeds 24 inches from inlet pipe invert to manhole invert, an approved drop manhole should be used.

(D) Inverted Siphons:

Inverted siphons should include at least two pipe lines of such size and hydraulic gradient as to maintain a velocity of at least 3 feet per second in one pipe under conditions of average dry weather flow. Control manholes must be provided at both ends of the inverted siphon line. The inlet and outlet details shall be so arranged that the normal flow is diverted to either barrel so that the other barrel may be removed from service for maintenance.

(i) Separation of Water and Sewer Lines:

Protection of the water supply, be it distribution system, production facilities or source is not only prudent but mandatory and absolutely necessary.

Sanitary sewers and appurtenances thereto shall not physically connect to a public or private potable water supply system so as to permit the passage of any sewage or polluted water into the potable supply.

Sewer construction shall not disturb, degrade, or decrease the watertightness of any existing water supply line.

(i) Separation of Water and Sewer Lines:

(A) Parallel Water and Sewer Lines:

(i) Sewer lines should conform to Figure A-1.

(ii) Common trench construction for water and sewer should be avoided where practical. Where used, the minimum pipe separations of Figure A-1 should be maintained.

(B) Vertical Separation at Crossings of Water and Sewer Lines:

No special precautions should be necessary where top of sewer line is at least 1.5 feet below bottom of waterline and adequate structural protection for each line is provided.

(C) Exceptions: Use of Pressure Pipe Material for Sewer Line:

(i) Where the above horizontal or vertical separations cannot be maintained, the following pressure pipe materials should be used in addition to whatever waterline improvements or reconstruction that may be advisable or required for protection of water. The use of these pressure pipe materials from manhole-to-manhole is encouraged to avoid discontinuity

of materials.

(I) Ductile iron pipe, class 50, ANSI Standard A21.51 (AWWA C- 15 1) with either Push-on or mechanical rubber gasket joints in accordance with ANSI Standard A21. 11 (AWWA-C I 11).

(II) PVC pressure pipe, ASTM D-2241, SDR 32.5, (125 psi) with rubber-gasket joint in accordance with UNI-Bell Plastic Pipe Association recommended Standard Specification UNI-B-1 for a pressure-joint assembly.

(III) Asbestos-Cement pressure pipe, class 100, ASTMC-296 (AWWA C-400) with rubberring gaskets in accordance with ASTM D-1869

(IV) High density polyethylene pipe (Driscopipe 1000) PE 3406, minimum SDR 32.5, with butt fused joints.

(V) Other materials approved by the State Health Division.

(ii) At crossings requiring pressure pipe materials, the following should apply with one standard length of special pressure pipe centered over the waterline in all cases:

| Pipe Material | Standard Pipe Length | Minimum Laying Length Each Side of Waterline Crossing |
|---|---|---|
| Ductile Iron | 18 Feet | 18 Feet |
| PVC | 20 Feet | 20 Feet |
| Asbestos-Cement | 13 Feet | 19 Feet |
| High-Density Polyethylene | 38 Feet | 19 Feet |

(D) Soil Restoration at Crossings:

Soil removed in sewer line trench construction at waterline crossings where sewer crosses over water should be replaced in all areas to as near natural densities as possible through mechanical compaction to restore any natural resistance to groundwater movement which did exist prior to construction. Soil should include no rock fragments over 1-1/2 inch in the pipe zone.

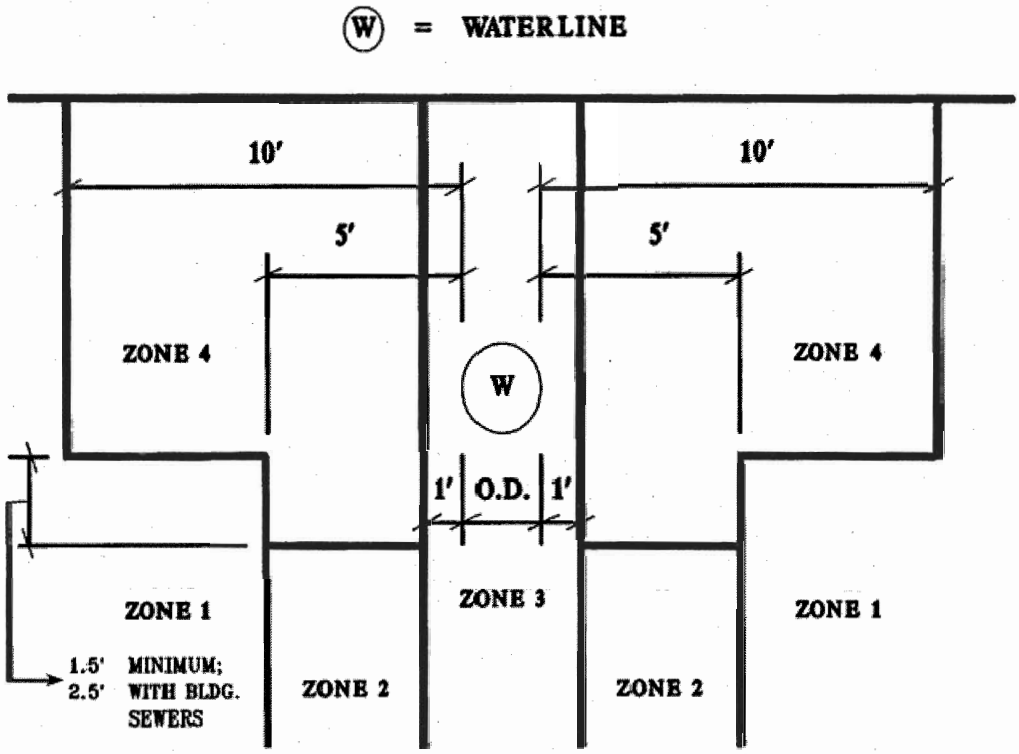
(E) Well Protection:

No sewer pipe should be laid less than 50 feet from any well without specific Health Division approval. Pressure pipe materials should be used to protect wells where minimum setbacks are not obtainable or where additional protection is required as determined by the State Health Division.

(F) Pipe Testing:

Whenever a pressure pipe material is used for any of the above purposes of separation, an appropriate pressure test should be conducted on the pressure pipe to confirm watertightness. Test pressures should be no less than 15 psig where use will be for a gravity sewer and higher where use will be for a pressure sewer (force main).

(G) Other Exceptions should be resolved jointly with the water purveyor and the State Health Division.




**SEWER LINE ZONES**

**ZONE 1** SEWER LINE CAN BE LAID IN THIS AREA WITH NO SPECIAL REQUIREMENTS OF EITHER CONSTRUCTION OR MATERIALS.

**ZONE 2** INSTALLING A SEWER LINE IN THIS ZONE IS NOT ADVISABLE AND MUST BE JUSTIFIED IN EACH CASE. WATER LINE SHOULD BE LOCATED ON A BENCH OF UNDISTURBED EARTH WHEN CONSTRUCTED CONCURRENTLY IN A COMMON TRENCH WITH SEWER LINE.

**ZONE 3** INSTALLING A SEWER MAIN DIRECTLY OVER A WATER MAIN OR DIRECTLY UNDER A WATER MAIN IN THIS ZONE IS PROHIBITED SINCE TAPPING AND O. & M. OF EACH LINE WOULD BE IMPAIRED.

**ZONE 4** SEWER LINE CONSTRUCTION IN THIS ZONE WOULD GENERALLY NOT BE PERMITTED. EACH INSTALLATION MUST BE JUSTIFIED. IF CONSTRUCTION WAS PERMITTED, PRESSURE PIPE MATERIALS FOR THIS SEWER LINE WOULD BE REQUIRED.

**Effective 9/1/81**

*FIGURE A-1*
**SEPARATION OF PARALLEL WATER-SEWER LINES**